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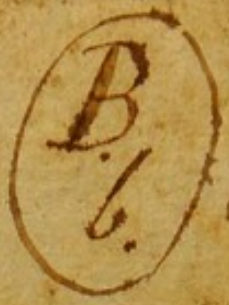

HYGROLOGY,

OR

CHEMICO-PHYSIOLOGICAL DOCTRINE

OF THE

FLUIDS

OF THE

HUMAN BODY,

TRANSLATED FROM THE LATIN OF

J. J. PLENCK OF VIENNA, PROFESSOR OF CHEMISTRY, &c.

BY ROBERT HOOPER,

OF PEMBROKE COLLEGE, OXFORD, M.D. F.L.S. F.L.M.S.

AND HONORARY MEMBER OF SEVERAL SOCIETIES.

Hic hominis ſcelétus chemicus est.

GAUBIUS.

LONDON:

PRINTED FOR T. BOOSEY, No. 4, OLD BROAD-STREET:

W. MUDIE EDINBURGH, AND W. GILBERT, DUBLIN.

1797.

TO THE

CELEBRATED

AND

LEARNED

JOSEPH JAMES PLENCK,

COUNSELLOR TO HIS IMPERIAL MAJESTY;

PUBLIC PROFESSOR OF CHEMISTRY AND BOTANY;

DOCTOR IN SURGERY;

PROFESSOR IN ORDINARY AND PERPETUAL

SECRETARY

TO THE

IMPERIAL MEDICO-CHIRURGICAL ACADEMY OF JOSEPH;

DIRECTOR

OF THE

MILITARY PHARMACOPÆIAS,

AND

SURGEON-GENERAL TO THE ARMY.

THIS TRANSLATION

IS INSCRIBED,

WITH THE UTMOST RESPECT,

BY

R. HOOPER.

PREFACE

BY THE

TRANSLATOR.

THE analyſis of the Human Fluids, according to the laws of modern chemiſtry, has been, for ſome time, a deſideratum in medicine; but until the preſent publication, no writer has exhibited a *complete view* of the ſubject.

The great experience of the learned Author, from his ſituation as Public Profeſſor of Chemiſtry, and the luminous order and perſpicuity which is ſeen in every part of the following Treatiſe, cannot but render it extenſively uſeful in a chemical and phyſiological point of view.

No writer ever poſſeſſed, in an higher degree the ſpirit of analyſis: rich in matter, and conciſe in deſcription, he every where unfolds to his readers, with perſpicuity and order, the nature and qualities of the ſubject on which he treats.

The ſubſequent Work is principally deſigned as a compendium, or text-book, to the more elaborate labours of modern chemiſts, who have, in part only, examined the properties of ſome particular fluids of the body; but it is to be hoped, that it may further excite phyſicians, to elucidate the nature and office of the animal fluids, by this mode of analyſis, and lead to a clearer conception of the Animal Œconomy.

It will alſo ſerve as an uſeful introduction to the general pathology the reſpectable profeſſor promiſes; which is likely to prove of great utility in the practice of medicine.

Though this work, by reaſon of its elementary nature, and ſyſtematic, logical arrangement, is particularly recommended to ſtudents; yet will the experienced phyſiologiſt find many things agreeably recalled to his memory: ſo that with propriety, it may be ſaid of this, as well as of all his other works,

"Indocti discant et meminisse periti."

The motives which induced the author to adopt the new chemical names, in part only, and in part to retain the old, are entirely unknown: for he has not explained himſelf on this head. The tranſlator has adhered to the nomenclature adopted by the author; but in order to render the work more complete, he has ſubjoined at the end, an alphabetical liſt of the old and new terms, in oppoſite columns. By this means, the reader, who is unacquainted with the names applied to ſubſtances by the old chemiſts, will, by reference,

find the modern; and on the other hand, he, who is not familiar with the new terms, will alſo find the old annexed.

All remarks on the contents are here omitted; as it is propoſed on a future occaſion to give ſome obſervations on the chemical analyſis of the Human Fluids, in a diſtinct Treatiſe; when the merits and experiments of the illuſtrious *Plenck* will be more particularly examined.

PREFACE

BY THE

AUTHOR.

CHEMISTRY teaches, that the Fluids conſtitute by far the largeſt part of the human body; and the conſideration of them, with regard to their different offices in the Animal Œconomy, is not a leſs important part of phyſiology, than the doctrine of the ſolids themſelves.

Hence I am of opinion, that it will be of the greateſt utility to eſtabliſh a doctrine, which ſhall *ſpecially* conſider the fluid of every ſolid part; more eſpecially, as the modern analyſis of the Human Fluids, (which deſervedly gains ground over the antiphlogiſtic chemiſts of the preſent times,) unfolds far different and more certain principles than were ever known to the chemiſts

and phyſiologiſts of former ages ; whoſe common error was, that they did not ſufficiently diſtinguiſh between the products of fire and putrefaction, and the ſimple and pre-exiſting principles of the animal fluids ; and that they were ignorant of the laws of vital affinity.

It is to be lamented, that, even in the preſent day, very few of the fluids of our body have been examined on the principles of modern chemiſtry ; when there is the greateſt reaſon to ſuppoſe, that both modern phyſiology, and pathology would receive conſiderable lights and improvements from their application.

This Chemico-Phyſiological attempt in tabellary-compendium, ſhews how far this ſcience has been carried in the healthy ſtate. Should it meet with the approbation of the learned, I ſhall, at a future period, extend my enquiries to the morbid ſtate of the Human Fluids, in a treatiſe on *general Pathology*.

CONSPECTUS.

The Hairy parts. page 27.

By boiling give out—oil and jelly; and leave animal gluten. Experiments, with aerated and volatile alkali, acids and heat.

OF THE FLUIDS IN GENERAL.

Definition—Solid, definition of—Fluidity depends on water—that of water on heat—Quantity of fluids—Division into crude—Sanguineous——Lymphatic—Secreted—Excrementitious.—The Secreted divided into lacteal, aqueous, mucous, albuminous, oleous, and bilious.—From their motion fluids are divided into circulatory—Commorant, and—Stagnant.

FLUIDS COMMON TO THE WHOLE BODY.

Of the BLOOD in general, page 33.

Definition—Quantity—Colour—Heat—Taste—Smell—Specific gravity—Consistence—Spontaneous separation—into Serum—and Cruor—Experiments in vital, mephitic air, and in vacuo—with boiling water, alcohol of wine, vegetable acids, radical vinegar, oxygenated acid of salt, common and concentrated acid of salt, caustic alkali—Spontaneous degeneration—By calcination affords, volatile alkali, empyreumatic oil, cœrulic acid, phosphoric acid.—Products of fire—By distillation emits inflammable and fixed air, and gives out water, empyreumatic oil, ammoniacal spirit, carbone—Proximate principles, animal gas, cruor of the blood, albuminous serum of the blood—The bilescent principle—Use.

FLUIDS PROPER TO EACH PART.

IN THE CAVITY OF THE CRANIUM.

IN THE SPECUS VERTEBRALIS.

IN THE CAVITY OF THE NOSTRILS.

IN THE CAVITY OF THE MOUTH.

IN THE CAVITY OF THE FAUCES.

IN THE EYES.

IN THE CAVITY OF THE MOUTH.

IN THE CAVITY OF THE FAUCES.

IN THE EYES.

IN THE CAVITY OF THE EARS.

IN THE NECK.

IN THE CAVITY OF THE THORAX.

IN THE BREASTS.

IN THE CAVITY OF THE ABDOMEN.

In the PARTS of GENERATION of MEN.

In the PARTS of GENERATION of WOMEN.

FLUIDS CONTAINED IN THE FŒTUS IN UTERO.

FLUIDS IN THE ARTICULATIONS.

FLUIDS IN THE BONES.

FLUIDS IN THE COMMON INTEGUMENTS.

ERRATA.

Page 44 *Line* 8 *for*, thirty-eight times heavier, *read*, a thirty-eighth part heavier.

Page	68	*Line*	15	*for*, least,	*read*, lest.
	70	—	9	sublingular	— sublingual.
	74	—	6	mucpairous	— muciparous.
	83	—	9	remuli	— ramuli.
	114	—	13	phelgm	— phlegm.
	119	—	13	composing	— of.
	125	—	17	wholely	— wholly.
	127	—	13	nauceous	— nauseous.
	130	—	5	tubes	— tabes.
	135	—	9	vitrolic	— vitriolic.
	136	—	11	ebulition	— ebullition.
	147	—	7	appears	— appear.
	232	—	6	Idioeletricity	— Idioelectricity.
	233	—	1	pose	— adipose.
	247	—	2	conspicuosly	— conspicuously.

THE

ELEMENTS

OF THE

HUMAN BODY.

THE minuteſt particles of an animal ſubſtance, which can no further be divided by chemical analyſis, are called its *Elements*.

Yet it is not improbable that theſe very ſimple parts, which we at preſent conſider as elements, will be diſcovered by the induſtry of future times, to be themſelves compounded.

The ELEMENTARY PRINCIPLES of our body hitherto known, are,

1. *Azote*, an element, which combined with hydrogene, conſtitutes *volatile alkali*; with the matter of heat, *azotic air*; with carbone, the *gluten of animal fibres*.

Azote is the primary element of the animal body, for it may be extracted from almoſt every part of the animal, by means of the nitrous acid, this having a greater affinity with the elements than the azote itſelf. The mucus, jelly, membranes, tendons, ligaments, and cartilages, afford it in a *leſs* degree, by means of the nitrous acid. The lymph, ſerum of the blood, the water of hydropic patients, the liquor amnii, and cheeſe give out *more*. The *greateſt quantity* of azote is obtained from the coagulable lymph of the blood, and from muſcle. The fleſh of young animals contains leſs than that of old; and it is in greater quantity in ſarcophagous* than in the fleſh of phytophagous† animals and fiſh.

It is not probable that the azote is produced by the decompoſition of the nitre; for after having performed the ſeparation, it is capable of ſaturating the ſame quantity of ſalt of tartar as before.

* Which live on animal food.

† Living on vegetables.

2. *The matter of heat*, which enters into the compoſition of both ſolids and fluids, and which in a ſeparate form conſtitutes the animal heat.

3. *The matter of light*, which in its free ſtate produces viſion; and when compounded enters as an element into the compoſition of oil and all other inflammable parts. The eyes of animals, which ſhine in the night time, owe this property to the matter of light.

4. *The electric matter*, which enters into all bodies, and affords the phenomena of animal electricity.

5. *Oxygene*, which in combination with the matter of heat conſtitutes *vital air*; with hydrogene, forms *water*; with aceſcent baſes, the *acid ſalts* of our fluids.

6. *Hydrogene*, which combined with oxygen forms *water*; with azote *volatile alkali*; with the matter of heat *inflammable air*, which is emitted from the large inteſtines; and with carbone *animal gas*: and, laſtly, combined with carbone and the ſebacic acid, conſtitutes the *oil of the adipoſe membrane*.

7. *Carbone*, which in combination with hydrogene, and the ſebacic acid, conſtitutes *the oil* of the adipoſe membrane; with hydrogene alone, *animal gas;* with azote, *animal gluten.*

8. *Sulphur*, which combined with inflammable air, conſtitutes *hepatic air;* exhaled from muſcular fibres, hair, incubated eggs, animal gluten; and, according to Lavoiſier, human excrement.

9. *Phoſphorus*, which, with oxygene, forms the *phoſphoric acid;* and with inflammable air, *phoſphoric air.* The lucid ſweat of ſome men, the phoſphoreſcence or light given out by the putrefying bodies of ſome animals, and the phoſphorus, obtained from cheeſe and human bones, ſufficiently ſhew that phoſphorus conſtitutes an element of our body.

10. *Soda*, or the fixed mineral alkali.

11. *Potaſh*, or the fixed vegetable alkali. Each of theſe is found in ſeveral of the fluids, as will hereafter be ſeen.

12. *An Earthy element.* Of the earths no kind is ſo frequently detected as the *calcareous*, which is found in the bones and other parts.

13. *A metallic element.* Of ſo great a number of metals, iron and manganeſe alone are found in an organized body, whether animal or vegetable. Iron is in greater quantity in the fleſh than in the bones; but in the greateſt proportion in the cruor or red part of the blood.

14. *An odorous principle*, perceptible in all the animal fluids; but of a peculiar kind in the human urine and excrements.

15. *The nervous fluid*, contained in the nerves, and which appears to be an element *ſui generis*; diſtinct from all known fluids, and not to be collected by art.

16. *The vital principle.* In all the ſolid and fluid parts of a living body, there exiſts an element with properties peculiar to itſelf, which conſtitutes life; hence it is juſtly called *vital.* This principle induces a mode of union in the other elements, widely differing from that which

ariſes from the common laws of *chemical affinity*. By the aid of this principle, nature produces the animal fluids, as blood, bile, ſemen, and the reſt; which can never be produced by the art of chemiſtry.

But if, in conſequence of death, the laws of *vital attraction* or *affinity* ceaſe to operate, then the elements, recovering their former properties, become again obedient to the common laws of *chemical affinity*, and enter into new combinations, from which new principles, or the *products of putrefaction* are produced. Thus the hydrogene, combining itſelf with the azote, forms *volatile alkali*; and the carbonated hydrogene, with the azote, *putrid air*; into which the whole body is converted.

It alſo appears from hence, why organized bodies alone, namely, animal and vegetable, are ſubject to putridity; to which inorganic or mineral ſubſtances are, in no degree, liable; the latter not being compounded according to the laws of vital affinity, but only according to thoſe of chemical affinity. For the fatiſcenſe or reſolution of the pyrites or ferrum ſulphura-

tum in the atmoſpheric air, is not putrefaction, but only the oxygene, furniſhed by the air, combining with the ſulphur, and forming ſulphuric acid.

FIRE, as well as putridity, ſeparates the conſtituent principles of animal bodies into their elements; but theſe, by a peculiar law, under the action of fire, again combine in a different manner, and form peculiar conſtituent principles, called, *the products of fire*. Thus the hydrogene, combining with azote, is changed into *volatile alkali*; but, with a large proportion of carbone, it forms *empyreumatic oil*, as hereafter will be explained.

From what has hitherto been ſaid, it will alſo appear, that the true conſtituent principles of an animal body cannot be detected, either by *putrefaction* or the action of *fire*; for by theſe means, we only diſcover the elements of thoſe principles. Thus, whenever volatile alkali is found to be generated, azote and hydrogene may be ſuppoſed to have been preſent in the natural ſtate of the animal ſubſtance; and when empyreumatic oil is obtained, it may be con-

cluded it is furniſhed by the hydrogene and carbone of the animal part.

THE CONSTITUENT PRINCIPLES OF THE BODY.

THE minuteſt particles, compoſed of two or more elements, which may again be decompoſed by the action of fire or putridity, are called the *conſtituent principles* of the human body. To this head are referred,

1. *The Water,* which conſtitutes the greateſt part of the humours, and is the vehicle of the other principles.

2. *The Animal gas,* which conſiſts of carbonated hydrogene, and is found not only in the blood, but in all the other fluids.

3. *The Inflammable gas,* emitted from the large inteſtines, *in flatu.*

4. *The Animal gluten,* which conſiſts of carbone, and azote, and forms the fibres of the ſolid

parts; the caſeous portion of the milk; and the cruor of the blood.

5. *The Albumen*, preſent in the ſerum of the blood.

6. *The Jelly*, found in the ſerum of the blood; lymph of the lymphatic veſſels, and other fluids; and in the interſtices of all the fibres.

7. *The Cruor*, which is the animal gluten impregnated with oxydated iron.

8. *The Mucus*, which lubricates the primæ viæ; the aerial ſurfaces of the lungs; the parts of generation, and the urinary paſſages.

9. *The Animal oil*, which fills the cells of the adipoſe membrane.

10. *The Reſin*, found in the bile.

11. *The Sebacic acid*, which is preſent in animal oil.

12. *The Phoſphoric acid,* which enters into the compoſition of the animal earth of the bones, and the phoſphorated ſalts of the urine.

13. *The Lactic acid,* in the ſugar of the ſerum of the milk.

14. *The Sugar,* latent in the ſerum of the milk.

15. *The Animal earth,* which is a phoſphorated calx, and not only forms the greateſt part of the bones, but alſo is found in the fibres of the ſoft parts and in all the fluids.

16. *Phoſphorated volatile alkali,* and

17. *Phoſphorated ſoda,* both of which are detected in the urine.

18. *The Culinary ſalt,* obtained from the urine, gaſtric juice, ſemen, and other humours.

The ANALYSIS of the fluids and parts of animal bodies is beſt performed.

1. *Via humida*, or *by humid diſtillation.* For this method developes the conſtituent principles only, and does not decompoſe like dry diſtillation; hence *no* new *products* are given out.

2. *By Chemical criteria*, the nature of which we are well acquainted with.

But the WORST method of analyſis is by *Ignis ſiccus*, or *Fire*; for by this means the *products of the fire* are alſo extracted. In this manner ariſe,

1. *Volatile alkali*, if hydrogene be combined with azote.

2. *Empyreumatic oil*, if hydrogene be united with a great portion of carbone.

3. *Inflammable air*, if hydrogene be in combination with a great portion of the matter of heat.

4. *Fixed air*, if carbone be united with the oxygene of the atmoſphere.

5. *Water*, if hydrogene be in combination with oxygene.

6. *Phoſphoric air*, if phoſphorus unite itſelf with inflammable air.

In this manner the *ſpirituous* fermentation of *milk* produces the *vinum lactis*, (which contains alcohol of wine) and its acid fermentation, the *acid* of milk.

THE PRINCIPLES OF THE SOLID PARTS.

THE PRIMARY principles of the ſolid parts are threefold.

1. *Animal jelly*.

2. *Animal gluten of the fibres*, and

3. *Animal earth*.

For all the animal parts, both hard and ſoft, when boiled for ſome time render the water *gelati-*

nous, leaving a *fibrous maſs*, which perfectly agrees with the fibrous gluten of the cruor and the cheeſe of the milk, and is called the *animal gluten of the fibres*.

This fibrous ſubſtance burnt in the naked fire goes into *carbone*, which if properly incinerated leaves a *phoſphorated calx*, called *terra animalis* or *animal earth*.

THE ANIMAL JELLY.

A Plaſtic juice, ſoluble in water, filling up the interſtices of all the fibres in the ſoft and hard parts.

For it may be extracted by boiling, not only from the horns, bones, and cartilages; but alſo from the fleſh, tendons, ligaments, the ſkin, membranes, veſſels, nerves, glands, and from all the viſcera.

It is alſo found in the *ſerum of the blood*, *the lymph of the lymphatic veſſels*, and other humours not excrementitious.

Animal jelly in a fluid form is called *juſculum* or *broth*, in its dry form *colla* or *glue*, and *Ichtyocolla* or *Iſinglaſs*, when prepared from the air bladders of the larger fiſh.

The PROPERTIES of animal jelly are,

SMELL: None. TASTE: Soft and inſipid. COLOUR: Whitiſh.

CONSISTENCE: If in a ſemifluid ſtate it be expoſed to the cold, a plaſtic, thick, tremulous, tranſparent maſs is formed.

It is totally ſoluble in *water*, and in *acids*, but not in *alcohol of wine*.

It is ſomewhat inſpiſſated by *acids*, nevertheleſs remains mixed with water.

It is diſſolved by the *cauſtic alkali*, but at the ſame time is decompoſed, and gives out a great quantity of volatile alkali.

It is not coagulated by the *heat of boiling water* like the albumen of the ſerum ; nor is it inflammable in the *fire*.

It does not combine in the ſame manner as oil, with *oils* and *reſins*.

GLUE, or dry jelly, very much attracts the water from the atmoſphere and becomes moiſt, as tables joined together with glue ſufficiently ſhew in moiſt weather.

SPONTANEOUS DEGENERATION : If ſoup or jelly be expoſed to the atmoſphere in the ſummer time, it ſomewhat aceſces by reaſon of the ſaccharine principle it contains, then begins to ſmell fœtid, and at length putrefies.

THE CONSTITUENT PRINCIPLES appear to be,

1. *Water*. From twenty ounces of jelly, eighteen of inſipid water ſoon putrefying are obtained by diſtillation.

2. *Sugar*. For dried jelly boiled with two parts of nitrous acid gives out the ſaccharine and mallic acid.

3. *Gelatinous gluten.* For mixed with acid of nitre a great quantity of azote is diſengaged, and glue by dry diſtillation affords the *igneous products* of animal gluten; namely, volatile alkali and empyreumatic oil, and leaves animal carbone, or that which conſiſts of animal earth and carbone.

4. *Culinary ſalt, and phoſphorated calx.* For carbone by incineration leaves theſe two principles.

Utility: This jelly conſtitutes the *nutritious juice* of the whole body. Thus it is carried by the moſt minute arteries to all the ſoft and hard parts of the body with the blood, and is depoſited in the interſtices of the fibres, which conſtitute the parenchyma proper to any part. It is alſo carried impregnated with the animal earth to the bones.

The circulation of this *nutritious jelly* is ſlow but conſtant, as the red bones of animals, who feed upon madder ſhew; for if the eating of the madder be omitted, the redneſs very gradually leaves them.

THE ANIMAL GLUTEN OF THE FIBRES.

A Plaſtic juice, inſoluble in water, which conſtitutes the baſis of the fibres of all the ſolid parts.

For if jelly be extracted from any ſoft part by boiling water, there will nevertheleſs remain a plaſtic, fibrous, white, tenaceous maſs.

Even the very bones, after long maceration in acids, diſmiſs their animal earth and form a ſoft fibrous maſs.

The PROPERTIES of this gluten are,

SMELL and TASTE: None. COLOUR: White. CONSISTENCE: Plaſtic and fibrous.

This maſs dried in the *air* is changed into *an horny* ſubſtance, which during combuſtion grows black and diffuſes the fœtor of burnt hartſhorn.

But MOISTENED and left to itſelf, it ſoon *putrefies*.

It is neither ſoluble in *water*, *oil*, nor *alcohol of wine*; but is ſoluble in *cauſtic alkali* and *mineral acor*.

THE ELEMENTARY PRINCIPLES of this gluten appear to be,

1. *A ſmall portion of water*: For this is given out in diſtillation.

2. *Carbone*: For it becomes black by burning.

3. *Azote*: For boiled with the acid of nitre, it eructates a great quantity of azotic gas.

4. *A ſmall quantity of animal earth*, or phoſphorated calx.

Therefore the animal gluten of the fibres, in a great meaſure agrees in its properties and elementary principles with the *fibrous gluten of the cruor*, the *albuminous* part of the egg, *ſerum* of the blood and lymph, with the *caſeous* part of the *milk*, and the *glutinous* part of *farina*.

USE: From this animal gluten of the fibres all the ſoft parts of our body are formed. Thus the albuminous ſerum exuding from the inflamed ſurface of the lungs is changed into a true and organic cellular membrane, by which the lungs concrete with the pleura.

THE ANIMAL EARTH.

CALCAREOUS earth impregnated with the acid of phoſphorus but not ſaturated, conſtitutes the baſis of the bony fibres.

This is that earth, which remains after the complete putrefaction of the human body; as many examples of human bodies, which have mouldered into duſt, and have been found in the catacombs of the Romans, prove.

But this ſame earth may alſo be obtained from the aſhes of all the ſoft parts, and from all the fluids.

Animal carbone, on account of this phoſphoric calx, is with difficulty incinerated.

QUANTITY: The bones of a fœtus contain a third part of animal earth; thoſe of an adult man, one half; and thoſe of old men, more than one half. But the ſoft parts ſcarcely contain an hundredth part.

It has no SMELL or TASTE: Is not ſoluble in *water*; with the *ſpirit of ſalt*, it unites as it were into a jelly: It is changed by the *acid of vitriol* into gypſum: It is ſlowly diſſolved by the *acid of nitre*: In the *fire* it does not go into a quick lime, with difficulty *vitrifies*, but at length is changed into an opake lacteal glaſs.

The UTILITY of animal earth is, to give a requiſite degree of ſolidity to the ſolids, and hardneſs to the bones.

THE SOFT WHITE PARTS.

THE ſkin, cellular membrane of the whole body, membranes of all the viſcera, ligaments, tendons, veſſels, nerves, and glands, boiled for a long time in water, form *animal jelly* and *fibrous animal gluten*.

THE SOFT RED PARTS.

THE ſubſtance of a RED MUSCLE is very compound. For it conſiſts,

1. *Of adipoſe membrane,* which contains the oil of animal fat.

2. *Of vaſcular ſubſtance,* the blood of which gives redneſs to the muſcle. Thus a muſcle waſhed for a long time becomes pale, and imparts its redneſs to the water.

3. *Of nerves and lymphatic veſſels,* which run through the ſubſtance of the muſcle.

4. *Of an irritable fibrous ſubſtance,* which conſtitutes the *Fleſh* of the muſcle.

The CONSTITUENT PRINCIPLES of theſe four parts are ſeparated from each other in the following manner:

1. *The red fleſh* is to be waſhed with cold water, until all the redneſs diſappear. The *reddened*

water evaporated by gentle heat, leaves an *albuminous gluten*, and a portion of the *ſalt* contained in the ſerum of the blood.

2. *The fleſh that remains after waſhing* is to be ſteeped for ſome time in alcohol of wine; by which the *extractive principle of the fleſh* and the remaining portion of the *ſalt* is extracted.

3. The fleſh that ſtill remains is to be *well boiled* in water. In this way *the animal jelly* and the *oil of the fat* is obtained from muſcle.

4. The fleſh which remains after boiling is a *fibrous*, white, inſipid, inodorous *maſs*; irreſoluble in water, contracting very much in the fire, and ſoon putrefying. Hence it bears a great ſimilitude to the fibrous gluten of the cruor, which, is therefore not improperly called *caro fluida*.

5. All animal fleſh boiled with *the acid of nitre* gives out a great quantity of *azotic gas*, and by dry diſtillation leaves *carbone*, very difficult to incinerate. Hence the elements of the fleſhy fibres are the animal gluten of the fibres.

Thus the ſubſtance of a muſcle is very compound; for it conſiſts of,

1. *Animal jelly.*

2. *Oil of animal fat.*

3. *The albumen of the ſerum of the blood.*

4. *The fibrous gluten of the cruor.*

5. *The extractive principle,* proper to fleſh.

This *extractive principle of the fleſh* as yet has not been ſatisfactorily explored by chemiſts.

By evaporation, it gives out, an agreeable, almoſt aromatic SMELL. Its TASTE is bitteriſh, and rather acrid. It is ſoluble in *water* and *alcohol of wine.*

The SALT contained in this extract appears to be the *ſoda phoſphorata* and *calx phoſphorata.* Does it not alſo contain *ſugar?* For the brown cruſt of roaſted meat diffuſes an agreeable ſmell almoſt like that of burnt ſugar.

The BOILING OF FLESH in water affords the following *analyſis*.

1. *Spuma*, or *froth* on the ſurface of the water; it ariſes from the *albuminous gluten* of the ſerum of the blood, and is removed with a ſkimmer.

2. *Oily particles*, which ſwim upon the ſurface of the broth, and are extracted from the adipoſe membrane of the muſcle.

3. *Jelly of fleſh*, which mixes with the boiling water and remains in a fluid ſtate by heat; but in cooling, the fat is ſeparated in the form of a ſolid cruſt, on the ſurface of the broth.

4. *Extractive matter*, which is the proper juice of the fleſh, and gives colour, ſmell, and taſte to the broth. It alſo forms a brown cruſt on the ſurface of roaſted meat, which gives to it the agreeable taſte and ſmell of burnt ſugar.

5. *Fibrous matter* of meat when perfectly boiled, which is without ſmell, taſte, or colour.

Therefore the muſcular fibre appears to conſiſt of *fibrous gluten* and *extractive matter*.

THE ADIPOSE PARTS.

THE ADIPOSE MEMBRANE is compoſed of the tela celluloſa, which contains animal oil.

The MEDULLA OF THE BONES is ſimilar to the adipoſe membrane.

THE OSSEOUS OR BONY PARTS.

THE BONES conſiſt of a fourfold principle.

1. *Animal Jelly.*

2. *Medullary oil:* For freſh bones boiled long in water form a *gelatinous* and *fat broth*.

3. *Animal earth*, which is *phoſphorated* calx, and conſtitutes the great volume or bulk of the bone.

4. *Fibrous animal gluten,* which affords the matrix of the animal earth,

Bones, macerated for a long time in *vinegar* or *acid of nitre* very much diluted, diſmiſs all their earth, and become ſo ſoft as to be bent without breaking.

Calcined in the naked fire, they become *black* from the remaining carbonic principle of the medullary oil and animal gluten, the hydrogene and azote of which fly off in the form of inflammable, azotic air, empyreumatic oil, and volatile alkali. But all theſe are the *products of fire.*

A great portion of *phoſphoric acid* is ſeparated from bones calcined almoſt to whiteneſs, by pouring on them the ſulphuric acid.

The *animal earth of bones* therefore conſiſts of calcareous earth and phoſphoric acid.

A ſmall quantity alſo of ſalt of ſoda and gypſum may be obtained by means of cold water, from bones calcined to blackneſs.

THE CARTILAGINOUS PARTS.

CARTILAGES and *human nails* boiled in water, give out jelly and a ſmall portion of animal oil.

The remaining part is not earthy but fibrous, and conſiſts of much animal gluten, and a little phoſphorated calx.

THE HAIRY PARTS.

HUMAN HAIRS boiled in water, give out a ſmall portion of *oil* and *jelly*. The remaining part is fibrous and conſiſts of *animal gluten*.

They are not ſoluble by aerated, but are by the cauſtic, alkali. They are alſo diſſolved in *acids* through the medium of heat. The acid ſolution by means of water is again decompoſed into white flakes.

The human hairs are indurated and rendered criſp by *heat*. And as the jelly of hairs readily

attracts water from the atmoſphere, the human hair boiled with ſoda is uſually employed for an hygrometer.

OF THE

HUMOURS

IN

GENERAL.

THE fluid parts of our body are called *Humours*.

A *fluid* is that body, the conſtituent principles of which ſo little attract each other, that when poured out, it drops guttatim, and adapts itſelf in every reſpect, to the form of the veſſel containing it.

A SOLID is that body, whoſe conſtituent principles are connected together, ſo as not to give way or recede from each other by motion, or preſſure.

The FLUIDITY of our humours depends upon the quantity of *water* they *contain*, and that of the water, upon the quantity of the matter of heat. If cold air abſorb the matter of heat in the fluid water, then the aqueous particles attract themſelves into a ſolid *ice*. If the matter of heat be reſtored by warm water, it again becomes *fluid*; and if to this fluid you add too much matter of heat by boiling, then the water by its repulſive power is expanded into *elaſtic vapour*.

QUANTITY OF THE FLUIDS. The drying of any part demonſtrates, that by far the greateſt part of the human body conſiſts of fluids. Thus the quantity of fluids in a man, of one hundred and ſixty pounds weight, is eſtimated at one hundred and thirty-five pounds. Of theſe twenty eight pounds are blood.

The humours are DIVIDED in reſpect of their *different natures*, into,

1. *Crude*, or thoſe which have not yet entirely put on an animal nature, as chyme, chyle, milk.

2. *Sanguineous*, to this is referred the blood, or the cruor with its ſerum.

3. *Lymphatic*, which are conſtituted by the lymph of the lymphatic veſſels and the nutritious jelly.

4. *Secreted*, to this head are referred, all thoſe ſeparated from the blood. Theſe are of very different natures.

5. *Excrementitious*, which are eliminated from the body, as the alvine fæces, urine, cutaneous and pulmonary perſpirable matter.

The SECRETED humours are again *ſub-divided* into,

Lacteal, which are white, as chyle, milk, the juice of the proſtate and thymus glands.

Aqueous, as the aqueous humour of the eye.

Mucous, as the mucous of the noſtrils and *primæ viæ*.

Albuminous, as the ſerum of the blood.

Oleous, as the oil of the adipose membrane.

Bilious, as the bile and cerumen of the ears.

From their *motion*, the fluids are divided into,

Circulatory, which continually circulate in the vessels.

Commorant, which circulate with a slow motion; as the oil of the adipose membrane, the nutritious jelly and male semen.

Stagnant, which remain for a certain time in any receptacle, as the cystic bile, urine, and alvine fæces.

HUMOURS

COMMON TO THE

WHOLE BODY.

OF THE BLOOD IN GENERAL.

THE red fluid, which circulates in the cavities of the heart, arteries, and veins, is called the *blood*.

The QUANTITY is eſtimated to be about twenty-eight pounds in an adult. Of this, four parts are contained in the *veins*, and a fifth in the *arteries*.

The COLOUR of the blood is red, in the *arteries* it is of a florid hue, in the *veins* darker; except only the pulmonary veſſels, in which it is of a *lighter*

caſt. The colour depends on the red globules of the cruor: For a ſmall portion of the cruor immerſed in water, tinges a great part of it red. Phyſiology demonſtrates that the redneſs of the globules depends on iron oxydated in the lungs. The florid redneſs of the *arterial* blood appears to be from the greater quantity of oxygene; and the blackneſs of the *venal*, from the abundance of carbone.

The HEAT of the blood of a healthy man has been aſcertained to be about ninety-ſix degrees of Fahrenheit's thermometer. The *arterial* blood is warmer than the *venal*.

MAMMALIA and *birds* have their blood *warm*, or of a degree ſuperior to that of the aſmoſphere.

FISH and *amphibious* animals are of *cold* blood, or of a degree which does not exceed the temperature of the air, or of the water in which they ſwim.

INSECTS and *worms* have a *white fluid* inſtead of red blood.

HEAT: It is demonſtrated in phyſiology, that the heat of the blood depends upon the quantity of the matter of heat contained in it.

Its TASTE is ſaltiſh: The SMELL of its halitus or vapour, when recently drawn, is ſomewhat urinous and fatuous.

Its SPECIFIC GRAVITY is greater than that of water; hence it ſinks to the bottom in that fluid.

Its CONSISTENCE is very plaſtic, ſomewhat glutinous and adheſive.

SPONTANEOUS SEPARATION: Blood drawn from a vein and expoſed to the atmoſphere in a veſſel, becomes cold; and having loſt its matter of heat, and hence its animal gas, conſiſts in appearance, of an homogeneous *red jelly;* but this by degrees ſpontaneouſly ſeparates into two parts;

Into *the ſerum of the blood*, a yellow ſomewhat greeniſh fluid: And

Into *the cake, cruor, or craſſamentum*, which reſembles a red maſs, ſwimming like an iſland in the ſerum.

Blood recently drawn, coagulates ſooner incloſed in *vital air*, than in atmoſpheric air; but ſlower if in mephetic air, or in vacuo. Hence the coagulation of the blood by the oxygene of the atmoſphere.

It is coagulated by the *heat of boiling water*, *alcohol of wine*, and by the *concentrated mineral acids*.

It is not changed by the *vegetable acids*, as diſtilled vinegar, &c; but is coagulated by *radical vinegar*.

By the *oxygenated acid of ſalt* it immediately becomes black like ink. By *the common acid of ſalt* it is not changed; by the concentrated, it is coagulated, but never becomes black.

It is diſſolved by the *fixed cauſtic alkali*, but not by the volatile.

SPONTANEOUS DEGENERATION: In the temperature of the atmoſphere, it *putrefies* in a few days, and generates a conſiderable quantity of volatile alkali: but by a gentle heat it dries into a hard, black maſs, called *extract of blood*. This deliqueſces in humid air, and with the mineral alkali, effloreſces.

During the calcination of blood in an *open crucible*, there is given off, firſt, *volatile alkali*, and an *empyreumatic oil*. After this the *cærulic acid* is evolved; and at length phoſphorus becomes oxydated with a red flame, and produces the phoſphoric acid, which flies off in the form of gas. The ſoda alſo is rendered volatile, and the iron deoxydated.

PRODUCTS OF THE FIRE: Blood diſtilled by itſelf ſwells very much during the operation; emits a conſiderable quantity of *inflammable* and *fixed air*, and gives out,

1. *Inſipid water*, which very ſoon becomes putrid.

2 *Empyreumatic oil,* produced from the hydrogene and carbone of the fibrous and albuminous gluten.

3. *Ammoniacal ſpirit,* which conſiſts of an empyreumatic acid, ſuperſaturated with volatile alkali. The volatile alkali is produced from the azote of the fibrous gluten and the hydrogene of decompoſed water.

4. *Carbone,* which remains behind, is very ſpongy, and with great difficulty incinerated. *The aſhes* however conſiſt, of a ſmall portion of culinary ſalt, ſoda, phoſphorated calx, and a ſmall quantity of iron.

The PROXIMATE PRINCIPLES of blood, are,

1. *Animal gas,* or carbonated hydrogene ; which flies off in the form of vapour from recent drawn blood.

2. The *Cruor of the blood,* and,

3. *The Albuminous ſerum of the blood.*

THE BILESCENT PRINCIPLE. If two parts of blood with one of water are coagulated by fire; a liquid ſeparates itſelf from that evaporated, which from its bitter taſte, yellow colour, bilious ſmell, and chemical analyſis, is very like unto cyſtic bile.

USE OF THE BLOOD.

1. If forms a *vital fluid*, which diſtends the cavities of the heart and veſſels, to prevent them from collapſing.

2. It *ſtimulates to contraction* the cavities of the heart and veſſels, by its matter of heat and vital air; by which means the circulation of the blood is performed.

3. It generates within itſelf *animal heat*, which it propagates throughout the body; as will be mentioned in its place.

4. It *nouriſhes* the whole body by means of the jelly of the ſerum.

5. It is that *ſource*, from which, *every ſecretion* of body is ſeparated.

6. It conſtitutes the *temperament of the humours*. Does not the cruorous principle abound in the *ſanguineous ?* The albuminous principle in the *phlegmatic ?* The bileſcent in the *choleric ?* and the carbonic in the *melancholic ?*

THE CRUOR OF THE BLOOD.

THE red maſs concreted into a cake, which ſwims like an iſland in the ſerum of the blood.

QUANTITY: It forms more than one half of the blood.

Its CONSISTENCE is plaſtic, thick, and concreted like glutinous jelly.

SPECIFIC GRAVITY: It is ten times heavier than water, hence it falls to the bottom in the ſerum.

It ſoon putrefies in the *temperature of the air*, but dried by a gentle heat, becomes a brittle dark red maſs.

It is inſoluble in WATER, and when *boiled* in it, is converted into a hard grumous maſs internally red.

The SURFACE OF THE CRUOR, after being expoſed in a veſſel to atmoſpheric air, becomes of a florid red colour; but the inferior ſurface contiguous to the veſſel, is of a deep black. If it be inverted, the ſurface which was before red, becomes black; and the black ſurface, red.

Therefore the oxygene of the atmoſpheric air unites itſelf with the ſurface of the blood; for if the black cruor be expoſed to *vital air*, although incloſed in a bladder, it becomes of a florid red; but in every kind of *mephitic air*, very black.

The cruor of the blood being once ſaturated with the oxygene of vital air, blackens again by degrees; but its florid redneſs never returns, even by a freſh ſaturation.

The PROXIMATE PRINCIPLES of the cruor are,

1. *The red globules*, which conſiſt of fibrous gluten and oxydated iron. The experiments of the *celebrated Rhades* ſhew, that in twenty-five pounds of blood from the human body, nearly two drachms of the oxyd of iron were obtained.

2. *The Fibrous Gluten of the Cruor*, conſiſting of carbone and azote.

For if the cruor of the blood be incloſed in linen, and waſhed for ſome time in cold water, continually preſſing it with the fingers; it yields all its *red* parts to the water, and there is left in the linen a white, fibrous, tenacious maſs, reſembling *fluid fleſh*.

The RED WATER which is waſhed from the *fibrous gluten of the cruor* is very ſmall in quantity, conſiſting of its red pigment, and is called the *red ſerum of the cruor*. Diſtilled to dryneſs, it leaves behind a carbone, exhibiting when incinerated a great quantity of iron attractable by the magnet.

The FIBROUS GLUTEN *of the cruor* is white, inodorous, and inſipid; and neither ſoluble in *water* nor in *alcohol of wine*; but is ſo by *acids*, and the *cauſtic alkali*. It may again be precipitated from an acid ſolution by *aerated alkali*. The fibrous part dried by a gentle heat *curls* and rolls itſelf up like parchment; but being moiſtened with water, and put in moiſt air, it ſoon becomes putrid.

The REDNESS OF THE GLOBULES therefore depends upon oxydated iron, for which purpoſe a very ſmall quantity is ſufficient; for I have ſeen one grain of purple mineral, colour, very red, many pounds of water.

USE OF THE CRUOR.

1. It gives the *red colour* to the blood.

2. By its metallic weight, it *irritates* more readily the heart and veſſels than the lighter particles; and,

3. It promotes *motion* together with the lighter particles of the ſerum.

THE SERUM OF THE BLOOD.

THE lymphatic fluid which ſwims upon the cruor of blood drawn from a vein.

SMELL: Fatuous, ſcarcely any. TASTE: rather ſalt.

COLOUR: Pellucid, and of a yellowiſh green. CONSISTENCE: Plaſtic, or aqueo-viſcid.

SPECIFIC GRAVITY: It is lighter than the cruor by a twelfth part, and thirty eight times heavier than water.

QUANTITY: It forms ſcarcely one half of the blood.

With *cold water* it readily unites itſelf without any alteration; but poured upon *boiling water* it immediately coagulates, and a part becomes white, which is called *the milk of the ſerum of the blood*: if the boiling be continued, or by pouring on alcohol of wine, it is again ſeparated from the water.

The ſerum is coagulated by the *concentrated mineral* and *vegetable acids*, as radical vinegar, and alſo by *alcohol of wine*; and by means of filtration the coagulum can be ſeparated from the water of the ſerum.

Alkaline ſalts appear rather to attenuate it.

The PROXIMATE PRINCIPLES of the ſerum are,

1. *Water.* From forty-ſeven ounces of ſerum, forty-three of inſipid water were yielded by diſtillation, which quickly putrefied.

2. *Albuminous gluten.* Serum ſtirred about with a ſtick, ſeparates a large quantity of gluten, like the white of an egg. By froſt, the water of the ſerum is converted into ice, and the albumen is ſeparated. The ſame thing is done by alcohol, by the mineral acor, and by boiling water.

3. *Jelly.* If equal parts of water and ſerum of the blood be coagulated by fire, that part of the ſerum which is not coagulated, upon being

cooled, puts on the appearance of a tremulous jelly.

4. *Aerated ſoda.* For from recent diluted ſerum, by pouring on mineral acids, a neutral ſalt is obtained; whoſe baſis is the mineral alkali.

5. *Culinary ſalt*, obtained from incinerated carbone along with *aerated ſoda*, and *phoſphorated calx*.

THE ALBUMINOUS PRINCIPLE of the ſerum, by ſome termed *the coagulable lymph*, by others the *albumen*, and by the moderns *albumina*, has the greateſt affinity to the white of an egg.

It has neither TASTE nor SMELL: It always poſſeſſes a white and opake COLOUR: Its CONSISTENCE is firm, and dried by a gentle heat is converted into an *horny* ſubſtance.

It is inſoluble in *water*, but upon being kept in warm water a few days, it *putrefies*, and becomes very fœtid.

It is ſoluble in the *concentrated mineral acids* and by the *cauſtic alkali*. It is precipitated from an acid ſolution by means of water, and from an alkaline ſolution, by means of acid.

The *nitrous acid* turns it yellow, the *vitriolic acor* red, and the *acid of ſalt* to an amethyſtine colour.

The ELEMENTARY PRINCIPLES of the albumen of the ſerum appear to be carbone, azote, and hydrogene.

Upon being boiled with the *acid of nitre*, it emits a quantity of azotic and nitrous gas; and in the reſiduum is found the acid of ſugar and the malic acid. Carbone, volatile alkali, and empyreumatic oil are the *products of fire*. May not the jelly of the ſerum with the oxygene of decompoſed water, produce the malic acid and the acid of ſugar?

USE:

1. The ſerum of the blood is the *vehicle* of the red globules.

2. By its *albumen* it renders the blood plaſtic and viſcidulous; leſt it eſcape from the veſſels by exceſſive tenuity.

3. By its *jelly* it nouriſhes every part of the body; and,

4. It is *that ſource*, from which all the ſecretions are ſeparated.

THE ANIMAL GAS OF THE BLOOD.

AN aeriform elaſtic fluid contained in the blood and all the humours.

Thus a vapour aſcends from blood, eſpecially when it is warm; which received into a glaſs collects on its ſides into drops like dew.

The SMELL of this vapour is ſingular, and nidorous; in carnivorous animals it is ſtronger, and is called *animal*.

Thus the fleſh of a recently killed animal, upon being expoſed to the cold, at leaſt in the

winter ſeaſon, emits for a long time a vapour in the form of ſmoke.

The SUPERFLUOUS animal gas is eliminated by the ſkin and lungs, under the name of *cutaneous* and *pulmonary tranſpiration.* Laſtly, it appears to be contained in every *cavity* of the body: Thus, in the winter time, upon laying open the abdomen, thorax, pericardium, and even the cavity of the cranium, a thick vapour is emitted.

The CONSTITUENT PRINCIPLES of this animal gas are *carbonated hydrogene;* or carbone diſſolved in hydrogene and mixed with a ſmall quantity of aqueous vapour. Thus it puts on the form of vapour, for without the water it would be inviſible gas.

That carbonated hydrogene is exhaled from the blood, the ſhutting up of blood recently drawn, in vital air, demonſtrates: the vital air by this means being converted by the exhaling gas of the blood, into carbonic or fixed air. For the oxygene of the vital air unites

with the carbone of the exhaled gas, and forms fixed air; and the hydrogene of the animal gas combining with the oxygene of vital air, is converted into water. The very ſame metamorphoſe is obſerved in the carbonated hydrogene expired from the lungs, and in that exhaled from the ſkin. Thus the expired air of the lungs precipitates lime water, which is the criterion of fixed air.

Thus the air of a confined chamber, and of that in which there are many perſons, is gradually changed into mere fixed air and azote, in which, life is deſtroyed, from the conſumption of vital air; as was the caſe with the *Engliſh, confined in the black hole,* in the *Eaſt-Indies.*

And thus, alſo, water diſtilled from the fluids and parts of animal bodies is of an inſipid animal odour, and quickly becomes putrid.

It is DECOMPOSED by vital air into carbonic gas and water; but united with azote it appears to conſtitute carbonated hydrogene, or *putrid* alkaleſcent *miaſma.*

The USE of the animal gas in our body, appears to be,

1. As a *vital turgor*, or that which diſtends the veſſels, and every part of a living animal body; by which it differs ſo much from the collapſed ſtate of a dead one.

2. It *reſiſts* the *preſſure* of the ſurrounding *atmoſphere*, for atmoſpheric air preſſes on the human body with a weight equal to two thouſand pounds. Thus animals ſhut up in the exhauſted receiver of an air-pump, or parts on which the dry cupping-glaſs is applied, ſwell enormouſly, from the preſſure of the air being removed.

The reaſon why we do not perceive this weight of the atmoſpheric air, is becauſe the animal gas and matter of heat latent in the body, are in equilibrio with it, and reſiſt its preſſure.

3. The *evolution* and uniform *propagation of animal heat* through the body. For the vital air abſorbed by the lungs, and circulating with the

arterial blood, is decompoſed by the animal gas of the blood: hence the oxygene of the vital air, uniting with the hydrogene of the animal gas, is converted into *water*. Thus the matter of heat of the vital air is every where evolved, and being diſengaged, conſtitutes *animal heat*. The carbone, being tranſmitted to the venous blood, gives it a *black* colour.

4. The animal gas exhaling through the lungs and ſkin, conſtitutes the *cutaneous* and *pulmonary tranſpiration*.

5. It forms the *animal vapour*, found in the cavities of the cranium, thorax, pericardium, abdomen, and the cells of the cellular membrane; by which means the concretion of theſe cavities is prevented.

THE LYMPH OF THE LYMPHATIC VESSELS.

THE liquid contained in the lymphatic veſſels.

SMELL: Fatuous. TASTE: None. COLOUR: Cryſtalline.

SPECIFIC GRAVITY: Greater than water. CONSISTENCE: Thin and ſomewhat plaſtic.

The QUANTITY appears to be very great, as the ſyſtem of the lymphatic veſſels forms no ſmall part of the human body.

Its CONSTITUENT PRINCIPLES appear to be *gelatinous-albuminous water.*

The lymphatic veſſels ABSORB this water, from the tela celluloſa of the whole body, from all the viſcera and cavities of the viſcera; and *convey* it to the thoracic duct, where it is mixed with the chyle.

USE: This lymph returns the ſuperfluous nutritious jelly from every part, and mixes it with the chyle in the thoracic duct, there to be further converted into the nature of the animal: and laſtly, it returns the ſuperfluous aqueous vapour, which is expired into the cavity of the cranium, thorax, and abdomen.

THE VAPOUR OF THE VAGINÆ, OR SHEATHS OF THE NERVES.

THE aqueous vapour contained in the ſheaths, and between the fibrils, of the nerves.

It appears to EXHALE from the arteries which run on the membranes of the nervous ſheaths, and when ſuperfluous, is returned by the abſorbing veſſels.

USE: It moiſtens the nervous fibrils, and prevents their becoming dry.

THE NERVOUS FLUID.

AN extremely ſubtile liquid, contained in the very minute canals which form the medulla of the cerebrum, cerebellum, medulla oblongata, medulla ſpinalis, and nerves.

The SECRETING ORGAN is compoſed of the extremities of the arteries which form the vaſcular cortex of the cerebrum, cerebellum, and medulla ſpinalis.

But the medulla ſpinalis is *internally* vaſcular, and *externally* medullary; that the ſpinal nerves may not have to paſs through the cortical ſubſtance.

The nervous liquid appears to exhale from the extremities of the nerves. The laſſitude and debility of *muſcles* from too great exerciſe, and the dulneſs of the ſenſorial organs from exceſſive uſe, would ſeem to prove this.

It has no SMELL nor TASTE; for the cerebrine medulla is inſipid and inodorous. Nor has it any COLOUR, for the cerebrum and nerves are white.

It is of ſo ſubtile a CONSISTENCE, as never to have been detected.

Its MOBILITY is STUPENDOUS, for in leſs than a moment, with the conſent of the mind, it is conveyed from the cerebrum to the muſcles, like the electric matter.

Whether the nervous fluid be carried, from the organ of ſenſe in the *ſenſorial* nerves to the cerebrum, and from thence in the *motory* nerves to the muſcles; cannot be poſitively affirmed, but may be proved.

The CONSTITUENT PRINCIPLES of this liquid are perfectly unknown, as they cannot be rendered viſible by art, or proved by experiment. Upon making a ligature upon a nerve, the motion of the fluid is interrupted, which proves that ſomething corporeal flows through it. It is there-

fore a weak argument, to deny its exiſtence becauſe we cannot ſee it; for who has ſeen the matter of heat, oxygene, azote, and other elementary bodies, the exiſtence of which no phyſician in the preſent day doubts?

The *electric matter*, whoſe action on the nerves is very great, does not appear to conſtitute the nervous fluid: for nerves exhibit no ſigns of ſpontaneous electricity: nor can it be the *magnetic matter*, as the experiment of *Gavian* with the magnet demonſtrates: nor is it *oxygene*, nor *hydrogene*, nor *azote*; for the firſt very much irritates the nerves, and the other two ſuſpend their action.

I am of opinion that the nervous liquid is an *element* ſui generis,* which exiſts and is produced in the nerves only; hence, like other elements, it is a thing unknown, and only to be known by its effects.

* With properties peculiar to itſelf.

The pulpous ſoftneſs of ſome nerves, and their lax ſituation does not allow them and the brain, to act on the body and the ſoul only by *oſcillation*. Laſtly, a tenſe chord although ligated, oſcillates.

Use of the Nervous Fluid. It appears to be an intermediate ſubſtance between the body and the ſoul, by means of which the latter thinks, perceives, and moves the muſcles ſubſervient to the will. Hence the body acts upon the ſoul, and the ſoul upon the body.

Laſtly, it appears to differ from the *vital principle;* for parts live and are irritable which want nerves, as bones, tendons, plants, and inſects.

HUMOURS

PROPER TO EACH PART.

IN THE

CAVITY OF THE CRANIUM.

THE VAPOUR OF THE VENTRICLES OF THE BRAIN.

THE thin vapour contained in the cavity of the ventricles of the cerebrum.

The SECRETORY ORGAN is conſtituted by the exhaling arteries of the choroid plexus of the ventricles of the cerebrum. The *ſuperfluous* vapour appears to be abſorbed by the oſcula of the lymphatics of the ſame plexus: for lymphatic

veſſels were lately ſeen on the corpora ſtriata of the cerebrum of a cow.

The QUANTITY in a living and healthy body is ſcarce viſible: but in dropſy of the ventricles of the brain, many ounces are collected.

The CONSTITUENT PRINCIPLES appear to be animal gas and water.

USE:

1. It impedes the *concretion* of the ventricles of the cerebrum.

2. It penetrates between the fibres of the cerebrine medulla, and thus preſerves it *ſoft* and *moiſt*.

THE VAPOUR OF THE CAVITY OF THE CRANIUM.

THE thin vapour contained in the cavity of the cranium, between the pia and dura mater.

The SECRETORY ORGAN is formed by the exhaling veſſels of the pia and dura mater. The *ſuperfluous* vapour appears to be abſorbed by the oſcula of lymphatic veſſels, the preſence of which the *Bachonian* glands of the dura mater prove.

The QUANTITY in the ſound and living body is inviſible, but in hydrocephalus internus immenſe.

Its QUALITY is the ſame as the vapour of the ventricles of the brain.

USE: It prevents the *concretion* of the pia mater and cerebrum with the dura mater, and preſerves the cortex of the cerebrum *moiſt* and *ſoft*.

IN THE

SPECUS VERTEBRALIS.

THE VAPOUR OF THE SPECUS VERTEBRALIS.

THE thin vapour in the ſpecus vertebralis between the dura and pia mater ſurrounding the ſpinal marrow.

The SECRETORY ORGAN is compoſed of the exhaling arteries of the pia and dura mater, inveſting the ſpecus and medulla ſpinalis. The *ſuperfluous* vapour appears to be abſorbed by the oſcula of the abſorbent veſſels.

The QUANTITY in a living and healthy man is inviſible, but very great in hydrorachitis and ſpina bifida.

Its CONSTITUENT PRINCIPLES are the ſame with thoſe of the vapour in other cavities.

USE: It prevents the *concretion* of the medulla ſpinalis with the dura mater of the ſpecus vertebralis, and preſerves its neceſſary *ſoftneſs* and *humidity*.

IN THE

CAVITY OF THE NOSTRILS.

THE MUCUS OF THE NOSTRILS.

THE mucus which lubricates the ſeptum and conchæ of the noſe.

The SECRETORY ORGAN is formed by the *cryptæ muciparæ*, ſituated in the pituitary membrane

lining the ſeptum and conchæ of the noſtrils. There is mixed with this mucus while in the cavity of the noſe,

1. *A roſcid water*, which flows through three meatuſes from the frontal, ſphænoidal, ethmoidal and maxillary ſinuſes, into the cavity of the noſtrils. A membrane not fungous like the pituitary membrane, but very vaſcular and tender, without muciparous cryptæ, lines the parietes of theſe ſinuſes.

2. The *Lachrymal humour*, which runs from the lachrymal ſac, through the *naſal canals* under the inferior concha naſalis, into the poſterior meatus of the noſtrils.

Excretory Organ. The abundant mucus of the noſtrils is occaſionally ejected by ſternutation, or wiped from the anterior foramina of the noſtrils; or falling into the fauces through the poſterior foramina, is ſpit out by the mouth.

It has no Smell. Taste: Fatuous.

It is without COLOUR: when thin, is pellucid; but not ſo when thick, being mixed with particles of different colours.

The QUANTITY of mucus ſecreted in twenty-four hours, is not yet determined. Infants, who always abound with mucus, ſecrete it in large quantities.

Its CONSISTENCE is viſcid, clammy, and ropy, firmly adhering to all bodies, even thoſe the moſt highly poliſhed.

The *mucus of the noſe* is thicker and more tenacious than every other mucus of the primæ viæ; which, as they recede to the interior, become more fluid; and again thicken towards the termination of the large inteſtines.

The SPECIFIC GRAVITY is ſomewhat greater than water, in which it at firſt ſwims upon the ſurface; but, after having expelled the air globules it contained, always falls to the bottom. That collected in the noſtrils during the night

contains very little air, and when ejected in the morning, ſometimes ſinks immediately in water.

Expoſed to the AIR, it dries into friable ſhining lamellæ.

Placed on *burning coal*, almoſt the whole flies off without any ſmell; but if mixed with any *purulent* particles it becomes fœtid.

It is neither mixed, nor diluted in *pure warm water*, nor by *boiling* in water; although during the ebullition it may apparently unite with the water, yet after cooling it falls to the bottom.

It appears, in a manner, to admit very freſh LIME WATER.

It does not unite OIL with water, like vegetable mucus.

It is not ſoluble in *neutral*, *aerated alkaline*, *fixed* nor *volatile ſalts*.

It is decompoſed by *cauſtic alkali*.

It is inſpiſſated by the *mineral acids* in a ſmall doſe, and in a larger quantity it is diſſolved, and rendered of a different colour. With the *acid of vitriol*, it forms a *purple* colour, and almoſt the whole deliqueſces, except ſome grumuli which fall to the bottom. Mucus is more completely diſſolved by the *acid of ſalt*, and an *amethyſtine* colour is produced. It appears ſomewhat to reſiſt the *acid of nitre*, but to the ſtronger acid it gives way; and when diſſolved, obtains a *yellow* colour.

SPONTANEOUS DEGENERATION. Of all the animal juices, this is the leaſt ſubject to putridity. Kept for a month in water expoſed to heat, which very much promotes putrefaction, it remains without any fætor: yet it does not retard the putrefaction of other bodies.

Animal mucus DIFFERS from the *vegetable* prepared from gum arabic; in not being ſoluble in *water*, nor capable of mixing *oil* with water; and in being ſoluble in the *mineral acor*, which vegetable mucus is not.

The CONSTITUENT PRINCIPLES appear to be, the albumen of the ſerum inſpiſſated with oxygene. Thus this mucus is very firmly inſpiſſated, and an artificial coryza is produced, which continues ſome days, if the vapour of oxygenated muriatic acid be drawn up the noſtrils.

By DRY DISTILLATION like the albumen of the ſerum, it is changed into volatile alkali, empyreumatic oil, and carbone. It is ſoluble by the *mineral acids*, like the coagulum of the ſerum; and the ſame colours are produced.

The USE of the MUCUS of the NOSTRILS.

1. It conſtantly preſerves the pituitary membrane and its nervous papillæ ſoft and *moiſt*, leaſt by the paſſing of the air through the noſtrils, they be dried and deprived of their olfactory power.

2. It moderates the exceſſive *ſenſibility* of the nerves (as it were naked;) for when deficient, a very diſagreeable ſenſation is produced by the air paſſing through.

3. It, in a manner, detains the *odorous* particles, attracted by the noſtrils to the olfactory nerves; and,

4. It attracts any *noxious* particles, and prevents their being inſpired with the air through the noſtrils into the lungs.

IN THE

CAVITY OF THE MOUTH.

THE SALIVA.

THE humours ſecreted by the ſalivary glands into the cavity of the mouth.

The SECRETORY ORGAN is compoſed of three pair of ſalivary glands.

1. The *parotid glands*, which evacuate their saliva by means of the *Stenonian duct* behind the middle dens molaris of the upper jaw.

2. The *submaxillary glands*, which pour out their saliva through the *Warthonian ducts* on each side of the frenulum of the tongue by a narrow osculum.

3. The *sublingular glands*, situated between the internal surface of the maxilla and the tongue, and pour out their saliva through numerous *Riverian ducts* at the apex of the tongue.

The saliva in the cavity of the mouth has MIXED with it,

1 The *mucus of the mouth*, which exhales from the labial and genal glands.

2. *A roscid vapour*, from the whole surface of the cavity of the mouth.

The saliva is continually *swallowed* with, or without masticated food, and some is also *spit out*.

It has no COLOUR nor SMELL: It is TASTELESS, although it contains a little ſalt, to which the nerves of the tongue are accuſtomed.

Its SPECIFIC GRAVITY is ſomewhat greater than water. Its CONSISTENCE is rather plaſtic, and ſpumous, from the entangled atmoſpheric air.

The QUANTITY of twelve pounds is ſuppoſed to be ſecreted in twelve hours. During maſtication and ſpeaking the ſecretion is augmented, from the mechanical preſſure of the muſcles upon the ſalivary glands. Thoſe who are hungry ſecrete a great quantity, from the ſight of agreeable food.

It is imperfectly diſſolved by *water*; ſomewhat coagulated by *alcohol of wine;* and is congealed with more difficulty than water.

It is inſpiſſated by a ſmall doſe, and diſſolved in a large doſe, of *mineral acids.* It is alſo ſoluble in *aerated alkali.*

CAUSTIC ALKALI and *quick lime,* extract volatile alkali from ſaliva.

It *corrodes* copper and iron, and precipitates ſilver and lead in the form of corneous luna.

It aſſiſts the SPIRITUOUS FERMENTATION of farinaceous ſubſtances: hence barbarous nations prepare an inebriating drink, from the chewed roots of the *Jatropha Manihot* and *Piper Methiſticum*.

It poſſeſſes an *antiſeptic* virtue, according to the experiments of the *celebrated Pringle*.

It eaſily becomes *putrid* in *warm air*, and gives off volatile alkali.

CONSTITUENT PRINCIPLES: It appears to conſiſt of water, albumen, ammoniacal ſalt, and animal earth.

Of Water, there is $\frac{4}{5}$ given out by diſtillation.

The Albumen, is detected by alcohol of wine.

The Ammoniacal ſalt, is demonſtrated by triturating quick lime with ſaliva; and, *the animal earth* from ſalival calculus, and the *products of fire*.

The USE of the SALIVA.

1. It augments the *taſte* of the food, by the evolution of ſapid matter.

2. During maſtication, it mixes with, diſſolves, and reſolves into its principles, the food; and changes it into a pultaceous maſs, fit to be ſwallowed. Hence it commences *chymification.*

3. It moderates thirſt, by moiſtening the cavity of the mouth and fauces.

IN THE

CAVITY OF THE FAUCES.

THE MUCUS OF THE FAUCES.

THE mucus which lubricates the cavity of the fauces :

The SECRETORY ORGAN is formed of very numerous mucpairous cryptæ, and mucous ſinuſes of the *tonſils*, *pharynx*, *foramen cæcum* of the *tongue* and *glandular expanſion* of *Morgagni*.

This mucus is partly ſwallowed with the ſaliva, and partly with the chewed food: but the more abundant part, collected eſpecially in the night time, is ſpit out from the mouth.

Its CONSISTENCE is thinner than the mucus of the noſtrils, being continually attenuated by the ſaliva.

The QUANTITY is not determined; but the number of ſources, and the frequent ſpitting, demonſtrate that it cannot be inconſiderable.

Its CONSITUENT PRINCIPLES and QUALITY, are the ſame as thoſe of the mucus of the noſtrils.

USE:

1. It *lubricates* the cavity of the fauces, for the eaſier deglutition of the maſticated food.

2. It renders the food in manducation into a *form* convenient to be ſwallowed.

3. It prevents *dryneſs* of the fauces, from the paſſing of the air during reſpiration and ſpeech.

4. By moiſtening the fauces, it prevents and moderates *thirſt*.

IN THE EYES.

THE AQUEOUS HUMOUR OF THE EYE.

THE very limpid water which fills the anterior and poſterior chambers of the eye.

The SECRETORY ORGAN appears to be the floating veſſels of the corpus ciliare, and the exhaling veſſels of the iris.

The ABSORBING ORGAN. When in too great a quantity, a certain part appears to tranſude through the pores of the cornea; and the remaining part is carried away by the oſcula of the abſorbing veſſels. This humour is perpetually regenerated, and if it flow out by a wound of the cornea, it is in a ſhort time repaired; as appears from the extraction of a cataract: for the flaccid and injured cornea ſometimes coaleſces within

twenty-four or forty-eight hours, and again becomes as prominent as before.

The QUANTITY is four or five grains. In the fætus it is very ſmall, as well as in old people, and in thoſe who are about to die; which is amongſt the cauſes of the eyes collapſing. So copious and quick is its ſecretion, that within twelve minutes, twenty-three grains will flow from a wounded eye.

Its SPECIFIC GRAVITY is lighter than fountain water, in the proportion of nine hundred and ſeventy-five to one thouſand.

COLOUR: Very tranſparent. SMELL: None.

TASTE: Very ſlightly ſaltiſh.

Upon the application of *fire* it totally exhales, leaving nothing behind. It is neither acted upon by *alcohol of wine* nor *mineral acor*. It is rendered ſomewhat turbid by the ſpirit of nitre and aqua regia.

The CONSTITUENT PRINCIPLES appear to be very limpid water mixed with animal gas: thus it putrefies in the air by attracting the azote. Some have found a little ſoda and culinary ſalt in it.

The USE of the aqueous humour.

1. The rays of light having penetrated the cornea, it tranſmits the *focus* through the pupil to the cryſtalline lens, but refracts the rays of light leſs towards the axis than the tranſparent cornea.

2. It diſtends the tranſparent cornea, and retains the cryſtalline lens and vitreous humour in their places.

THE CRYSTALLINE LENS.

THE lentiform, pellucid body, incloſed in a membranaceous capſule, and ſituated in a peculiar fovea in the anterior ſurface of the vitreous humour.

Its FIGURE is like a lentil, but the anterior ſurface is plain, and the poſterior convex. Its *circumference* is circular; and *its diameter*, rather more than four lines.

Its SPECIFIC GRAVITY, is moſt frequently four grains. Its *denſity* is greater than water, as it not only ſinks to the bottom in fountain, but alſo in heavier water.

Its CONSISTENCE is ſoft, the moſt ſo in the fœtus, becoming gradually harder in the adult, and quite hard in old age.

The FABRIC of the CRYSTALLINE LENS, is lamellous, for by macerating it in ſpirit of wine or vinegar, above two thouſand concentric laminæ, laying one upon another, like the leaves of a book, may be ſeparated with a ſcalpel. Theſe lamellæ conſiſt of parallel fibres, united together by tranſverſe cellular fibres. This very delicate tela celluloſa is diſtended with *a very limpid aqueous fluid* called AQUULA.

The Secretory organ of this aquula appears to be formed by the very fine and pellucid arteries, or ramuli arising from the central artery, which perforate the posterior surface of the crystalline lens. It is probable that the *abundant* aquula is carried back by the absorbent vessels.

By *alcohol of wine* and *acid liquors*, the lens is rendered opake, and is condensed by congelation.

In boiled fish, the exterior cortex of the lens is rendered opake and white, but the nucleus remains pellucid.

Use: It transmits, and somewhat refracts, the focus of the rays of light to the vitreous humour; for the refractile power of the crystalline lens is not much greater than that of water.

THE VITREOUS HUMOUR.

THE pellucid vitriform body which fills the whole bulb of the eye behind the crystalline lens.

Its CONSISTENCE, is viſcous, tremulous, and pellucid.

COLOUR: Tranſparent, reddiſh in the tender fætus, and rather opake in old age.

The SPECIFIC GRAVITY, is greater than common water, for it ſinks to the bottom in it. The weight of the vitreous humour of an eye weighing one hundred and forty-two grains, was one hundred and four grains.

Its DENSITY in reſpect of its ſize is ſmall. Thus placed upon letters it moderately enlarges them, but leſs ſo than the cryſtaline lens.

Its STRUCTURE is membranaceous and cellular, filled with innumerable ſmall drops of very limpid water, contained in an equal number of little cells of the hyaloid membrane; ſo that it reſembles a ſingular ſpecies of tremulous jelly.

That the whole of this vitreous ſubſtance is compoſed of ſmall cells, externally broad but nar-

rower towards the center, and which have a communication one with another; would appear from the ſucceſſive dropping of the aquula from a cell when wounded; for it is not ſuddenly emptied, but drop by drop.

The EXCRETORY ORGAN of this aquula is formed of the pellucid ramuli of arteries, running to the vitreous body from the central artery. The *abundant* aquula is returned by the oſcula of the abſorbent veſſels.

In hot water it is rendered rather opake; but quickly again becomes limpid. It is indurated, and dilated by froſt.

It is rendered turbid by *oil of tartar*, *ſpirit of vitriol*, *ſalt*, and *nitre*; but not by vinegar.

USE:

1. It tranſmits the focus of the rays of light from the cryſtalline lens to the retina.

2 It moderately augments the focus and refracts it to the axis.

3. It expands the bulb of the eye.

THE AQUULA OF THE CAPSULE OF THE CRYSTALLINE LENS.

THE pellucid water, ſituated within the capſule of the cryſtalline lens and the lens itſelf.

In QUANTITY, it appears to be ſcarcely more than a drop.

It is SECRETED by the pellucid remuli of the artery which runs to the capſule and lens. The *abundant* part is carried back by the abſorbing veſſels.

USE: It prevents the concretion of the cryſtalline lens with its capſule.

THE PIGMENT OF THE IRIS.

THE coloured mucus which covers the anterior and poſterior ſurface of the iris.

The colour of the anterior ſurface of the iris is *various*; but in the poſterior ſurface which is called UVEA it is always *black*, and agrees with the choroidal pigment.

VARIETY OF COLOUR in the iris. In northern kingdoms the iris is bluiſh, or of a pale aſh colour. In warm regions, it is uſually of a dark cheſnut, or almoſt black. In ſome, the iris has ſtriæ of various colours; and there are alſo men who have a different colour in each eye.

In *animals* the colours of the iris are often vivid. *Yellow*, in the *Wolf*, *Cat*, and *Owl*. *Golden*, in the *Frog* and *Fiſh*, and of a *ſilver hue* in ſome. The eyes of ſome animals, as the Ferret and Zibethus, give out light in the night time.

SECRETORY ORGAN. The ſurface of the iris is flocculent like velvet; and a coloured mucus is ſecreted into the flocci, by the arteries of the iris; which, when in too great a quantity, appears to be again taken up by the abſorbing veſſels. The nigrum pigmentum of the uvea contributes much to the colour of the iris; for upon removing it the colour of the iris is changed.

The colour of the iris is alſo deſtroyed, if its flocci be contracted by *alcohol of wine*; or the veſſels of the eye dilated by *inflammation*, or diſſolved by *putridity*.

The CONSTITUENT PRINCIPLES of this pigment is animal mucus mixed with a peculiar *colouring principle*.

USE:

1. This pigment reflects the rays of light falling through the pellucid cornea and aqueous humour.

2. It *prevents* an exceſſive quantity of the rays falling upon the retina.

3. And laſtly, it conſtitutes the *beauty* and *variety of colour* in the eyes.

THE PIGMENT OF THE CHOROID MEMBRANE.

THE black, or browniſh black mucus, which covers the anterior ſurface of the choroid membrane contiguous to the retina, and the interior ſurface of the corpus ciliare.

CONSISTENCE: Anteriorly it is thick, poſteriorly thin, and is ſomewhat deficient at the entrance of the optic nerve. In the embryo it is very black; in infants it is the thickeſt and moſt clammy: for the older the perſon the thinner and ſofter it becomes.

In the eyes of Æthiopians this mucus is thick and black. In Leuco-Æthiopians, both men and animals, it is entirely wanting; ſo that the red

ſanguineous veſſels of the retina and membrana choroidea may be ſeen through the pupil; as in the eyes of white hares, ſome dogs, and white mice.

The CONSTITUENT PRINCIPLES are, animal mucus chemically united with a black colouring principle.

The USE of this pigment is to abſorb the rays of light, which fall through the retina, leſt they be reflected and injure the ſight. Thus the *Leuco-Æthiopians* only ſee diſtinctly at twilight, and ſhun the light in the day time; for the ſtrong light at noon-day, reflected from the red ſurface of the choroid membrane, renders the ſight confuſed and painful.

THE TEARS.

THE limpid fluid ſecreted by the lachrymal gland, and flowing on the ſurface of the eye.

The SECRETORY ORGAN is formed by the lachrymal glands, one of which is ſituated in the

external canthus of each orbit, and emits ſix or ſeven *excretory ducts*, which open on the internal ſurface of the upper eyelid above its tarſus, and pour forth the tears.

The tears have mixed with them an *arterious roſcid vapour*, which exhales from the internal ſurface of the eyelids, and external of the tunica conjunctiva, into the eye. Perhaps the *aqueous humour* alſo tranſudes through the pores of the cornea on the ſurface of the eye.

Absorbent Organ. A certain part of this aqueous fluid is diſſipated in the air; but the greateſt part, after having performed its office, is propelled by the orbicular muſcle, which ſo cloſely conſtringes the eyelid to the ball of the eye, as to leave no ſpace between, unleſs in the internal angle, where the tears are collected.

From this *collection* the tears are abſorbed by the *orifices of the punctæ lachrymaliæ*; from thence they are propelled through the *lachrymal canals*, into the *lachrymal ſac*, and flow through the *ductus*

naſalis into the cavity of the noſtrils, under the inferior concha naſalis.

The LACHRYMAL SAC, appears to be formed of longitudinal and tranſverſe muſcular fibres; and its *three orifices* furniſhed with ſmall ſphincters, as the ſpaſmodic conſtriction of the punctæ lachymaliæ proves, if examined with a probe.

SMELL: None. TASTE: Saltiſh, as people who cry perceive.

COLOUR: Tranſparent. CONSISTENCE: Aqueous.

The QUANTITY, in its natural ſtate, is juſt ſufficient to moiſten the ſurface of the eye and eyelids; but from ſorrow, or any kind of ſtimulus applied to the ſurface of the eye, ſo great is the quantity of tears ſecreted, that the punctæ lachrymaliæ are unable to abſorb them. Thus the greateſt part runs down from the internal angle of the eyelids, in the form of great and copious drops, upon the cheeks. A great quantity alſo

deſcends, through the lachrymal paſſages into the noſtrils; hence thoſe who cry have an increaſed diſcharge from the noſe.

Tears expoſed to the ATMOSPHERE, or evaporated by a gentle heat, dry into a luteal maſs, which often exhibits cubic cryſtals.

LIME WATER is not rendered turbid by tears, becauſe the ſoda they contain is not aerated but cauſtic: and thus the *ſyrup of violets* is rendered green.

Freſh tears are perfectly diſſolved in *water*, but *dried tears* are not. They are coagulated by *alcohol of wine*, and a culinary ſalt and ſoda is obtained by evaporation. Freſh as well as dried tears are ſoluble in *alkaline ſalts*.

Freſh tears are not changed by the *acid of vitriol*, or *acid of ſalt*; but thoſe dried are diſſolved with an effervescence. They are momentaneouſly inſpiſſated by the oxygenated muriatic acid, as well as by the oxygene attracted from the atmoſphere.

The CONSTITUENT PRINCIPLES are,

Water, which conſtitutes the greateſt part of tears.

A peculiar mucus, coagulated by alcohol of wine.

Culinary ſalt, *cauſtic* and *phoſphorated ſoda*; alſo phoſphorated calx is obtained from the incinerated carbone.

USE OF THE TEARS.

1. They continually *moiſten* the ſurface of the eye and eylids, to prevent the pellucid cornea from drying and becoming opake, or the eye from concreting with the eyelids.

2. They prevent that pain, which would otherwiſe ariſe from the friction of the eyelids againſt the bulb of the eye from continually winking.

3. They waſh and clean away the *duſt* of the atmoſphere, or any thing acrid that has fallen into the eye, by the true *vis medicatix*.

4. *Crying* unloads the head of congeſtions.

THE JUICE OF THE MEIBOMIAN GLANDS.

THE unctuous humour which lubricates the tarſi of the eyelids.

The SECRETORY ORGAN is conſtituted by the ſebaceous glands of *Meibomius*, ſituated like inteſtines, near the tarſi of the eyelids, almoſt at their angles; out of which the ſmegma flows through peculiar pores.

This ſmegma in its natural ſituation mixes with the tears, and is abſorbed with them into the lachrymal paſſages.

Its CONSISTENCE is unctuous; the freſh and thin ſecreted juice is ſomewhat inſpiſſated by the oxygene of the atmoſphere.

SMELL, TASTE, and COLOUR of limpid unguen.
QUANTITY: Small.

CONSTITUENT PRINCIPLES: Oleaginous mucus does not appear to be ſoluble in water.

USE:

1. This ſmegma *lubricates* the tarſi of the eyelids, leſt the tender ſkin with which they are ſurrounded, be injured by friction and frequent winking.

2. By mixing with the tears, it *involves* their ſaline acridity.

3. From the *mixture* of the ſebum of theſe glands with the tears, *colla* or *glue* is produced, which continually conglutinates the eyelids of many quadrupeds, in ſuch a manner, that they continue *blind* for ſome time *poſt partum*.

THE SUCCUS LEMOSUS, OR FÆCULENT JUICE OF THE CARUNCULA LACHRYMALIS.

THE puriform ſebaceous juice found adhering to the internal angle of the eyelids, eſpecially after ſleeping.

The SECRETORY ORGAN appears to be the caruncula lachrymalis, ſituated in the internal angle of the tarſus, formed of ſeveral ſebaceous glands, perforated by many foramina, and furniſhed with ſmall pili, ſcarcely conſpicuous, which in ſome manner detain this fæculent ſecretion.

The QUANTITY is very ſmall, but is collected in the greateſt proportion during ſleep, when it is called LEMÆ, and is uſually removed by the finger when awake.

The QUALITY of this ſmegma is ſimilar to that of liquid ſuet, and is thought to be mucous and oily.

The USE appears to be to obturate the hiatus of the tarſi in the internal angle of the eyelids, and thus prevent the tears falling in that place during ſleep.

THE MUCUS OF THE LACHRYMAL SAC.

THE mucus which lubricates the internal ſurface of the lachrymal ſac.

The SECRETORY ORGAN appears to be compoſed of the arterious veſſels of the pulpous, red membrane, which forms internally the lachrymal ſac. The *abundant* mucus flows with the tears through the naſal duct into the noſtrils.

USE: It prevents the *concretion* of the lachrymal paſſages, and defends them againſt the ſaline acridity of the tears.

IN THE

CAVITY OF THE EARS.

THE CERUMEN, OR WAX OF THE EARS.

THE ſmegma, which lubricates the internal ſurface of the meatus auditorius externus and membrane of the tympanum.

The SECRETORY ORGAN is compoſed of the *ceruminous glands*, ſituated under the ſkin lining the meatus auditorius, upon which the excretory ducts open.

The QUANTITY in a ſtate of health is ſmall; but if it be ſuffered to collect for ſome time, it very frequently forms into ſolid cylinders, by attracting the oxygene of the atmoſphere; and thus ſtopping up the meatus auditorius, produces

deafneſs, which, is eaſily removed by warm water.

SMELL: none, except when rancid. TASTE: very bitter.

COLOUR: yellowiſh. CONSISTENCE: unctuous, if not kept long, otherwiſe rather waxy.

It is not ſoluble in *ſpirit of wine, oil,* nor *ſoap* diſſolved in water. It burns in the *fire.* It does not become *rancid* after remaining for a year in the meatus auditorius.

It is diſſolved in *ſaliva,* and in *warm water,* although it be very much inſpiſſated.

The CONSTITUENT PRINCIPLES appear to be,

Animal mucus, which gives it lubricity.

A Ceraceous principle, which appears to be oil inſpiſſated by oxygene. For oiled paper, expoſed

to the air for a long time, is converted into a kind of wax, by attracting the oxygene of the atmosphere.

A Bilious principle, secreted from the blood, which gives the bitter taste.

USE OF THE CERUMEN.

1. It *lubricates* the sensible membrane of the meatus auditorius externus and tympanum, lest they be dried by the air.

2. By its *bitterness* it drives away *insects* flying in the air, for which purpose the hairs of the meatus auditorius also assist.

3. It moderates the vehemence of *sound*.

THE MUCUS OF THE EUSTACHIAN TUBE.

THE mucus which lubricates the cavity of the eustachian tube.

The SECRETORY ORGAN is conſtituted by the arterious veſſels of the pituitary membrane, which is reflected from the fauces into the cavity of the tube. The *ſuperfluous* mucus flows into the fauces.

USE: It *covers* the internal ſurface of the tube, and prevents it being dried by the air.

THE AIR OF THE CAVITY OF THE TYMPANUM.

THE atmoſpheric air, which enters the cavity of the tympanum from the fauces, through the Euſtachian tube.

The USE of this air appears to be, to reſiſt the preſſure of atmoſpheric air ruſhing too violently through the meatus auditorius externus into the tympanum, when the ſound is very violent. Laſtly, ſome deaf people by opening their mouths appear to hear by means of the agitated air of the tympanum.

THE AQUULA, OR WATER OF THE LABYRINTH.

THE insipid water which fills the cavity of the tympanum.

There is no air found in this cavity; for the water so fills up the scalæ of the cochlea, both surfaces of the spiral lamina, the three semi-circular canals and the vestibulum, as to inundate the branches of the soft auditory nerve.

The SECRETORY ORGAN of this fluid appears to be, the exhaling arteriolæ of the labyrinth. When *abundant*, it is absorbed by the oscula of the patulous lymphatic vessels in the labyrinth.

It has no SMELL nor TASTE.

It becomes white, and is inspissated by the *acid of vitriol.*

USE:

1. It preserves *moist* and *soft* the nervous fibrils of the auditory nerve, expanded in the laby-

rinth, to prevent their becoming dry from the air of the cavity of the tympanum.

2. It *moderates* the tremors of the ſounds, which, perhaps, might be too ſtrong for the naked fibrils of the auditory nerves.

IN THE NECK.

THE JUICE OF THE THYROID GLAND.

THE yellowiſh white juice contained in the cells of this gland, eſpecially in infants.

SECRETORY ORGAN. The origin of this juice appears to be from the exhaling arteries of this very vaſcular gland.

The EXCRETORY DUCTS, which carry this juice into the cavity of the larynx, have not, according

to the opinion of ſome, been hitherto detected. The *abundant* juice appears to be abſorbed by the lymphatic veſſels going from the gland.

The USE of this juice, as well as of the thyroid gland, as yet remains amongſt the phyſiological deſiderata. It has lately been ſuppoſed to afford a diverticulum to the blood when driven violently to the head. It is frequently the ſeat of endemical ſwellings amongſt the Tyroleſe and Swiſs.

THE MUCUS OF THE ŒSOPHAGUS.

THE mucus which covers the internal ſurface of the œſophagus.

The SECRETORY ORGAN of this mucus appears to be, peculiar muciparous ſinuſes, ſituated in the tela celluloſa of the œſophagus.

The DORSAL GLANDS, which lay near the œſophagus, and are often very conſpicuous about the fifth vertebræ of the thorax, are mere lymphatic glands; have no excretory ducts to ſeparate a peculiar juice into the œſophagus, according to the

opinion of ſome. With the mucusof the œſopha-gus there is alſo mixed an *aqueous vapour*, which exhales into the cavity of the œſophagus from the extremities of arteries.

Its QUALITY is ſimilar to that of the mucus of the fauces, but ſomewhat thinner.

USE:

1. It *lubricates* the cavity of the œſophagus, that the food may with greater eaſe deſcend into the ſtomach.

2. It prevents the *concretion* of the parietes of the œſophagus.

3. It defends the muſcular fibres from *drying*, and becoming inactive.

IN THE

CAVITY OF THE THORAX.

THE INSPIRED AIR OF THE LUNGS.

THE atmoſpheric air, which, during inſpiration, is drawn through the noſtrils, cavity of the mouth, rima of the larynx, trachea and bronchia, into the veſiculæ pulmonales.

QUANTITY: An adult man draws into his lungs at each inſpiration, about thirty cubic inches of atmoſpheric air; and as in the ſpace of a minute we inſpire fifteen times, hence every minute we require four hundred and fifty, every hour twenty-ſeven thouſand, and in twenty-four hours ſix hundred and forty-eight thouſand cubic inches of atmoſpheric air for reſpiration.

The Conſtituent principles of atmoſpheric air, are generally divided into,

Genuine, which conſtitute the air itſelf, and, into,

Heterogeneous, which are every where more or leſs mixed with atmoſpheric air.

GENUINE PRINCIPLES. The chemical analyſis and ſyntheſis of atmoſpheric air prove, that out of an hundred parts of pure atmoſpheric air, twenty-ſeven are vital air, or oxygene, and ſeventy-three azotic air.

The QUANTITY of vital air in the atmoſphere is every where the ſame, or ninety-five degrees in the *Eudiometer of Fontana*; it is however ſomewhat more on the ſurface of the ſea, and ſomewhat leſs on the tops of mountains.

The HETEROGENEOUS PRINCIPLES mixed with atmoſpheric air, are

Water; a cubic foot of very damp atmoſpheric air, may contain twelve grains of water.

Fixed air. The hundredth part of the moſt pure atmoſpheric air, is fixed air.

Inflammable air, of which an immenſe quantity is decompoſed from the water of marſhes, from metallic mines, and coal-pits, from cemeteries and privies, &c. and diſperſed in the atmoſphere.

Laſtly, the diſengaged matter of heat, matter of light, electric, and magnetic matter, the exhalations of all animals, vegetables, minerals, waters, and innumerable other ſubſtances are continually mixed with the maſs of atmoſpheric air.

Use of Atmospheric Air. It conſtitutes the great chemical elaboratory of nature, from which all bodies are compoſed, and into which they are again reſolved; as animal and vegetable putrefaction prove, by means of which they are again converted into aerial gas, from which not even the bones are exempt.

The atmoſpheric air acts in two ways upon the animal body :

1. *Mechanically*, by which it compreſſes the cutaneous ſurface of the body, and prevents the humours from being converted into gaſſes, by the matter of heat, and the cutaneous veſſels from extreme dilatation or rupture.

2. *Chemically*, by which the continual abſorption of vital air takes place from the inhalent oſcula of the ſkin, and aerial ſurface of the lungs.

The inſpired atmoſpheric air, alſo acts in two ways upon the lungs.

The *mechanical* action of inſpired air acts by its weight and elaſticity on the lungs, and conſiſts in the dilatation of the pulmonary veſicles, by which the arterious and venous veſſels running through the veſiculæ pulmonales become larger, and the blood very eaſily paſſes from the arteries into the pulmonary veins.

During expiration, the veſiculæ pulmonales and pulmonary veſſels again ſo contract themſelves, that the blood cannot paſs from the arteries into the pulmonary veins, but is accumulated about the right ſide of the heart. Thus in animals, killed in the exhauſted receiver of an air-pump, the vena cava, right ſinuſes and auricles of the heart, and the pulmonary artery are found very turgid with blood, but the left ventricle of the heart empty.

The *chemical* action conſiſts in the abſorption of the vital air into the blood of the pulmonary veins; for vital air is no longer found in that which is expired.

No air, unleſs turgid with *vital gas*, although elaſtic and heavy, is fit for reſpiration; hence the antients not improperly called this principle, although unknown to them, the *pabulum vitæ*.

This vital air, mixed with the blood,

1. Affords a *ſtimulus*, by which the heart is ſtrongly irritated; for if vital air be inflated by

bladders into the lungs of animals about to die, the heart is immediately again called into action.

2. It gives to the arterious blood its *florid red colour*. For the blood of the pulmonary vein is *beautifully red*, but that of the right ſide of the heart is ſomewhat black.

3. Oxygene or vital air, being decompoſed by the animal gas or carbonated hydrogene; the matter of heat is diſengaged, and *animal heat* generated.

4. The hydrogene of the animal gas, combining with the oxygene of vital air, is converted into water; and thus the carbone being diſengaged, paſſes into the venal blood, which cauſes its *blackneſs*.

THE EXPIRED AIR OF THE LUNGS.

THE air inſpired by the veſiculæ pulmonales, is again expired through the bronchia, trachea,

and rima of the larynx, into the cavity of the mouth and noſtrils.

The QUANTITY is nearly the ſame as that inſpired: for the deficiency of the vital air abſorbed in the lungs, is ſupplied by the mixture of their perſpirable matter.

QUALITY: The air being deprived at every expiration of all its oxygene, is no longer adapted to reſpiration: for it ſuffocates animals and extinguiſhes the flame of a candle.

CONSTITUENT PRINCIPLES: It conſiſts of,

1. *Water*; for poliſhed glaſs, if breathed upon in the winter time, is moiſtened.

2. *Fixed air*; for, if blown on lime water, the lime is precipitated.

3. *Azotic air*; for this part of inſpired air is not abſorbed by the lungs, hence having undergone no change, it is again expired.

Animal gas, or carbonated hydrogene, appears to be decompoſed by a certain portion of vital air, ſo that the carbone combining with the oxygene of vital air, is changed into *fixed air;* and the hydrogene combining with another portion of oxygene is converted into *water*.

The MATTER OF HEAT in part diſengaged from the decompoſition of vital air, ſerves for the gaſification of expired air.

This is the reaſon why atmoſpheric air in a chamber, or other place in which many men are incloſed, by degrees is entirely converted into fixed air, and azote; in which the men are killed, and the flame of a candle extinguiſhed.

USE: The lungs having abſorbed the oxygene from the inſpired air, give out their *noxious* or mephitic air in expiration.

THE PERSPIRABLE MATTER OF THE LUNGS.

THE vapour which exhales from the aerial ſurface of the lungs with the expired air, through the mouth and noſtrils, into the atmoſphere.

The SECRETORY ORGAN is compoſed of the exhalent arteries ſituated in the nervous membrane, lining the aerial ſurface of the lungs.

VAPOROUS CONSISTENCE. This vapour is ſo rarefied in *ſummer* time, from the abundance of the matter of heat contained in the atmoſpheric air, as not to be ſeen. In *winter* it is ſo condenſed by the cold of the atmoſphere as to be viſible.

SMELL and TASTE, in an healthy man: none. But an odour is diffuſed, if heterogeneous particles be eliminated through the lungs with the perſpirable matter. Thus the breath of women, during the time of menſtruation, and of thoſe who labour under ſmall pox or putrid fever, often

becomes fœtid. By drinking of wine, the breath is alſo rendered acidulous, even the day after.

CONSTITUENT PRINCIPLES. It appears to conſiſt of aqueous vapour combined with animal gas or carbonated hydrogene.

The cutaneous perſpirable matter appears to agree for the moſt part with that of the lungs, as will be explained in its place.

USE: Of the perſpiration of the lungs.

1. It liberates the *blood* from the ſuperfluous animal gas, and aqueous *latex*.

2. It *moiſtens*, and preſerves ſoft, the aerial ſurface of the lungs, and prevents it from being dried by the inſpired air.

3. Sometimes it liberates and *depurates* the blood, by the true *vis medicatrix*, from miaſma and other morbid acridities, as the ſtinking or acid breath of ſome men proves. And,

4. It is the *vicarious excretion* of the cutaneous perſpiration; thus, when the latter is ſuppreſſed, the pulmonary perſpiration is increaſed.

THE MUCUS OF THE LUNGS.

THE mucus which lubricates the internal ſurface of the larynx, trachea, bronchia, and veſiculæ pulmonales.

The SECRETORY ORGAN is formed by the muciparous glands, ſituated under the internal membrane of thoſe parts.

The *abundant* mucus is often ſpit out under the name of the *pulmonary ſputum*, or *phelgm*.

TASTE and SMELL: In an healthy man, none.

CONSISTENCE: Somewhat thinner than the mucus of the noſtrils.

COLOUR: None. Nevertheleſs men, otherwiſe the moſt healthy, ſometimes ſpit up phlegm in the morning, of a bluiſh black colour.

USE:

1. To prevent the *drying* (which is very much to be feared) of the aerial ſurface of the larynx, bronchia and veſiculæ pulmonales, by the continual paſſing of the air.

2. To *defend* the ſenſible membrane of theſe parts from being irritated by acrid or pulverulent ſubſtances, inſpired with the atmoſpheric air.

3. To render the voice agreeable, for it becomes hoarſe, if the larynx and trachea be dry.

THE VAPOUR OF THE CAVITY OF THE THORAX.

THE vapour which exhales between the lungs and pleura into the cavity of the thorax.

It is SECRETED by the arterious exhalent veſſels ſituated in the external ſurface of the lungs, and internal of the pleura. When *abundant*, it is carried back by the lymphatic veſſels of theſe parts.

The QUANTITY is very ſmall in an healthy ſtate; more copious in dead bodies, but moſt copious in hydrothorax.

QUALITY: Like other animal vapours.

USE:

1. To *preſerve* the external ſurface of the lungs and internal of the pleura, moiſt, ſoft, and flexile,

2. To *defend* and prevent the lungs from the friction of, and concretion with, the pleura.

THE VAPOUR OF THE PERICARDIUM.

THE vapour which exhales into the cavity of the pericardium.

It is SECRETED by the arterious exhalent veſſels which open on the external ſurface of the heart, and internal of the pericardium. The *abundant* vapour is again returned by the lymphatic veſſels of the parts juſt mentioned.

The QUANTITY in the living ſubject is ſmall, ſcarcely conſpicuous. In the dead body, for the moſt part, it is greater than in a natural ſtate; but it is the greateſt in hydrocardia.

Its QUALITY is ſimilar to the vapour of the thorax.

USE:

1. It prevents the *concretion* of the heart with the pericardium.

2. It diminiſhes the *friction* of the heart againſt the pericardium.

3. It preſerves the parts *ſoft* and *flexile*.

THE JUICE OF THE THYMUS GLAND.

THE milky juice contained in the cells of the thymus gland.

It appears to be SECRETED by the many ſmall arteries opening into the cells of this gland, and to be returned, when *abundant*, by its lymphatic veſſels. For an *excretory duct* has never been as yet detected by any anatomiſt.

QUANTITY: If any part of this gland be cut and preſſed, a great quantity of whitiſh juice flows into the inciſion.

The QUALITY of this milky juice is inodorous, inſipid, and coagulable by ſpirit of wine into *grumi*.

The uſe of this juice as well as of the gland, is as yet unknown. It appears to be mixed with the lymph of the lymphatic veſſels, in order to render it more nutritious or gelatinous. This perhaps is the reaſon why the thymus gland is ſo

large in the fætus, the ſudden increaſe of which requires a greater quantity of nutritious gelatina, than that of the adult, in whom this juice and the whole gland gradually waſtes away.

IN THE BREASTS.

THE MILK OF THE BREASTS.

THE white, ſweetiſh fluid, ſecreted by the glandular fabric of the breaſts of women.

The SECRETORY ORGAN is conſtituted by the great conglomerate glands, ſituated in the fat of both breaſts, above the muſculus pectoralis major.

EXCRETORY ORGAN: From each acinus compoſing a mammary gland, there ariſes a radicle of a *lactiferous* or *galactiferous* duct. All theſe

canals gradually converging, are terminated without anaſtomoſis in the papilla of the breaſts by many orifices: which upon preſſure, pour forth milk.

The SMELL of freſh-drawn milk is peculiar, animal, fatuous and not diſagreeable. TASTE: Sweetiſh, ſoft, bland, agreeable.

The SPECIFIC GRAVITY is greater than water, but lighter than blood; hence it ſwims on it. COLOUR: White and opake.

CONSISTENCE: Oily and aqueous. A drop put on the nail flows ſlowly down, if the milk be good.

TIME OF SECRETION: The milk moſt frequently begins to be ſecreted in the laſt months of pregnancy; but on the third day after delivery, a ſerous milk called *Coloſtrum* is ſeparated: and, at length, pure milk is ſecreted very copiouſly into the breaſts, that from its abundance, it often ſpontaneouſly drops from the nipples.

DURATION OF THE SECRETION. If the ſecretion of the milk be daily promoted by ſuckling an infant, it often continues many years, unleſs a freſh pregnancy ſupervene.

The QUANTITY uſually ſecreted within twenty-four hours, by nurſes, is *various*, according as the nouriſhment may be more or leſs chylous. It appears that not more than two pounds of milk are obtained from five or ſix pounds of meat. But there have been known nurſes, who have given from their breaſts two or even more than three pounds, in addition to that which their child has ſucked.

That the ORIGIN of the milk be derived from chyle carried with the blood of the mammary arteries into the glandular fabric of the breaſts, is evident from its more copious ſecretion a little *after meals;* its diminiſhed ſecretion from *faſting;* from the *ſmell* and *taſte* of food or medicines in the ſecreted milk; and laſtly, from its ſpontaneous *aceſcence*; for humours perfectly animal become putrid.

The PROPERTIES of animal and human milk.

Milk ſeparates ſpontaneouſly into *cream*, *cheeſe*, and *ſerum of milk*; and that ſooner in a *warm* ſituation than in a *cold* one.

In a *greater temperature than that of the air* it aceſces and coagulates, but more eaſily and quicker by the addition of *acid ſalts* or *coagulating plants*.

Lime water coagulates milk imperfectly. It is not coagulated by *cauſtic alkali*, for it diſſolves its caſeous part.

With *aerated alkali* the caſeous and cremoraceous parts of the milk are changed into a *liquid ſoap*, which ſeparates in the form of white flakes: ſuch milk by boiling is changed into a yellow and then into a brown colour.

Milk *diſtilled* to dryneſs, gives out an inſipid water and leaves a whitiſh-brown extract, called the *extract of milk:* which diſſolved in water, makes a milk of leſs value.

Milk freſh drawn and often agitated in a warm place, by degrees goes into the *vinous fermentation*, ſo that *alcohol of wine*, may be drawn over by diſtillation, which is called *ſpirit of milk*. It ſucceeds quicker if *yeaſt* be added to the milk. Mares milk, as it contains the greateſt quantity of the ſugar of milk, is beſt calculated for vinous fermentation.

The PROXIMATE PRINCIPLES of milk, or its integral parts, are,

1. The *Aroma*, or odorous volatile principle, which flies off from freſh drawn milk in the form of viſible vapour.

2. *Water*, which conſtitutes the greateſt part of milk. From one pound, eleven ounces of water may be extracted by diſtillation. This water with the ſugar of milk forms the *ſerum of the milk*.

3. *Bland Oil*, which from its lightneſs ſwims on the ſurface of milk after ſtanding, and forms the *cream of milk*.

4. *Cheeſe*, ſeparated by coagulating milk, falls to the bottom of the veſſel, and is the animal gluten.

5. *Sugar*, obtained from the ſerum of milk by evaporation. It unites the caſeous and butyraceous part with the water of the milk.

6. Some *neutral ſalts*, as the ſal digeſtivus and muriated calx; which are accidental, not being found at all times, nor in every milk.

Theſe principles of milk DIFFER widely in reſpect to *quantity* and *quality*, according to the *diverſity of the animals*.

The *Aroma of the Milk* is of ſo different an odour, that perſons accuſtomed to the ſmell, and thoſe whoſe olfactory nerves are very ſenſible, can eaſily diſtinguiſh whether milk be that of the cow, goat, mare, aſs, or human. The ſame may be ſaid of the ſerum of the milk, which is properly the ſeat of the aroma.

The CREAM OF MILK is thicker and more copious in the milk of the ſheep and goat, than in that of the aſs, mare, or human milk.

The BUTTER of goats and cows is eaſily ſeparated from the milk, and will not again unite itſelf with the butter-milk. Sheep's *butter* is ſoft and not of the conſiſtence of that obtained from the cow and goat. Aſſes, mares, and human *butter* can only be ſeparated in the form of cream; which cream, by the aſſiſtance of heat, is with great eaſe again united to the milk from which it was ſeparated.

The CHEESE of cows and goats milk is ſolid and elaſtic, that from aſſes and mares ſoft, and that from ſheep's milk almoſt as ſoft as gluten. It is never ſeparated ſpontaneouſly from the milk of a woman, but only by art, and is wholely fluid.

The SERUM abounds moſt in human, aſſes, and mares milk. The milk of the cow and goat contains leſs, and that of the ſheep leaſt of all.

The SUGAR OF THE MILK is in the greateſt quantity in the mares and aſſes, and ſomewhat leſs in the human milk.

The MILK OF A WOMAN differs.

1. In reſpect of *food*. The milk of a woman, who ſuckles, living upon *vegeto-animal food*, never aceſces nor coagulates ſpontaneouſly, although expoſed for many weeks to the heat of a furnace. But it evaporates gradually in an open veſſel, and the laſt drop continues thin, ſweet and bland. The reaſon appears to be, that the caſeous and cremoraceous parts cohere together by means of the ſugar, more intimately than in the milk of animals, and do not ſo eaſily ſeparate; hence its aceſcenſe is prevented.

It does *aceſce*, if mixed or boiled with vinegar, juice of lemons, cremor tartar, ſpirit of vitriol, or with the human ſtomach.

It is *coagulated* with the acid of ſalt or nitre, and by the acid gaſtric juice of the infant: for

infants often vomit up the coagulated milk of the nurſe.

The milk of a ſuckling woman, who lives upon *vegetable food* only, like cows milk, eaſily and of its own accord aceſces, and is acted upon by all coagulating ſubſtances like the milk of animals.

2. In reſpect *of the time of digeſtion.* During the firſt hours of digeſtion the chyle is crude, and the milk leſs ſubacted: But towards the twelfth hour after eating, the chyle is changed into blood, and then the milk becomes yellowiſh and nauceous, and is ſpit out by the infant. Hence the beſt time for giving ſuck, is about the fourth or fifth hour after meals.

3. In reſpect *of the time after delivery.* The milk ſecreted immediately after delivery is ſerous, purges the bowels of the infant, and is called *Coloſtrum.* But in the following days it becomes thicker and more pure, and the longer a nurſe ſuckles, the thicker the milk is ſecreted; thus new born infants cannot retain the

milk of a nurſe who has given ſuck for a twelvemonth, on account of its ſpiſſitude.

4. In reſpect *of food or medicines.* Thus if a nurſe eat garlic, the milk becomes highly impregnated with its odour, and is diſagreeable. If ſhe indulge too freely in the uſe of wine or beer, the infant becomes ill. From giving a purging medicine to a nurſe, the child alſo is purged; and laſtly, children affected with tormina of the bowels, ariſing from acids, are often cured by giving the nurſe animal food.

5. In reſpect *of the affections of the mind.* There are frequent examples of infants being ſeized with convulſions from ſucking mothers irritated by anger. An infant of one year old, while he ſucked milk from his enraged mother, on a ſudden was ſeized with a fatal hæmorrhage and died. Infants at the breaſt in a ſhort time pine away, if the nurſe be afflicted with grievous care; and there are alſo infants who after every coition of the mother, or even if ſhe menſtruate, are taken ill.

USE OF THE MOTHER'S MILK.

1. It affords the native *aliment* to the new-born infant, in which reſpect milk differs little from chyle. Thoſe children are the ſtrongeſt who are nouriſhed the longeſt by the mother's milk.

2. The *coloſtrum* ſhould not be rejected; for it relaxes the bowels, which in new born children ought to be open, to clear their inteſtines of the *meconium*.

3. *Lactation* defends the mother from a dangerous reflux of the milk into the blood, whence lacteal metaſtiſis and leucorrhæa are ſo frequent in lying in women, who do not give ſuck. The motion of the milk alſo being haſtened through the breaſt by the ſucking of the child, prevents the very common induration of the breaſt, which ariſes in conſequence of the milk being ſtagnated.

4. *Men* may *live* upon milk, unleſs they may have been accuſtomed to the drinking of wine.

For all nations, the Japoneſe alone excepted, uſe milk, and many live upon it alone. Laſtly, for many diſeaſes eſpecially the gout, ſcurvy, dyſentery, and phthiſical tubes of the different viſcera, a *milk diet* is reckoned amongſt the moſt efficacious remedies.

THE CREAM OF THE MILK.

THE oleous part which ſwims upon the ſurface of milk after ſtanding.

Milk when deprived of its cream, is called *ſkimmed milk*. This ſoon aceſces and ſeparates into the ſerum and cheeſe.

Milk beat in a wooden veſſel with a peſtle ſoon ſeparates into butter, and a white acidulous ſerum called *butter-milk*, conſiſting of the caſeous and cremoraceous part of milk in which its white colour reſides.

The obtaining of butter from milk is IMPEDED by whatever increaſes the union of the cream

with the caſeous part; as exceſſive cold or heat; or if ſoap, ſugar, culinary, or any other neutral ſalt be thrown into the milk.

Butter melted by the fire and again cooled is called *melted butter*, and does not ſo ſoon become rancid as freſh butter.

Freſh butter has no SMELL. Its TASTE is bland, oleous, and ſweetiſh. COLOUR: White, but that made in the month of May is yellowiſh.

CONSISTENCE: In the cold, rather ſolid; by heat liquifying into oil; and again in the cold becoming ſolid.

By DISTILLATION it paſſes into the *oil of butter*, which is no longer acted upon by cold.

In a temperature greater than that of the *atmoſphere*, it becomes rancid, as it ſpontaneouſly evolves the acid of fat: hence its acrid and rancid taſte and ſmell. It may again be deprived of its rancidity, by waſhing it with ſpirit of wine and water.

It is inſoluble in *water* and *acids*. With *cauſtic alkali* it may be boiled into a ſoft ſoap.

Its CONSTITUENT PRINCIPLES are the ſame as thoſe of the animal oil of the adipoſe membrane, which will be ſpoken of in its place; namely, *carbone*, *hydrogene* and *ſebacic acid*.

USE: The cream is converted into the fat of the body.

THE CHEESE.

THE white, elaſtic, glutinous part of coagulated milk, eaſily putrefying of its own accord.

There are TWO SPECIES of cheeſe.

The *Simple*, obtained from the coagulum of ſkim milk only, without the cream of milk. This is hard and dry.

The *Cremoraceous*, or that prepared from milk with its cream; this is ſoft, and, as it were, pultaceous.

Cheeſe is MADE by means of a ſtrong preſſure on the coagulum of milk, by which all the ſerum is extracted, and the addition of ſalt prevents its putridity.

Simple cheeſe, gradually, but ſlowly, paſſes into a kind of putrid fermentation; hence the acrid ſmell and taſte of old cheeſe. But *cream cheeſe*, from its mixture with oil, degenerates into a putrid, rancid maſs.

Cheeſe is not diſſolved by *cold water*; and by *boiling water* it forms a glutinous very plaſtic maſs, ductile into threads. Broken porcelane veſſels are ſo firmly joined together with this gluten, mixed with quick lime; that food may be boiled in them, without again ſeparating the parts.

It is diſſolved by the *concentrated mineral acids*, and by *cauſtic alkali*.

Dried by a GENTLE HEAT it forms, as it were a hard horny maſs. When *burnt* it diffuſes the

fœtor of burnt hartſhorn. By *dry diſtillation* it gives out an inſipid water, fixed and inflammable air, volatile alkali, and very fœtid empyreumatic oil; and there remains a great portion of carbone, very difficult to be incinerated, which affords aerated and phoſphorated calx, but no fixed alkali.

The CONSTITUENT PRINCIPLES appear to be animal gluten, which conſiſts of carbone and azote; and phoſphorated calx.

Therefore the cheeſe of milk has a very GREAT SIMILITUDE to the glutinous part of vegetable farina.

USE: It paſſes into the fibrous gluten of the cruor and ſolid parts.

THE SERUM OF THE MILK.

THE aqueous part, impregnated with the ſugar, which ſwims upon the caſeous portion of coagulated milk.

The SPONTANEOUS COAGULATION of milk, even in a warm ſituation, ſucceeds very ſlowly and imperfectly. But quicker and more perfect, if increaſed to the boiling heat, and if, at the ſame time, a *coagulating ſubſtance* be mixed with it. Such ſubſtances are,

1. Some *acids*, as vinegar, juice of lemons, cremor tartar, and mineral acids.

2. *Vitrolic Air*, if admitted to milk coagulates it, but is again reſolved by the admiſſion of *alkaline air*.

3. From the *vegetable kingdom*. The Galium luteum, or yellow ladies bed ſtraw, or cheeſe renning. The Rubia tinctorum, or wild madder. The Valantia cruciata, or common croſſwort. The Scolymus cynara, or artichoke, and all the claſs of Cardui. It is ſingular that theſe vegetables muſt be added when freſh, or infuſed in cold water; for their warm infuſion and diſtilled water do not act upon the milk, but even retard its coagulation: nor if they be added to warm milk, is there any ſeparation.

Sugar, neutral and mediate ſalts, gum arabic, and alcohol of wine coagulate milk.

Cauſtic alkailne ſalts cannot coagulate milk becauſe they diſſolve its caſeous part. *Aerated* alkaline ſalts coagulate it but imperfectly, and in a far different way than acid ſalts; for aerated alkali unites with the cheeſe and butter into a *ſaponaceous* maſs, which again ſeparates from the milk in the form of white and denſe flakes, becoming yellow from protracted ebulition, and at length growing brown. Milk is only imperfectly coagulated by *lime water*.

4. From the *animal kingdom*. The coagulum of the milk from the calf's ſtomach commonly called *rennet*. The gaſtric juice. The internal pellicle of the human ſtomach dried; or that of the hens or pullets, and the yolk of an egg.

In reſpect of TASTE, the ſerum of milk is either

1. *Acid*, when prepared with acids.

2. *Sweet*, when prepared with rennet or other coagulating bodies not acid.

The TASTE of the ſimple ſerum of milk is ſweetiſh, agreeable, and, if prepared without boiling, has the ſmell and aroma of the milk.

CONSISTENCE. It is always turbid, but may be ſeparated and *clarified* from the ſuſpended caſeous particles of the cream, by beating it up into a froth with the white of an egg.

SPONTANEOUS DEGENERATION. When left to itſelf, by reaſon of its ſaccharine principle, it firſt goes into the ſpirituous, and then on a ſudden into the acid fermentation, by which the *lactic acid* is generated. See chemiſtry.

The CONSTITUENT PRINCIPLES of the clarified ſerum of the milk are, *water* with the *aroma* and *ſugar of milk*. Sometimes the *ſal diſgeſtivus* and *muriated calx* are alſo found.

USE: It conſtitutes the water of the blood.

THE SUGAR OF THE MILK.

THE ſaccharine principle, ſui generis, which is latent in the ſerum of the milk.

SEPARATION. Pure ſerum of milk, evaporated to dryneſs, leaves a cruſt of a white, milky, opake colour, called the *ſugar of milk*.

Its TASTE is of a fatuous, ſweet, earthy nature. The *Figure of the cryſtals* is minute, irregular, and for the moſt part, like priſmatic parallelopipeds.

It is DISSOLVED in ſeven parts of cold, and in four of boiling water. This ſolution exhibits, as it were, the *artificial ſerum of milk*, which firſt of all goes into the ſpirituous, and ſoon after into the acid fermentation.

A ſimilar ſugar of milk is found in animal jelly, and in the yolk of an egg.

Its CONSTITUENT PRINCIPLES are *ſugar*, and the *baſis of the ſaccho-lactic acid*. For by the me-

dium of acid of nitre, it is changed into two acids; the *acid of ſugar* and the *ſaccho-lactic acid*: as is explained in chymiſtry.

USE: The ſugar of milk is a *vinculum* by which the caſeous adheres laxly to the butyraceous part, and is united with the water. Thus as in *vegetable emulſion*, the farinaceous coheres with the oleous part, by means of mucilage; and in this manner is united with the water.

THE SMEGMA OF THE AREOLÆ OF THE BREASTS.

THE unctuous humour which lubricates the areola and papilla of the breaſts, eſpecially in women who ſuckle.

QUANTITY: In women not giving milk, ſcarcely perceptible.

It is SECRETED by the ſebaceous glands, ſituated under the tender cutis of the mammary areolæ.

QUALITY: Mucous and oily. Dried, it forms black ſordes, adhering to the areolæ and folds of the nipples.

USE: It prevents the tender ſkin of the areolæ and nipples from being *excoriated* by the ſtrong ſucking of the child, and its frequent humidity during ſucking: for experience ſhews, that moiſt parts are much more eaſily excoriated than dry.

IN THE

CAVITY OF THE ABDOMEN.

THE AIR OF THE PRIMÆ VIÆ.

THE air contained in the cavity of the ſtomach and inteſtines.

The QUANTITY in an healthy man is ſmall, creating no flatulence, but in a morbid ſtate, as in the tympanites of the inteſtines, it is often enormous.

EXCRETION: When abundant, it is eliminated *in ructu*, or by *flatus*, from the primæ viæ. But atmoſpheric air often cauſes vomiting, when ſwallowed copiouſly and deſignedly.

The CONSTITUENT PRINCIPLES *of Gaſtric air.* In a very healthy man frozen to death by cold on a winter's night, there was found a mixture of four kinds of air in the primæ viæ:

Fixed air was found in the greateſt quantity in the ſtomach, and but little in the ſmall inteſtines.

Vital air was contained chiefly in the ſtomach, and ſmall inteſtines, and,

Azote, and *carbonated inflammable air*, in the large inteſtines.

From this it will appear, why *crepitus ex ano* diſcharged on a lighted candle, goes off with a greeniſh flame. Alſo why air diſtilled from dried human excrement, exhibits inflammable air, burning with a green flame. The green colour proceeds from the carbone, diſſolved in inflammable air.

The ORIGIN OF GASTRIC AIR, is from,

1. *Atmoſpheric air,* which is ſwallowed with the ſaliva, food, and drink, and is decompoſed into vital air and azote.

2. *Ingeſted food,* decompoſed into its elementary principles.

3. *Animal gas,* or carbonated hydrogene exhaling into the cavity of the primæ viæ.

USE: From theſe gaſſes chyle appears to be formed. Thus the carbone combined with the hydrogene, forms the cream; and the carbone with the azote, the cheeſe of the chyle. In this manner only can be conceived, how from ſuch different foods, as fleſh, bread, oleraceous ſubſtances, and fruits, decompoſed into their elementary principles, and according to the law of vital affinity, entering into new combinations; a white chyle is always produced. The oxygene of vital air united with certain baſes, forms the ſugar of milk in the chyle, which carries with it the matter of heat into the blood.

THE GASTRIC JUICE.

THE limpid juice ſecreted by the arteries into the cavity of the ſtomach.

The SECRETORY ORGAN is compoſed by the exhaling oſcula of the very numerous arteries which bedew every part of the ſtomach.

It is continually mixed with the ingeſted food, and when the ſtomach is empty, is expelled into the ſmall inteſtines and abſorbed by the mouths of the lacteal veſſels. Sometimes this juice, if the body be bent forward, regurgitates from an empty ſtomach through the œſophagus into the cavity of the mouth.

Healthy gaſtric juice has no SMELL. The TASTE is ſaltiſh.

COLOUR: limpid like water, unleſs it be a little tinged with the yellow colour of the bile regurgitating into the cavity of the ſtomach.

Its SPECIFIC GRAVITY is lighter than blood, for after being mixed with it, it again riſes to the ſurface.

Its CONSISTENCE is ſomewhat plaſtic from being mixed with the mucus of the ſtomach, but of its ſelf it is aqueous.

The QUANTITY is very great, as would appear from the extent of the ſurface of the ſtomach, and its continual ſecretion. But it ſeems to be more copious when ſolicited by the ſtimulus of food.

The gaſtric juice of *ruminant* and of *phytophagous animals* furniſhed with *four ſtomachs*, eſpecially when grown up, ſoon *putrefies*, and turns the ſyrup of violets to a *green colour*.

That of *carnivorous*, and *phytophagous animals* furniſhed with *one ſtomach* only, is acid, turning the ſyrup of violets *red*.

The gaſtric juice of *omnivorous animals*, as *man*, has neither of theſe qualities; for it does not alter the ſyrup of violets.

It very eaſily unites with *water*, but never with blood.

It is not coagulated by *acids* nor *alkalines*. But by *alcobol of wine* a ſmall quantity of an albuminous maſs is precipitated.

Left to itſelf it does not putrefy, but even reſiſts *animal* putrefaction, and the acid fermentation of *vegetables*. In this quality it principally differs from ſaliva.

EVERY KIND of gaſtric juice *coagulates milk*. For it is a property not only peculiar to the ſtomach of phytophagous, but alſo to thoſe of ſarcophagous, ruminant, and non-ruminant animals. The *human* ſtomach and that of *abortive fœtuſes* have alſo this quality.

Even the very cheeſe obtained from the milk of an heifer's ſtomach, coagulates milk. And what is moſt wonderful, the ſtomach itſelf either wet, or carefully dried without artificial heat, or waſhed with the lixivium of ſalt of tartar, has the

ſame power; for ſix grains of the internal membrane of the ſtomach, infuſed with water, coagulates above one hundred pounds of milk.

But in ruminating animals, the juice of the *fourth ſtomach* alone poſſeſſes this property. Laſtly, the craw of birds, which appears to contain ſalival juice only, is deſtitute of the power of coagulating milk.

The CONSTITUENT PRINCIPLES of gaſtric juice, are,

1. *Water*, which conſtitutes its greateſt part.

2. *An Albuminous principle*, precipitated by alcohol of wine.

3. *Culinary Salt*, produced by chemical analyſis.

4. *Gaſtric acid*, which is generally believed to be an acid with properties peculiar to itſelf; but by ſome ſuppoſed to be phoſphoric acid mixed with a ſmall quantity of volatile alkali.

It is aſſerted that from the maceration of freſh fleſh with culinary ſalt in water, an artificial juice may be obtained ſimilar to natural gaſtric juice.

Gaſtric juice diſtilled to dryneſs, gives out water, which is neither acid nor alkaline. Sometimes a little volatile alkali and empyreumatic oil, which appears to be the products of the albumen.

The remaining maſs conſiſts of culinary ſalt, ammoniacal ſalt, and a ſmall portion of carbone.

The USE of the GASTRIC JUICE.

1. It poſſeſſes a wonderful power of *digeſting*, or changing into chyme, animal or vegetable food. Upon killing a ſwan, a water ſerpent was detected in the throat, extending ſomeway into the ſtomach. The part which occupied the throat was found in a crude ſtate, and that which projected into the ſtomach, was digeſted into a pultaceous maſs.

Even food encloſed in golden capſules is digeſted in the ſtomach: hence the gaſtric juice and not the ſtomach digeſts.

2. It poſſeſſes a menſtrual property adapted to the *diverſity of aliment*, peculiar to each claſs of animals; ſo that, in the carnivorous, it digeſts fleſh only, and not vegetables; in the herbivorous ruminant, vegetables only, and not fleſh; and in man, living upon animal and vegetable food, it is poſſeſſed of the wonderful property of digeſting both. The gaſtric juice of *dogs* gradually digeſts even the *bones* that have been ſwallowed.

3. It does not act upon the *ſtomach* by its *vital power*, nor on *worms*, when *alive*. But in the dead body it appears to macerate the ſtomach, now deprived of its vitality, and, as it were, to digeſt it.

4. It reſiſts by a peculiar *antiſeptic* quality the *putridity* of animal food, and the *fermentation* of vegetables. Hence putrid fleſh is eat by ſome men with impunity.

5. It by degrees reſolves *milk* after it has coagulated gently in the ſtomach. Even the gaſtric juice out of the ſtomach, aſſiſted by the heat of a furnace, diſſolves food into chyme.

6. Acid, or alkaline gaſtric juice, taken internally as a medicine, cures *dyſpepſia* and *intermittent fevers*. But exhibited in a *putrid fever*, the former was inefficacious, and the latter hurtful. The acid gaſtric juice, applied externally in the form of fomentation, cures *putrid* and eſpecially *ſcrophulous ulcers*, in a wonderful manner, as I have often experienced; although at firſt it ſomewhat irritates and increaſes the pain. It is ſometimes employed to diſſipate *indolent* and *inflammatory tumours*, with great ſucceſs. The like experiments with alkaline gaſtric juice upon ulcers, prove that it either avails nothing, or makes them worſe.

THE CHYME.

THE griſeous maſs produced from ingeſted food contained in the ſtomach.

SMELL and TASTE: Fatuous and nauſeous. COLOUR: Cineritious or yellowiſh. CONSISTENCE: Pultaceous and ſoft.

The QUANTITY correſponds with the quantity of ingeſta, or aliments received.

Its SPECIFIC GRAVITY is much greater than water.

The NUTRITIVE PRINCIPLES of animal food are, jelly, animal gluten of the fibres, and bland oil of the adipoſe membrane.

The nutritive principles of vegetable food are amylum or ſtarch, the albuminous principle of *olera*, the farinaceous vegetable gluten and ſugar; and in ſome a bland oil.

The CONSTITUENT PRINCIPLES of chyme therefore conſiſt of,

1. *Ingeſted animal* or vegetable food, reſolved into a pult or alible principles.

2. *Crude Particles* of food, which cannot be decompoſed by the gaſtric juice.

3. *Swallowed Saliva*, mixed with the gaſtric juice and mucus of the ſtomach.

USE: It is the maſs from which the chyle is prepared in the ſmall inteſtines.

THE PANCREATIC JUICE.

THE limpid juice ſecreted from the pancreas into the cavity of the inteſtines.

SECRETORY ORGAN. The pancreatic, or Wirſungian duct, ariſes by very thin radicles from innumerable acini; theſe form a *common duct* which penetrates the coats of the *Inteſtinum duodenum* obliquely downwards; at which place, for the moſt part, it unites with the *ductus communis choledochus*, and by an orifice common to both, opens into the cavity of the inteſtine.

The pancreatic juice mixes with the chyme coming from the ſtomach into the duodenum. But when there is no chyme, it is abſorbed into the lacteal veſſels of the ſmall inteſtines.

The QUANTITY appears to be very great, for the pancreas is three times as large as the ſalival glands, and ſituated in a warmer place.

QUALITY: It is very like in its ſmell, taſte, colour, and conſiſtence, to ſaliva. Hence its conſtituent principles do not appear unlike it. But the exact analyſis has not yet been made.

The USE of the Pancreatic juice, is,

1. To dilute the *chyme* coming from the ſtomach into the duodenum; and if any injurious ſubſtance has been digeſted in the ſtomach, to diſſolve it into its principles.

2. To dilute and attenuate the *bile*, eſpecially the cyſtic, which is viſcid and acrid; and to temper its acridity.

3. By its plentiful acceſs, to aſſimilate the crude chyme more and more into an animal nature.

THE BILE.

THE bitter juice ſecreted in the glandular ſubſtance of the liver, and in part regurgitating into the gall bladder.

The SECRETORY ORGAN, is formed by the very ſmall *acini*, or *vaſcular glomeruli*, which conſtitute almoſt the whole ſubſtance of the liver, and terminate in very minute canals, called *biliary ducts*. The biliary ducts exonerate their felleous fluid into the *ductus hepaticus*, which conveys the bile into the ductus communis choledochus, from whence it is in part carried into the duodenum.

The other part of hepatic bile regurgitates from the *ductus communis choledochus* through the *cyſtic duct*, into the gall bladder. For the hepatic bile, except during digeſtion, cannot flow into the duodenum, which contracts when empty: hence

it neceſſarily regurgitates through the cyſtic duct into the gall bladder.

The HEPATIC GLOMERULI, are mere vaſcular and not folliculous cavities, in which the bile is depoſited. For wax injected through the *vena portæ*, paſſes directly in a ſtraight line, without any intervening nodes, into the biliary pores.

The branches of the *vena portæ* contribute the moſt to the ſecretion of the bile; for its peculiar blood returning from the abdominal viſcera, loaded with the carbonic principle, anſwers exactly to the nature of the bile. It is not clear whether the florid blood of the *hepatic artery* nouriſhes the liver only; or at the ſame time, ſeparates a peculiar principle, neceſſary for the formation of bile.

That cyſtic bile is not ſecreted by the arterious veſſels of the gall bladder, is evident from its vacuity, upon making a ligature on the cyſtic duct.

From what has been ſaid, it appears, that there are, as it were, *two kinds* of bile in the human body.

1. *Hepatic,* which flows from the liver into the duodenum. This is thin, of a faint yellow colour, inodorous, and very ſlightly bitter; otherwiſe the liver of animals would not be eatable.

2. *Cyſtic,* which regurgitates from the hepatic duct, into the gall bladder, and there, from ſtagnating becomes thicker, the aqueous parts being abſorbed by the oſcula of the lymphatic veſſels; and more acrid from concentration. In dead bodies only, the cyſtic bile tranſudes through the inorganic pores of the *veſicula fellea,* into the neighbouring parts.

The PROPERTIES of healthy cyſtic bile, are,

COLOUR: Yellowiſh-green. CONSISTENCE: Plaſtic, like thin oil. When very much agitated it *froths,* like ſoap and water.

SMELL: fatuous, ſomewhat like muſk; eſpecially the putrefying or evaporated bile of animals.

TASTE: Bitter, yet not ſo much ſo as that of the gall of brutes. It is wonderful that gall, combined with aloes, forms a maſs, of a nauſeous, but ſweetiſh taſte.

Its SPECIFIC GRAVITY is greater than diſtilled water.

Bile, diſtilled *in balneo maris*, gives out a fetid water, and leaves a black maſs, called the extract of bile.

Neither bile, nor its extract, are ſoluble in *water*.

It is decompoſed by the *mineral acids* and *vinegar*, and its albuminous part is precipitated into *coagulum*; which, is again diſſolved by adding a greater quantity of the acid of ſalt. The ſolution with the acid of ſalt becomes *red*.

The whole of the bile becomes *white* like *milk*, from the *oxygenated acid of ſalt*. The albuminous part of the bile forms a very tenaceous coagulum, which dried ſlowly, indurates in the

form of *gall-ſtone*. Therefore the ſuper-abundant oxygene of the acid of ſalt, deſtroys the colouring principle of the bile, and indurates the albumen into a *gall-ſtone*.

The albuminous part of bile is coagulated by *alcohol of wine*. The tincture, ſeparated from the coagulum, and evaporated to dryneſs, leaves a *reſinous*, balſamic, inſipid *maſs*; ſoluble in ſpirit of wine, except a ſmall portion of jelly that remains, and forms a *green* ſolution with alkali.

This reſinous maſs of the bile diſtilled *per ſe*, gives out a yellowiſh bitter water: empyreumatic, thick, balſamic oil: and a little volatile alkali. The maſs which remains in the retort, is like *colophone*, or black reſin.

The EXTRACT *of bile*, by dry diſtillation gives out,

1. *An alkaline, bitteriſh water.*

2. *Dry volatile alkali.*

3. *Empyreumatic, fetid oil.* All theſe are the products of the fire, ariſing from the decompoſition of the albumen of the bile. The whole maſs, during the diſtillation, ſwells very much, and the internal ſurface of the cucurbite is covered over with a black, ſhining varniſh, which does not adhere to the fingers. The carbone that remains is copious, ſhining, eaſily incinerated; and affords ſoda, phoſphorated calx, and iron.

Bile is not *animal ſoap*, for it doth not unite with the *bland* and *ætherial oils*; nor does it diſſolve oil, nor *mix* it with water like ſoap; nor, like the latter, is it ſoluble in water. It is true that oily drops are *extracted* from linen and cloth, if rubbed with bile; but this is done by the friction expelling the very minute oily particles from the linen, in conſequence of the bile having a greater *affinity* to linen and cloth, than the oil. Nor is that ſoap, which conſiſts of reſin and mineral alkali; for the quantity of ſalt is too ſmall, in proportion to the reſin.

SPONTANEOUS DEGENERATION: Bile putrefies in a veſſel ever ſo cloſely ſtopped. But the *extract* may be preſerved for years free from putrefaction.

The CONSTITUENT PRINCIPLES of bile, are,

1. *Water*, which conſtitutes the greateſt part of bile.

2. *An Albuminous Principle*, precipitated from bile by alcohol of wine and mineral acor.

3. *A Reſinous principle*: for the tincture, made by the coagulation of bile with alcohol of wine, and after the ſeparation of the coagulum evaporated, exhibits a black, reſinous maſs, ſoluble in ſpirit of wine; except a little remaining jelly.

4. *A Colouring Principle*: which adheres to the reſinous part, and gives the colour to the bile.

5. *Soda*, in its cauſtic ſtate: thus healthy bile does not effervеſce with acids, but affords a neutral

ſalt, varying according to the quantity of mineral acid mixed with it. Thus with acid of vitriol, it conſtitutes the *ſal mirabilis*; with acid of ſalt, culinary ſalt.

6. *Phoſphorated calx*: a ſmall portion of *iron* and *culinary ſalt* is alſo obtained from the incinerated carbone of bile.

Some modern chemiſts are of opinion, that bile is the blood in ſome way deprived of its oxygene: for if two parts of blood be coagulated by fire with one part of diſtilled water, and then filtrated, the liquor is bitter, yellow, and very like bile. The ſame change of blood into bile takes place, if blood inſtead of water be boiled with fuming ſpirit of nitre: but the cauſe of this phænomenon appears not yet to be diſcovered.

The PRIMARY USE of bile is, the *extrication of chyle*, from the chyme ſent into the duodenum. For there the firſt appearance of chyle is obſerved, and it is known that bile extricates oil from cloth and linen.

2. By its *acridity* it excites the periſtaltic motion of the inteſtines; hence the bowels are ſo inactive in people with jaundice.

3. It imparts a *yellow colour* to the excrements. Thus the white colour of the fæces in *icterus*, in which diſeaſe the flow of the bile into the duodenum is entirely prevented.

4. It prevents the *abundance of mucus and acidity* in the *primæ viæ*; hence acid, pituitous, and verminous *ſaburra* are ſo frequent from *deficient or inert bile*.

THE CHYLE.

THE white liquor, obſerved ſome hours after eating, in the lacteal veſſels of the meſentery, receptaculum chyli, and thoracic duct.

The ORIGIN OF CHYLE is from the chyme, which in the ſmall inteſtines is ſeparated by the bile into chyle and excrement. The *chyle* is abſorbed

by the oſcula of the lacteal veſſels, which are in the greateſt number in the *Jejunum* and *Ileum*. The *fæx of the chyme*, with the greateſt part of the bile, is propelled into the large inteſtines.

The SMELL of chyle is like milk. Its TASTE: ſweetiſh. COLOUR: White. CONSITENCE: Thinner than blood and milk.

Its SPECIFIC GRAVITY is lighter than blood; hence chyle is often ſeen ſwimming upon it, if a vein be opened ſome hours after eating.

Its QUALITY is very ſimilar to milk; for, like the latter, it is coagulated and aceſces; but ſometimes its nature is altered, from bad digeſted food or medicines. Thus the chyle becomes blue, from eating *Indigo*; yellow, from the *yolks* of eggs: and thus it has an acrid taſte, from digeſting the *ſyrupus florum perſicorum*.

The QUANTITY is greater or leſs, according to that of the ingeſta, and their greater or leſs nouriſhing power. From five or ſix pounds of food, very little more than two pounds of chyle are elaborated.

CONSTITUENT PRINCIPLES: Like milk, it ſeems to conſiſt of ſerum, cream, and cheeſe.

1. *Water* forms the greateſt part of the chyle.

2. *Oily cream*; which is compoſed of hydrogene and carbone.

3. *Cheeſe*; which, by the vis vitalis, is compoſed of the carbone and azote of the ingeſted food.

4. *Earth*; for lacteal calculi are frequently found in the receptaculum chyli, and in the courſe of the lacteal veſſels.

5. *Animal lymph*; which is mixed with the gaſtric and enteric juices.

The reaſon why the chyle which is ſeparated from ingeſted *vegetables*, (whoſe nutritive principles are, ſtarch, the albuminous principle, oil, vegetable gluten and ſugar;) is of the ſame nature as that prepared from *animal* ingeſta, (whoſe alible, or alimentary principles are, oil, jelly and animal gluten;) is, that the principles of both are diſſolved

into their elements, which, are the ſame in animal and vegetable foods. Thus the *cream of chyle* ariſes from the carbone and hydrogene; and the *cheeſe of chyle*, from the carbone and azote of both animal and vegetable food. In a ſimilar manner the ſugar of the milk and phoſphorated calx of the chyle is produced from the admixture of oxygene with its baſes.

Laſtly, all the chyle is mixed with the albuminous and gelatinous lymph in the *thoracic duct*, into which, all the lymphatic veſſels of the body exonerate themſelves; thereby becoming more impregnated with the animal nature, and rendered more caſeous.

The DIFFERENCE between chyle and milk is, that chyle is thinner, more crude, and leſs caſeous.

USE OF CHYLE.

1. It ſupplies the matter, from which the *blood* and other *fluids* of our body are prepared; from which fluids, the *ſolid parts* are formed.

2. By its *aſceſent nature*, it ſomewhat reſtrains the putreſcent tendency of the blood. Hence the dreadful putridity of the humours from ſtarving, and thus, milk is an excellent remedy for putrid ſcurvy.

3. By its very copious *aqueous latex* it prevents the ſpiſſitude of the fluids, and hence obviates their immeability and inaptitude to the ſecretions.

4. The chyle ſecreted in the breaſts of puerperal women, under the name of *milk*, conſtitutes the primary and moſt excellent nutriment of all aliments for new-born infants.

THE ENTERIC JUICE.

THE limpid liquor, ſecreted by the exhalent arteries, in the whole courſe of the ſmall and large inteſtines.

In the ſmall inteſtines, it is mixed with the *chyme*; but in the large, with the *fæces*; and when

the *inteſtines* are *empty*, it is abſorbed into the lacteal veſſels.

The QUANTITY appears to be very great, as is evident from the amplitude and length of the ſecretory organ; from the immenſe number of ſecerning arteries; heat of the part; aqueous diarrhæa; and from the very great quantity ſecreted after taking a purgative medicine. Yet there appears to be a greater quantity of this juice ſecreted in the ſmall, than in the large inteſtines, as the rather ſolid conſiſtence of the excrements of an healthy man proves.

The QUALITIES of this juice are like thoſe of the ſaliva: hence the conſtituent principles appear to be of the ſame nature, but tinged with bile.

The USE OF THE ENTERIC JUICE, is,

1. To *dilute* the *chyme* in the inteſtines, and to decompound and change it into chyle.

2. To continually cleanſe, deterge, and moiſten the *inteſtines*, eſpecially the *large*; to prevent

the excrement from indurating into too compact *ſcybala*, and adhering to the inteſtines.

3. Sometimes alſo *acrimonies* are eliminated with the enteric juice *from the blood*, as would appear from the critical diarrhæas of diſeaſes, not gaſtric. Thus bilious fever, merely venous from the beginning, during its courſe is often cured by diarrhæa.

THE MUCUS OF THE PRIMÆ VIÆ.

THE mucus which lubricates the internal ſurface of the ſtomach, and ſmall and large inteſtines.

The SECRETORY ORGAN is formed by the muciparous glands, ſituated under the villous coat of the primæ viæ. When *abundant*, it is eliminated with the excrement of the large inteſtines.

CONSISTENCE: In the ſtomach and ſmall inteſtines, thin; but in the rectum, more copious and thicker than in the noſtrils. Its other *properties* agree with the mucus of the noſtrils.

The QUANTITY is very great, as the breadth and length of the ſecretory ſurface ſhews.

USE:

1. It *lubricates* the ſurface of the primæ viæ, that the *chyme* may deſcend more eaſily through the ſmall inteſtines, and the excrement through the large.

2. It *prevents* the injury of the ſenſible ſurface of the ſtomach and inteſtines from acrid and ſpirituous foods, or acridity of the bile; hence heart-burn, tormina, and teneſmus, if this mucus be eliminated by draſtic purges.

THE ALVINE FÆCES.

THE fetid maſs, contained in the cavity of the large inteſtines.

It ARISES from the *remains* of ingeſta, which the *vires coctrices naturæ*, or digeſtive powers of nature, are unable to convert into chyle; and has

mixed with it the excrementitious portion of the bile, and mucus of the large inteſtines.

The alvine excrement is firſt FOUND in the *inteſtinum cæcum*; for ſtercoraceous fetid ſcybala are frequently detected in the appendix of the colon.

The SMELL of excrement, even of the moſt healthy man, is very diſagreeable, and *peculiar* to the ſpecies of animal; more intolerable in man and *carnivorous*, than in *herbivorous* animals, as the horſe, &c. The corruption of cow dung is ſo ſmall, that an odorous water is diſtilled from it, called the *aqua milleflorum*. Human excrement dried for a long time, emits a ſmell almoſt like that of *ambergris*. In *putrid diſeaſes* of men, and in *privies*, its fetor is very deteſtable, ſharp, and offenſive; from being mixed with the volatile alkali, ariſing from putridity.

TASTE: fatuous. Thoſe who have laboured under the *pica ſtercophaga*, and have eat human excrement, declare that it is ſweet.

Colour: In an healthy man, yellow; the longer retained, the browner it becomes. The yellow colour is from its mixture with the bile; for fæces become white, if the bile be prevented from flowing into the duodenum, as in jaundice.

Quantity: An healthy and adult man excretes daily from four to five ounces, or more. *Vegetables* afford more copious fæces than *fleſh*, by reaſon of their very great proportion of water.

Consistence: In an healthy man, *pultaceous* in the large inteſtines, but by degrees it becomes like a thick electuary in the extremity of the rectum, and is preſſed through the narrow ſphincter of the inteſtine in a cylindric form. If the food be not well digeſted, the excrement deſcends ſoft, and in greater quantity. Fæces retained long in the bowels, form, as it were, hard and dry *ſcybala*.

Its Specific Gravity is ſo light, as to ſwim upon water and urine.

The CONSTITUENT PRINCIPLES of alvine excrement are as follows.

1. *Water,* which conſtitutes the greateſt part: for when diſtilled by a ſlow gentle fire, it emits ſo great a quantity of fetid water, that it is reduced to a *tenth* part of its weight. This water is limpid and inſipid, yet has a ſtercoraceous fetor.

2. *An odorous fetid principle,* which affects the noſtrils, and paſſes into the water, during diſtillation.

3. *Inflammable carbonated air,* obtained from diſtilled excrement, which upon being ſet fire to, burns with a bluiſh green flame; for in this manner, flatus emitted from the anus on the flame of a candle, takes fire, and flies off towards the back.

4. *The remains of the ingeſted food.* Thus in the fæces of carnivorous animals there is often detected the ſound fibres of tendons; in the *album græcum* of dogs, friable fragments of

bones; and in thoſe, of herbivorous animals, the fragments of the ſkin, and membranes of grapes. The germinating power has not been deſtroyed in ſeeds, which have been ſwallowed whole by man or any other animal. In the excrements of the Tenea or moth, the colour of the wool predominates; the red colour of the ſorgus in the excrements of Italian ruſtics; an odour of tobacco in the ſtercorous evacuation of the Elephant: and the black matter of ſwallowed iron, in the alvine fæces of the Stork. Laſtly, the *ſcybala* of metal workers, are ſometimes covered with a ſhining leaden cruſt.

5. *The remains of the inquiline humours*: For the alvine fæces have mixed with them,

Firſt, *The excrementitious part of the bile*, whoſe nature it is to indurate very much, and tinge the excrement of a yellow colour; hence it forms the *colouring principle* of the fæces.

Secondly, *The earthy part of the pancreatic and enteric juices*: For it is certain, that ſwallowed

heterogeneous bodies, and even the villous coats of the inteſtines, are often found covered over with a *ſtony cruſt*. Thus it is credible, that earthy particles may be depoſited in the alvine fæces, from the human fluids.

Thirdly, *The inteſtinal mucus* mixed copiouſly with the fæces, to which the ſoftneſs ſo natural to them, is uſually attributed.

The USE of the exoneration of the alvine excrement is, to *clear* the inteſtines from uſeleſs and hurtful acrid ſaburra.

THE VAPOUR OF THE CAVITY OF THE ABDOMEN.

THE aqueous vapour which exhales into the cavity of the abdomen.

The SECRETORY ORGAN is conſtituted by the exhaling oſcula, ſituated on the *internal* ſurface of the peritoneum, and *external* of all the abdominal viſcera. The *abundant* vapour is abſorbed by

the orifices of the lymphatic veſſels of the ſurfaces juſt mentioned.

The QUANTITY, in a ſtate of health, is very ſmall; but in dropſy of the abdomen, great and incredible. I lately drew away forty pounds from the abdomen of a woman, labouring under aſcites, by paracenteſis.

The Quality of this vapour is like that in all the large cavities of the body.

USE:

1. To preſerve *moiſt*, ſoft, and flexile, the abdominal viſcera.

2. To prevent the *concretion* of the viſcera with each other, or with the peritoneum.

THE JUICE OF THE SUPRA-RENAL GLANDS.

THE juice which is found in the cavity of the ſupra-renal glands.

The SECRETORY ORGAN of this juice is formed by the oſcula of the arteries, which open into the cavity of the glands. Theſe ſupra-renal glands or *capſules*, ſituated above the kidneys, one on each ſide, are of a conglomerate ſtructure, and in the middle, between the anterior and poſterior ſurfaces, are furniſhed with a ſmall cavity, in which ſome fluid is found.

Its COLOUR in the fætus is whitiſh, in the adult, reddiſh or yellow, and ſometimes brown.

An EXCRETORY DUCT as yet has never been detected; hence the *abundant* fluid appears to be abſorbed by their lymphatic veſſels.

The USE of this juice, as well as that of the glands, is as yet unknown; but whatſoever it may be, this alone can be ſaid, that in the fætus theſe glands are of greater conſequence, than in the adult: For in the former they are larger than the kidneys, but in the latter much leſs.

THE URINE.

THE ſaline liquid, ſecreted in the kidneys, and dropping down from them, guttatim, through the ureters, into the cavity of the urinary bladder.

The SECRETORY ORGAN is compoſed of the arterious veſſels of the cortical ſubſtance of the kidneys, from which the urine paſſes through the uriniferous tubuli and renal papillæ, into the renal pelvis; whence it flows drop by drop, through the ureters, into the cavity of the urinary bladder: where, it is detained ſome hours, and at length, when *abundant*, eliminated through the urethra.

The urine of an healthy man is DIVIDED in general into,

Crude, or that which is emitted one or two hours after eating; this is for the moſt part aqueous, and often vitiated by ſome foods, and,

Cocted, which is eliminated ſome hours after the digeſtion of the food, as that which is emitted

in the morning after ſleeping. This is generally in ſmaller quantity, thicker, more coloured, and more acrid than at any other time. Of ſuch coćted urine,

The COLOUR is uſually citrine, and not unhandſome.

The DEGREE OF HEAT agrees with that of the blood; hence in atmoſpheric air it is warmer, as is perceived if the hand be waſhed with urine.

The SPECIFIC GRAVITY is greater than water, and that emitted in the morning is always heavier than at any other time.

The SMELL of freſh urine is not diſagreeable. The TASTE is ſaltiſh, and nauſeous.

The CONSISTENCE is ſomewhat thicker than water.

The QUANTITY depends on that of the liquid drank, its diuretic nature, and the temperature of the air.

PROPERTIES of healthy urine.

Freſh urine does not appear to be of an *acid* nor an *alkaline* nature: For it does not change the *ſyrup of violets*.

Mixed with *fixed alkali* and *aqua calcis*, it eructates volatile alkali.

Urine is neither coagulated by *alcohol of wine*, nor *mineral acor*: Hence it is an aqueous liquor, not a ſerous one.

When COLD, it is gradually rendered more turbid, and depoſits a *ſediment*, which, is again diſſolved, if the urine be made warm.

Evaporated to the thickneſs of honey, it becomes red, bitter, very acrid, but not alkaline, and is called *ſapa of urine*; which, when evaporated to dryneſs, is called *extract of urine*.

Urine diſtilled to the conſiſtence of honey, and ſuffered to *chryſtallize*, depoſits *ſal digeſtivus*, *microcoſmic ſalt*, and *phoſphorated* and *mineral alkali*.

THE CHANGES OF URINE IN THE AIR. Preſerved in an open veſſel, it remains pellucid for ſome time, and at length there is perceived at the bottom, a *nubecula*, or little cloud, conſolidated as it were from the gluten. This nubecula encreaſes by degrees, occupies all the urine, and renders it opake. The natural ſmell is changed into a putrid *cadaverous* one; and the ſurface is now generally covered with a *cuticle*, compoſed of very minute chryſtals. At length the urine regains its tranſparency, and the *colour* is changed from a yellow to a brown; the cadaverous ſmell paſſes into an *alkaline*: and a brown, grumous *ſediment* falls to the bottom, filled with white particles, deliqueſcing in the air, and ſo conglutinated as to form, as it were, little ſoft calculi.

Thus *two ſediments* are diſtinguiſhable in the urine; the *one* white, and gelatinous, and ſeparated in the beginning; the *other* brown, and grumous, depoſited by the urine, when putrid.

SPONTANEOUS DEGENERATION: Of all the fluids of the body, the urine firſt putrefies. In ſummer, after a few hours, it becomes turbid, and

ſordidly black; then depoſits a copious ſediment, and exhales a fetor, like that of putrid cancers, which, at length becomes cadaverous. Putrid urine effervesces with acids, and if diſtilled, gives off, before water, an urinous volatile ſpirit.

The CONSTITUENT PRINCIPLES of healthy urine, are,

1. *Water*, from twenty ounces; nineteen of a nauſeous, fetid water, were obtained by diſtillation.

2. *The odorous principle* of urine, perceptible to the ſmell, and which, during diſtillation, paſſes with the water into the receiver.

3. *Phoſphorated ſoda.* The dry extract of urine, well calcined, diſſolved in water, and put to chryſtallize, depoſits a ſalt; which, chemically examined, conſiſts of mineral alkali and phoſphoric acid.

This ſalt, digeſted with vinegar, loſes ſome part of its alkali; hence the ſalt that remains

is rendered more acid by the phoſphoric acid: and thus by ſome is called the *acidum perlatum.*

Phoſphorated volatile alkali. If calcined extract of wine, diſſolved in ſpirit of wine, and filtered, be put to *chryſtallize,* chryſtals are formed; which conſiſt of volatile alkali with a ſmall quantity of mineral alkali, and phoſphoric acid. Hence it is of three kinds, and is called *microcoſmic* or *fuſible ſalt of urine.* This ſalt, burnt in a crucible, or upon burning coal, diſmiſſes its volatile alkali, and is changed into a *vitriform maſs,* deliqueſcing in the air; which, on account of the mineral alkali contained in it, is not pure acid of phoſphorus.

Calculous matter, depoſited in the form of browniſh-red earthy gluten, from putreſcent urine, at the bottom and ſides of the chamber-pot. It conſiſts of *gluten, animal earth,* and the *lithic acid*; as the analyſis of *urinary calculus* ſhews.

The extractive principle of urine. From the liquid reſiduum of urinous ſapa, by chryſtalli-

zation, a ſaline liquid is extracted, attracting the water from the atmoſphere, but otherwiſe not known. The remaining *extractive principle* is ſoluble in water, and appears to be gelatinous.

7. *Sal digeſtivus, culinary ſalt and animal earth* may be elixiviated from the incinerated carbone of diſtilled urine.

Products of the Fire. Urine diſtilled *in balneo maris*, gives off a copious *water*, of a nauſeous fetor, and leaves an earthy reddiſh *extract*. This diſtilled by fire, exhibits *urinous ſpirit, dry volatile alkali*, and very fetid *empyreumatic oil*; and if the heat be greatly encreaſed, a ſmall portion of *phoſphorus*. At length a carbone remains, which incinerated, affords *ſal digeſtivus, culinary ſalt, phoſphorated ſoda, and calcareous earth*.

No liquor in the human body, however pure, is ſo variable in reſpect to *quantity* and *quality*, as the urine; for it varies,

. *In reſpect to* AGE. In the *fætus* it is inodorous, inſipid, and almoſt aqueous; but as the *infant* grows, it becomes more acrid and fetid: and in *old age* more particularly ſo.

. *In reſpect to* DRINK: It is ſecreted in greater quantity, and of a more pale colour, from cold and copious draughts. It becomes green from an infuſion of Chineſe tea, or the uſe of the pulp of Caſſia.

. *In reſpect to* FOOD: From eating the heads of Aſparagus, or Olives, it contracts a peculiar ſmell: From the fruit of the Opuntia, it becomes red; and from faſting, turbid.

. *In reſpect to* MEDICINES: From the exhibition of Rhubarb root, it becomes yellow; and from Turpentine, a violet colour.

. *In reſpect to the* TIME OF THE YEAR: In the winter, the urine is more copious, and aqueous; but in the *ſummer*, from the encreaſed tranſpiration, it is more ſparing, higher coloured, and ſo acrid, that it ſometimes becomes

ſtrangurious. The *climate* induces the ſame difference.

6. *In reſpect of the* MUSCULAR MOTION *of the* BODY: It is ſecreted more ſparingly, and concentrated by motion; and is more copiouſly diluted, and rendered more crude, by *reſt*.

7. *In reſpect of the* AFFECTION *of the* MIND: Thus fright makes the urine pale.

USE: The urine is an excremetitious fluid, like lixivium, by which the human body is not only liberated from the ſuperfluous water; but alſo from the ſuperfluous ſalts, and animal earth: and is defended from corruption.

Laſtly, The vis medicatrix naturæ ſometimes eliminates many morbid and acrid ſubſtances with the urine; as may be obſerved in fevers, dropſies, &c.

THE MUCUS OF THE BLADDER.

THE mucus lubricating the internal furface of the urinary bladder.

The SECRETORY ORGAN is compoſed of the muciparous glands, ſituated under the innermoſt membrane. When *abundant*, it is eliminated with the urine.

QUALITY: It is not waſhed away by the urine, unleſs very acrid.

USE: It defends the internal and very ſenſible furface of the urinary bladder, from being *corroded* by the acrimony of the urine: thus it is not ſoluble in urine.

IN THE

PARTS of GENERATION of MEN.

THE MUCUS OF THE URETHRA.

THE mucus which lubricates the internal ſurface of the urethra.

The SECRETORY ORGAN is compoſed of the muciparous glands, ſituated under the internal membrane of the urethra. When *abundant* it is waſhed away with the urine.

USE: To defend the very ſenſible ſurface of the urethra, againſt the acridity of the urine.

THE SMEGMA OF THE GLANS PENIS.

THE unctuous humour ſecreted on the ſurface of the glans and prepuce.

The SECRETORY ORGAN is formed of the ſebaceous follicles, ſituated on the margin of the glans. When abundant it is waſhed away with the urine, or collected between the prepuce and corona glandis.

QUALITY: Almoſt butyraceous, and very odorous. Whence theſe follicles are called by ſome *odoriferous glands*.

USE:

1. By this ſmegma the very ſenſible ſurface of the glans and prepuce is *defended*, leaſt it be irritated during the efflux of urine, by its acridity.

2. It preſerves the *lubricity* between the glans and prepuce, and prevents the friction of the former, during coition.

3. It alſo prevents the *concretion* of the glans with the prepuce.

THE VAPOUR OF THE TUNICA VAGINALIS OF THE TESTICLES.

THE aqueous vapour exhaling into the cavity of the tunica vaginalis, which involves the teſticles.

The SECRETORY ORGAN is compoſed of the exhalent arteries, ſituated on the *internal* ſurface of the tunica vaginalis, and *external* of the teſticles. When *abundant*, it is abſorbed by the oſcula of the lymphatic veſſels.

QUANTITY: In a natural ſtate, very little; but very great in hydrocele of the tunica vaginalis.

USE:

1. It prevents the *concretion* of the teſticle with the tunica vaginalis.

2. It preſerves the teſticles *ſoft*, leſt their fabric be dried.

THE LIQUOR OF THE PROSTATE GLAND.

THE lacteſcent juice ſecreted by the proſtate gland.

The SECRETORY ORGAN of this liquid is formed of the arteries of the proſtate gland, which is not only ſituated under the neck of the urinary bladder; but cloſely embraces the beginning of the urethra, on its inferior, lateral, and ſuperior parts, to its bulb.

From this gland, eight and ſometimes ten *excretory duct*s go out, which running obliquely forwards, open by minute oſcula into the cavity of

the urethra, near the head of the caput gallinaginis, above, below, and on each ſide, of its eminence.

The liquor of the proſtate is ſent through theſe ducts in a ſufficient quantity into the urethra, during coition, or pollution; and is evacuated through it, with the ſemen; in ſome men it is alſo forced into the urethra in a ſmall quantity, during an attempt to evacuate the alvine fæces, or to paſs the urine. Laſtly, it is the liquid which eunuchs emit in coition and pollution.

Quality: acidulous, coagulable by ſpirit of wine; hence it is albuminous.

Colour: Whitiſh. Thus the ſemen mixing with this juice, is rendered whiter; for its natural colour in the veſiculæ ſeminales is yellowiſh.

Use: It is mixed in the cavity of the bulb of the urethra with the ſemen, iſſuing from the veſiculæ ſeminales, in every coition and pollution. Thus this part of the urethra is the broadeſt, and may be yet more dilated by its own powers.

It is not yet aſcertained, whether this liquor encreaſes and inſpiſſates the volume of the ſemen, that it may be with more eaſe ejected; or whether it is of any other uſe to the ſemen. In ſome animals, as the Ram and Kid, this gland is wanting.

THE MALE SEMEN.

THE prolific liquor ſecreted in the teſticles of men, and carried unto the veſiculæ ſeminales.

The SECRETORY ORGAN of the ſemen is compoſed of the *ſeminal canaliculi*, or very minute canals, which conſtitute the fabric of the teſticle, and ſeparate the ſemen from the blood of the ſpermatic arteries. From theſe canaliculi it is carried to the *Epididymis*, and from thence, through the *vas deferens*, by a long and ſlow courſe into the *veſiculæ ſeminales*.

In caſtrated animals, and in eunuchs, the veſiculæ ſeminales are ſmall, and contracted; and a little lymphatic liquor, but no ſemen, is found in them. The ſemen is detained for ſome time in the *veſiculæ ſeminales*, and rendered thicker from the

continual abſorption of its very thin part, by the oſcula of the lymphatic veſſels.

In *laſcivious* men, the ſemen is ſometimes, though rarely, propelled by nocturnal pollution from the veſiculæ ſeminales, through the *ejaculatory ducts*, (which ariſe from the veſiculæ ſeminales, perforate the urethra tranſverſely, and open themſelves by narrow and very nervous oſtia at the ſides of the *caput gallinaginis)* into the urethra, and from it to ſome diſtance.

But in *chaſte* men the greateſt part is again gradually abſorbed from the veſiculæ ſeminales, through the lymphatic veſſels, and conciliates ſtrength of the body.

The *ſmell* of ſemen is ſpecific, heavy, affecting the noſtrils, yet not diſagreeable. The ſame odour is obſerved in the roots of the orchis, julæ of cheſnuts, and the autheræ of many plants. The ſmell of the ſemen of quadrupeds, when at heat, is ſo penetrating as to render their fleſh fetid and uſeleſs, unleſs caſtrated. Thus the fleſh of the Stag, *tempore coitus*, is unfit to eat.

The TASTE of ſemen is fatuous, and ſomewhat acrid.

CONSISTENCE: In the teſtes, thin and diluted; in the *veſiculæ ſeminales*, viſcid, denſe, and rather pellucid: but by venery, and debility, it is rendered thinner.

SPECIFIC GRAVITY: The greateſt part of ſemen ſinks to the bottom in water, yet ſome part ſwims on its ſurface, which it covers like very fine threads mutually connected together in the form of a cobweb.

COLOUR OF SEMEN: In the teſticles it is ſomewhat yellow, and in the veſiculæ ſeminales it acquires a deeper hue. That emitted by pollution, or coition, becomes white from its mixture with the whitiſh liquor of the proſtate gland during its paſſage through the urethra. In thoſe people who labour under jaundice, and from the abuſe of ſaffron, the ſemen has been ſeen *yellow*, and in a atrabiliary young man, black.

Quantity: Semen expoſed to atmoſpheric air, loſes its pellucidity and becomes thick; but after a few hours it is again rendered more fluid and pellucid than it was immediately after its emiſſion. This phenomenon cannot ariſe from water or oxygene attracted from the air. At length it depoſits a phoſphorated calx, and forms a corneous cruſt.

Semen turns SYRUP OF VIOLETS green, and diſſolves earthy, mediate, and metallic ſalts.

Freſh ſemen is inſoluble in water, until it has undergone the above change in atmoſpheric air, It is diſſolved by alkaline ſalts.

By *ætherial oil* it is dried into a pellucid pellicle, like the cortex of the brain.

It is diſſolved by all *acids*, except the oxygenated acid of ſalt, by which, it is coagulated in the form of white flakes. It is alſo acted upon by *alcohol of wine*.

By DRY DISTILLATION ſemen gives out a ſmall portion of empyreumatic oil, and volatile alkali. The remaining incinerated carbone, affords ſoda and phoſphorated calx.

The CONSTITUENT PRINCIPLES OF SEMEN. Chemical analyſis demonſtrates that one hundred parts of ſemen contain,

1. *Of water*, ninety parts.

2. *Of animal gluten*, ſix parts.

3. *Of phoſphorated calx*, one part.

4. *Of pure ſoda*, three parts.

5. *By microſcopical examination*, it is aſſerted, that an immenſe number of very ſmall animalculæ with round tails called *ſpermatic animalcules* may be ſeen.

6. *The odorous principle*, which flies off immediately from freſh ſemen. It appears to conſiſt of a

peculiar vital principle, and by the antients was called *aura ſeminis*.

Use of the Semen.

1. Emitted into the female vagina *ſub coitu*, it poſſeſſes the wonderful and ſtupendous power of impregnating the ovulum in the female ovarium. The odorous principle, or *aura ſpermatica* only, appears to penetrate through the cavity of the uterus and fallopian tubes to the female ovarium, and there to impregnate the albuminous latex of the mature ovulum by its vital power. The other principles of the ſemen appear to be only a vehicle of the ſeminal aura.

2. In chaſte men, the ſemen returning through the lymphatic veſſels into the maſs of the blood, gives *ſtrength* to the body and mind; hence the bull is ſo fierce and brave, the caſtrated ox ſo gentle and weak; hence every animal languiſhes *poſt coitum*; and hence tabes dorſalis from onaniſm.

3. It is by the ſtimulus of the abſorbed ſemen, at the age of puberty, into the maſs of the humours; that the beard and hair of the pubes, but in animals the horns, are produced: and the weeping voice of the boy changed into that of a man.

IN THE PARTS OF

GENERATION OF WOMEN.

THE SMEGMA OF THE LABIA OF THE VULVA.

THE unctuous juice, which covers the internal ſurface of the nymphæ and labia majora.

The SECRETORY ORGAN is compoſed of the ſebaceous glands, ſituated under the ſkin of the ſur-

face above mentioned. When *abundant* it is washed away with the urine.

CONSISTENCE: Mucous and oily, and in some butyraceous.

COLOUR: Yellowish. SMELL: Peculiar, hircine, or almost like that of the herring, and offensive; especially in those who are libidinous, and during the time of the catamenia.

The QUANTITY, is so observable as to be seen adhering to the surface of the nymphæ, like a butyraceous varnish.

QUALITY: It is of an oily mucous nature, mixed with a *peculiar odorous principle*.

USE:

1. It covers the very sensible surface of the nymphæ, lest they be dried by the air, and deprived of their sensibility. Does not the odorous principle stimulate to venery? For it abounds in the libidinous.

2. It lubricates the vulva, leſt it be pained by the friction during coition, or irritated *poſt mictum*, by any urine that may remain.

THE MUCUS OF THE VAGINA.

THE mucus lubricating the internal ſurface of the female vagina.

The SECRETORY ORGAN is compoſed of the glands, or muciparous lacunæ, ſituated under the internal membrane of the vagina. When *abundant*, it drops from the vulva.

QUALITY: Very viſcous. QUANTITY: Not very ſmall, but more abundant towards the end of pregnancy.

USE: It lubricates the vagina, leſt it be pained from friction *ſub coitu*. At the time of parturition it lubricates the paſſage for the infant, that it may more eaſily paſs through the vagina, on which account it is ſecreted in larger quantity, about that period.

THE LIQUOR EXCRETED DURING THE FEMALE VENEREAL ORGASM.

THE mucous, whitiſh liquor, which women emit from the orifice of the vulva, during the ſenſation of the *venereal æſtrum* at the time of coition, or pollution.

The Secretory organ is compoſed of the mucous lacunæ, ſituated in the vulva, about the orifice of the urethra; for this liquor was ſeen to come from that part, and there are very ſmall canals, ſufficiently conſpicuous, eaſily admitting an horſe hair, which run into theſe lacunæ.

QUANTITY: Sometimes very great, eſpecially in the ſalacious.

USE: It is not *female ſemen*, otherwiſe it would not be thrown without the cavity of the vagina. Nor is it the liquor of the *female proſtate*; for women have no ſuch gland about the neck of the urinary bladder. It appears to moiſten, and lubricate the clitoris, and very ſenſible orifice of

the urethra, at the time of coition, and to prevent it from being injured by friction. Does it by its abundance, excite a desire of venery? And may not the sensation of the *æstrum venereum*, during coition, arise from its passage through, and dilatation of the very nervous excretory canals?

THE LIQUOR OF THE UTERINE CAVITY.

THE whitish liquid, secreted into the cavity of the uterus.

The SECRETORY ORGAN appears to be formed of the arterious vessels, which exhale a serous humour into the cavity of the uterus. *Glands* are also said to be found in the substance of the human uterus. The *abundant* liquor runs into the vagina.

CONSISTENCE: In the *virgin uterus*, this liquor is serous, turbid, and rather whitish, in *girls just born* it is always so: and in *pregnant* and *gravid women*, it is sometimes lactescent.

QUANTITY: Before and after menſtruation, and about the termination of the lochia, it is ſecreted ſo abundantly, that it flows from the vagina. The ſimilitude of this humour with the vaginal diſcharge, commonly called the *whites*, leads to a ſuppoſition, that it is mixed with that ſecretion.

USE:

1. It *moiſtens* the cavity of the uterus, leſt it be dried by the irruent atmoſpheric air, and become rigid.

2. It prevents the *concretion* of the uterine cavity.

3. Does it contribute any thing to the *nouriſhment* of the embryo, if it enter the cells of the placenta?

THE MUCUS OF THE NECK OF THE UTERUS.

THE mucus which is found in the neck of the uterus.

The SECRETORY ORGAN appears to be formed of peculiar mucous lacunæ, concealed in the reticulated juga of the cervical valves. They are ſometimes ſo turgid with mucus, that it may be preſſed out; and their excretory ducts not unfrequently admit a hair for ſome length.

CONSISTENCE: Like mucus; but in the pregnant it is much thicker. COLOUR: Sometimes rather reddiſh.

QUANTITY: In a ſtate of virginity, ſmall: but in *pregnant* women it is ſo copious, as to obturate, and fill up all the neck and mouth of the uterus.

USE:

1. It prevents the concretion of the neck of the uterus, which, during pregnancy, is contracted.

2. It *obturates* the mouth of the uterus, during pregnancy; leſt in the firſt months, the impregnated ovulum, as yet very little, ſhould fall from the cavity of the uterus.

3. At the time of parturition, it flows from the neck of the uterus into the vagina, and *lubricates* the uterine orifice and the vagina, for the deſcent of the infant. Thus when this mucus is tinged with red blood, or ſanguineous ſtriæ, it is a ſign of *approaching labour*.

THE MUCUS OF THE FALLOPIAN TUBES.

THE thin mucus which lubricates the internal ſurface of the Fallopian tubes.

It appears to be SECRETED by the ſmall muciparous glands, ſituated under the internal membrane of the tubes. When *abundant*, it flows into the cavity of the uterus.

USE: It *lubricates* the paſſage for the deſcent of the impregnated ovulum from the ovarium, through the Fallopian tube into the cavity of the uterus.

THE JUICE OF THE OVULA OF THE OVARIUM.

THE liquor contained in the Graafian ovula of the female ovarium.

It appears to be SECRETED by the arterious veſſels, which exhale a liquid from the internal ſurface of the membrane, forming the cavity of the ovulum. When *abundant*, it is carried back by the abſorbent veſſels.

QUANTITY: Scarcely equals the leaſt drop.

QUALITY: It appears to be albuminous; for it is inſipid, inodorous, coagulated by alcohol of wine, and fire, and ductile into white threads.

USE: The Graafian ovulum, appears to be the receptacle, from the albuminous liquor of which, (by means of the aura ſpermatica virilis, impregnated with the vis vitalis, and the formative niſus,) the embryo, placenta, and its membranaceous ovum would ſeem to be formed: the impregnated

ovulum then glides from the ruptured *ovulum graafianum*, and is carried through the Fallopian tube into the cavity of the uterus.

THE MENSTRUAL BLOOD.

THE blood flowing every month from the genitals of woman, from the time of puberty, to about the fiftieth year.

The SECRETORY ORGAN is compoſed of the arterious veſſels, ſituated in the *fundus* of the uterus, which are more dilated at the time of menſtruation by anaſtomoſis. The diſſection of women who have died during menſtruation, proves this. Sometimes, though very rarely, women during pregnancy, menſtruate; and when this happens, the diſcharge takes place from the arterious veſſels of the *vagina*.

During *pregnancy* and *lactation*, when the perſon is in good health, the catamenia, for the moſt part, ceaſe to flow.

The QUANTITY in our climate, ſecreted at every menſtrual diſcharge, is five or ſix ounces; it rarely exceeds eight.

DURATION: It continues for three, four, and ſometimes five days; ſeldom longer.

CONSISTENCE: Partly fluid, partly grumous.

QUALITY: In an healthy and clean woman, it is ſimilar to other blood: but if cleanlineſs be neglected, it becomes fetid, from the quick putreſcence of grumi, lodging in the vagina.

The menſtrual diſcharge VARIES very much, in reſpect to climate, temperament, conſtitution of the body, mode of life, food, affections of the mind, and uſe of venery; as is explained in phyſiology.

The USE of the menſtrual diſcharge, is to render the uterus fit for the conception and nutrition of the fætus; therefore *girls* rarely conceive before the catamenia appear, and *women* rarely after their

entire ceſſation; but very eaſily after every menſtruation.

THE LOCHIAL BLOOD.

THE blood flowing from the uterus after delivery.

The SECRETORY ORGAN is formed by the arterious and venous veſſels in the fundus, or other parts of the uterus, to which, the placenta adhered during gravidity; for theſe veſſels are very large when the placenta is ſeparated, and the uterus not contracted.

QUALITY: The blood when it firſt flows after parturition, is fluid, copious, and pure; but, on the ſecond or third day, it is intermixed with large or ſmall grumi.

The lochial blood then becomes pale and reddiſh, very ſimilar to water mixed with a ſmall quantity of blood; by reaſon of the uterine veſſels

being gradually more contracted: at length, for ſome days, it continues to drop like whitiſh ſerum, intermixed with the cellular lacini of the membrana chorion, and then wholly ceaſes.

The lochial diſcharge *differs* in reſpect to the conſtitution of the body, contractility of the uterus, lactation, uſual menſtruation, regimen, and ſtate of mind, as is mentioned in phyſiology.

The USE of the lochial flux, is, to liberate the uterine veſſels; which, during pregnancy, are very turgid, and dilated with blood. Thus the uterus returns to its former condition, and free from the increaſe of the blood, is again rendered fit for a new conception.

HUMOURS

CONTAINED IN THE

FŒTUS IN UTERO.

THE LIQUOR OF THE AMNION.

THE liquor contained in the cavity of the membranaceous ovum, ſurrounding the fœtus in the gravid uterus.

The SECRETORY ORGAN appears to be compoſed of the arterious veſſels of the chorion, exhaling into the cavity of the amnion.

The QUANTITY, in reſpect of the fœtus, is very great at the beginning. It anſwers to the weight of the fœtus, about the middle of pregnancy; but is in the ſmalleſt proportion in the laſt month, when it moſtly weighs two pounds.

SPECIFIC GRAVITY: Greater than diſtilled water, for it ſinks to the bottom in it.

SMELL: Fatuous. TASTE: Saltiſh, like ſerum of milk.

CONSISTENCE and COLOUR: Towards the end of pregnancy, it is like the turbid ſerum of milk.

The CONSTITUENT PRINCIPLES appear to be water, impregnated with the albuminous principle, and ſalt; as is evident from the taſte. It is *coagulated* by fire, alcohol of wine, and acor of nitre.

USE:

1. It keeps the uterus and ovum of the fœtus, *diſtended*, during pregnancy; leſt the latter be compreſſed by the uterus, abdominal parietes, or by any external violence.

2. It diminiſhes the *gravity* and *calcitration* or rolling motion of the fœtus, (ſwimming in the liquor of the amnion,) on the uterus.

3. A portion appears to be abſorbed by the lymphatic veſſels of the ſkin of the fœtus, at leaſt during the firſt months of pregnancy, for its nouriſhment.

4. The protruſion of the bladder of the amnion, during parturition, gradually dilates the *uterine orifice.*

5. Flowing out, at the time of parturition, it *lubricates* the *vagina,* for the paſſage of the fœtus.

THE WATER OF THE MEMBRANA CHORION.

THE cryſtalline water, which, during the firſt weeks of pregnancy, is ſituated between the chorion and amnion.

As the amnion very ſoon encreaſes in ſize during the firſt months after conception, the interſtice between theſe membranes, with the cryſtalline water, gradually diſappears. Yet, ſometimes, it continues till the end of pregnancy, and flows out upon rupturing the chorion, (when it is called the *ſpurious water, or liquor of the amnion*) without the ſimultaneous rupture of the amnion.

The ORIGIN, and USE of this water, is as yet unknown.

THE WARTHONIAN JELLY OF THE UMBILICAL CHORD.

THE gelatinous humour, with which the cellular ſubſtance of the umbilical chord is ſometimes turgid.

The SECRETORY ORGAN appears to be compoſed of the arteries of the cellular ſubſtance, which conſtitute the vagina of the umbilical chord.

The QUANTITY, in *thick* chords, is very great; hence they are very much ſwollen with it: but in *lean* ones, it is ſo little, as to appear to be merely membranous.

The USE of this jelly. It appears to defend the umbilical veſſels, leſt they be compreſſed during parturition. Is it abſorbed by the lymphatic veſſels of the umbilical chord, and carried to the fœtus for its greater nouriſhment?

THE CASEOUS VERNIX OF THE SKIN.

THE butyraceous ſmegma, with which the whole cutaneous ſurface of the fœtus is covered, like a varniſh, during pregnancy.

The SECRETORY ORGAN appears to be compoſed of the *ſebaceous glands of the ſkin*, and of the *cutaneous pores*, which penetrate from the cutis into the ſubcutaneous cellular texture.

QUANTITY: In ſome fœtuſes very great, in others ſmall.

QUALITY: As to conſiſtence and colour, like butter.

USE:

1. It *lubricates* the body of the fœtus, that it may with more eaſe paſs in labour.

2. During pregnancy, the body of the fœtus is *defended* by this varniſh, againſt the macerating power of the liquor amnii.

THE MECONIUM.

THE dark green excrement, contained in the large inteſtines of the fœtus.

It appears to ORIGINATE from the *bile* and *inteſtinal mucus*; for the meconium is preſent, when the firſt ſecretion of the bile takes place in the fœtus: and in monſters, who want the liver, inſtead of meconium, a little diſcoloured mucus only, is found in the inteſtines.

SMELL: None. TASTE: Not known. CONSISTENCE: Pultaceous and viſcid. COLOUR: Dark green. QUANTITY: Some ounces.

USE: The meconium keeps the large inteſtines *open*, and prevents their concretion. After birth, it is eliminated through the orifice of the anus.

HUMOURS

IN THE

ARTICULATIONS.

THE SYNOVIA.

THE unctuous humour, contained in the capsular ligaments and articulations of the bones.

The SECRETORY ORGAN is composed of the *synovial glands*, so situated in peculiar foveoli in the articulations, that they can only be very slightly pressed by the heads of the bones. There is also mixed with this liquid, an aqueous *vapour*, secreted by the arteries of the capsular ligament; which, when in too great a quantity, is absorbed by the lymphatic vessels, opening into the cavity of the joint.

The SMELL of ſynovia is fatuous, animal, like that of the ſperma of frogs. TASTE: Saltiſh.

COLOUR: Pellucid; and of a greeniſh white. CONSISTENCE: Viſcous.

SPECIFIC GRAVITY: Greater than diſtilled water.

QUANTITY: More or leſs, according to the ſize of the joint. It is greateſt in the articulation of the femur and knee.

It unites with *cold water*, and when agitated, froths, by reaſon of its albuminous principle. It lacteſces with *boiling water*, and in part coagulates. It alſo in part coagulates with *alcohol of wine*.

Expoſed to a dry ATMOSPHERE, it gradually paſſes from a viſcous into a gelatinous conſiſtence; at length it again becomes viſcous, indurates into a ſcaly net, and depoſits ſaline chryſtals, which are, aerated ſoda and culinary ſalt.

It becomes green with *ſyrup of violets*; and renders *lime water* turbid.

Synovia is not changed by *aerated alkali*; but by *cauſtic alkali* it is rendered more fluid. Dried ſynovia and its fibrous precipitate are diſſolved in the ſame manner.

A floccous ſubſtance is precipitated from ſynovia, by the concentrated mineral and vegetable acids; which, is again diſſolved in acids not concentrated. The diluted mineral acid and *acetum*, coagulate ſynovia, and the ſolution gradually becomes clear, after depoſiting its fibrous precipitate.

Constituent Principles: Two hundred and eighty-eight grains of ox's ſynovia, contain,

Of water, two hundred and thirty grains.

Of a common albuminous principle, thirteen grains.

Of a particular albuminous principle, thirty-four grains.

Of aerated ſoda, two grains.

Of culinary ſalt, five grains.

Of phoſphorated calx, two grains.

By DRY DISTILLATION Synovia gives out an inſipid water ſoon putrefying, volatile alkali, and empyreumatic oil. From the remaining elixiviated carbone, culinary ſalt and aerated ſoda are obtained; and from the incinerated carbone, a phoſphoric calx.

The USE OF SYNOVIA.

1. It *lubricates* the cartilaginous ſurfaces of the articulatory bones, to prevent their being rubbed down by motion: thus it facilitates the motion of the articulations, and impedes the diſagreeable ſtrepitus, or creeking, during their motion.

2. It *prevents* the *concretion* of the articulated bones from long reſt.

THE JUICE OF THE VAGINÆ, OR SHEATHS OF THE TENDONS.

THE unctuous juice contained in the ſheaths of the long tendons.

The SECRETORY ORGAN appears to be formed of the veſſels of theſe ſheaths. The *abundant* juice is abſorbed by the oſcula of the lymphatic veſſels.

QUALITY: Oily and mucous. A great quantity is collected in the form of albumen, in the tumours attacking the vaginæ of the tendons of the carpus, which are called *ganglions*.

USE: To lubricate the tendons for motion, and to defend them from concreting with their vaginæ.

HUMOURS

IN THE BONES.

THE MARROW OF BONES.

THE fat ſubſtance, contained in the medullary cavities of the long cylindrical bones.

The oily juice, found in the ſpongy ſubſtance of the little, and in the extremities of the long large bones, is called the *ſuccus medullaris*, or medullary juice.

The SECRETORY ORGAN is formed by the arteriolæ, of the very minute cells, encloſing a thin oil, like very ſmall globules, which conſtitutes the medulla, or marrow of bones. The *trunks* of theſe ſmall arteries run to peculiar oſſeous foraminula, penetrating the medulla of the bones.

The *abundant* oil of the medulla, appears to be carried back through the lymphatic veſſels.

SMELL: None. TASTE: Oily and gelatinous; hence the marrow of the bones is ſo ſapid. SPECIFIC GRAVITY: Lighter than water.

The CONSISTENCE of the medullary oil is thinner than the fat of every other part of the body. In *embryos* it is almoſt gelatinous. In *dead* bodies, it becomes opake.

COLOUR: In *adults*, of a faint pellucid yellow, in the aged, of a deep yellow; and in dead bodies, opake.

The CONSTITUENT PRINCIPLES are, *animal oil*, mixed with *animal jelly*.

USE:

1. It renders the larger bones *leſs ponderous* than they would be if they conſiſted of mere compact matter.

2. Like the adipoſe membrane, it is the *prompuarium*, or ſource for the changing of oil into *nutritious jelly* by the vis vitalis, or vital power.

3. It is not certain whether it diminiſhes or encreaſes the *fragility* of the bones: for thoſe of old men are very fragile, although they contain marrow.

THE OSSEOUS JUICE.

THE earthy gelatinous juice, which forms the compact, ſpongy, and reticular ſubſtance of bones, in the medullary cavity.

The earthy gluten, which exudes from fractured bones, and not only unites them again, but alſo very often any looſe fragments or portions of bones, is called *Oſteocolla*, or *Callus*.

This juice is CARRIED by the arterious veſſels which enter the ſubſtance of bones, and is diſpoſed in the fibres of bones, according to the ſecret

order of nature. But tranſuding in fractured bones, from the ruptured veſſels, it forms new oſſeous fibres. When *ſuperfluous*, it ſeems to be returned through the lymphatic veſſels into the maſs of the fluids.

The CONSTITUENT PRINCIPLES of this oſſeous juice appear to be, *animal earth* diſſolved in *animal gluten*, and *nutritious jelly*; as is explained in the conſideration of the *bony parts* and *animal earth*.

USE: It conſtitutes the nature, increaſe, and nutriment of bones.

HUMOURS

IN THE

COMMON INTEGUMENTS.

THE SMEGMA OF THE SUBCUTANEOUS GLANDS.

THE unctuous humour which covers the ſurface of the epidermis.

The SECRETORY ORGANS of this ſmegma are threefold.

1. *The ſebaceous glands*, which lay concealed under the ſkin, and pour out a ſebaceous humour through their ducts; which, open on the external ſurface of the epidermis. Theſe

ſebaceous follicles are found in almoſt every part of the body, except the ſoles of the feet, palms of the hands, and fingers.

2. *The inorganic pores*, which do not lead to any follicles, but proceed, in a ſtraight line, into the cells of the ſubcutaneous adipoſe membrane. Through theſe pores, the oil of the adipoſe membrane, liquified by the animal heat of the body, tranſudes on the ſurface of the epidermis.

3. *The pores of the hairs*: For through the ſame pores by which the hairs emerge from the ſkin, the ſubcutaneous oil tranſudes; by which the hairs are lubricated.

The CONSISTENCE of this ſmegma is, in general, ſomewhat oleaginous, but thickeſt under the axillæ, or arm-pits, and on the hairy part of the head, where, it concretes into oily *furfur* and lemæ; and in the interſtices of the toes, into black ſordes. The ſebaceous glands of the face, when preſſed by the fingers, very often give out a ver-

micular, white, caſeous matter, black on the top, called *comedones*.

COLOUR: Pale yellow; but ſometimes reddiſh in the axillæ, and blackiſh between the toes. The ſmegma of fat men, ſtains the cloths in the axillæ, of a blue colour; which, may again be converted into a red, by the juice of lemons.

SMELL: Singular, eſpecially in fat men. The black ſordes between the toes, ſtinks like rotten cheeſe.

TASTE: Rather oleaginous.

QUANTITY: Greateſt under the axillæ, in the interſtices of the toes, ſcrotum, and hairy part of the head.

The CONSTITUENT PRINCIPLES are glandular ſebum, mixed with the ſubcutaneous oil; hence the oily ſweat of the face, and the greaſy ſpots, conſpicuous on linen or ſilk with which the face has been wiped when moiſt.

USE:

1. It *lubricates* the external ſurface of the cuticle, leſt it be dried by the air, unto rugæ, chops, or ſcales.

2. It moderates the *friction* of the cuticle on other parts; thus the cutaneous ſmegma is ſeparated more copiouſly under the axillæ.

THE MUCUS OF THE RETICULUM MALPHIGIANUM.

THE mucus ſituated in the Reticulum Malphigianum, or Rete mucoſum, between the epidermis and cutis of the whole body.

The SECRETORY ORGAN appears to be the arterious veſſels, which open under the epidermis on the ſurface of the cutis. When *abundant*, it is carried back by the cutaneous lymphatic veſſels.

CONSISTENCE: Glutinous.

It has no SMELL nor TASTE.

The COLOUR of this mucus varies in reſpect to,

1. *Climate*: It is *white* in Europeans; *brown*, in Semiæthiopians; and *very black*, in Æthiopians, as the epidermis in theſe is only of a cinereous colour.

2. *Particular parts of the body*: The *areolæ* of the breaſts, the region of the *vulva* and the *ſcrotum*, for the moſt part, are of a different colour from the epidermis of other parts of the body. The papillæ of the breaſts of *pregnant* women, eſpecially of thoſe who have once born a child, become yellow; but the nipples of the *Samojedi*, although in a ſtate of virginity, are very black.

The DISEASED colour is, *yellow*, in the jaundice; *livid*, in the black jaundice; *greeniſh*, in chloroſis; and *red* on the part where a bliſter has been applied. The ſtigmata alſo of ſome exanthematous diſeaſes are ſituated in this mucus, as in petechial fever, meaſles, ſcarlatina, &c.

The CONSTITUENT PRINCIPLES of this humour ſeem to be, animal mucus mixed with the colouring principle.

USE:

1. It *conglutinates* the epidermis to the cutis.

2. It *moderates* the ſenſe of touching; hence, great pain, if the cutaneous nerves be deprived of their epidermis.

3. It *moiſtens* the cutaneous papillæ, leſt they be dried by the atmoſpheric air: for ſuch is the violence of this air, that it corrugates, and dries all the animal membranes, except the epidermis; and deprives them of their fluids, and life.

4. It is the ſeat of the *external colour* of men.

THE JUICE OF THE HAIRS.

THE coloured juice contained in the vaginæ, or ſheaths of the hairs.

It is SECRETED by the very ſmall arteries opening into the cavity of the bulbs, and is protruded through the whole of the vaginæ which form the hairs. When in *too great* a quantity, it appears to exhale through their extremities.

The hairs receive their COLOUR from this juice: for in old age they become *dry* and *hoary*, whatever their colour was before.

The colour of this juice varies greatly, in reſpect to,

1. *Climate.* The inhabitants of cold countries have *whitiſh* hair. Thoſe of warm climates, *black*, or *brown*; yet in ſome nations there is, here and there, an exception.

2. *Temperament.* *Melancholics* not unfrequently have black hair; *phlegmatics*, whitiſh; *cholerics*, blackiſh; and the *ſanguineous*, yellow or brown.

3. *Age.* The more pale the hair is in boys, the deeper the colour when grown up. This is

particularly obſerved in boys, who have auburn hair.

The CONSTITUENT PRINCIPLES, appear to be animal gluten, mixed with the colouring principle.

QUALITY: Viſcous, inſipid and inodorous. May not this juice be the cauſe of *Idioeletricity*? for there are frequent examples of hairs emitting light in men and brutes, if they be rubbed or combed in the morning.

USE: The colour, thickneſs, rigidity, or flexility, the quick or ſlow increaſe, and the length of the hairs, appear to depend upon the quantity and quality of this nutritious juice.

THE OIL OF THE ADIPOSE MEMBRANE.

THE oil contained in the cells of the adipoſe membrane.

The SECRETORY ORGAN is compoſed of the red arteries, which ſurround the cells of the

poſe membrane, like net-work, and furniſh oil to the correſponding cells.

When *abundant*, it is abſorbed by the oſcula of the lymphatic veſſels, opening into the cells of this membrane.

SMELL: None, if freſh. TASTE: Bland, ſoft, and oleous.

COLOUR: White, pellucid, and in old age, yellowiſh.

CONSISTENCE: In the living and warm body *fluid*, eaſily yielding to the fingers, without elaſticity. This fluidity can be demonſtrated to the eye in the omentum, and other parts of living dogs.

As animal oil, in ſeventy-two degrees of heat, is fluid, and in ſixty-four, firſt begins to grow clammy; hence, it follows, that the fat of the animal body, whoſe heat is ninety-ſix degrees, is fluid.

SPECIFIC GRAVITY: One ninth part lighter than diſtilled water.

Its QUANTITY is eſtimated at about eight pounds, in a moderate ſized man, neither very fat nor very lean; but the quantity varies in reſpect to ſituation.

It abounds particularly in the *common integuments*. There is a great quantity in the *glutei muſcles*; and *burſæ of fat* are, here and there, found between the muſcles of the *poples*. The hemiſpheric figure of the *female breaſts*, and the *mons veneris*, are mere fat. It is alſo in large quantities, in the *palm* of the hands, and *ſoles* of the feet. There is none in the viſcera of the *head* and *thorax*. The *omentum* has little in its natural ſtate, but there is, generally, a conſiderable portion around the *Inteſtinum rectum*, and ſtill more about the *kidneys*.

It is liquified by *heat*, and congealed by *cold*. It is neither diſſolved by *water*, *ſpirit of wine*, *acids*, nor *aerated alkali*.

It is diſſolved by *cauſtic alkali*, and paſſes into an *alkaline ſoap* by boiling; which, is ſoluble in water.

It forms an emplaſtric maſs with the *calces of metals*, eſpecially of *lead*.

SPONTANEOUS DEGENERATION. Fat, expoſed long to the temperature of the atmoſphere, attracts the oxygene, and thence becomes *rancid*; for it acquires an acrid, burning *taſte*, and a diſagreeable *ſmell*, affecting the noſtrils and eyes. From its rancidity, the *ſebacic acid* appears to be evolved, and the oil gradually to be decompoſed.

During *dry diſtillation*, it froths very much, and then gives off an acidulous water, empyreumatic oil, and a great quantity of inflammable and carbonated air. The remaining ſhining incinerated carbone, leaves a ſmall portion of pure and phoſphorated calx.

The empyreumatic oil is generally thick, and concrete; but by repeated diſtillations is rendered thin, colourleſs, and more like an etherial oil;

and is called the *animal oil of Dipellius*; which, unleſs very carefully preſerved from the acceſs of air, in ſtone bottles, well ſtopped, in a ſhort time loſes its white colour.

If tallow be put into a frying-pan, expoſed to a gentle heat, and mixed with a third part of quick lime, by continual agitation, a *ſebacic calx* is formed from the union of the lime with the acid of fat. This, boiled in twelve parts of water, and filtered, affords a lixivium; which is to be evaporated to dryneſs, the remaining ſalt calcined, and diſtilled with half the quantity of the acid of ſulphur: the lime thus becomes united with the acid of ſulphur, and pure *ſebacic acid* paſſes into the receiver.

This *ſebacic acid*, is an acid with properties peculiar to itſelf, and is obtained from the oil of animal fat. Its *taſte* is diſagreeable. Its *colour* yellow.

With *alkaline ſalts* and *alkaline earths*, it forms neutral ſalts, which agree in many reſpects with acetated neutral ſalts.

It DISSOLVES gold, ſilver, and mercury, and *precipitates* lead from a nitrous and acetous ſolution, and tin from aqua regia.

With *alcohol of wine*, it forms ſebacic æther. Boiled with *acid of nitre*, it is changed into *acid of ſugar*. It agrees very much with acid of vinegar.

The CONSTITUENT PRINCIPLES of animal fat, are, therefore, *animal oil*, chemically combined with *ſebacic acid*, into a ſpecies of *acid ſoap*.

The *Elementary principles of* OIL, appear to be, carbone, combined by chemical attraction with hydrogene, and matter of light, into one ſubſtance. The elements of *ſebacic acid*, appear to be, oxygene, united with an unknown acidifiable baſis into ſalt.

Perhaps the baſis of this ſalt, is the gummous principle; for, by the acid of nitre, a vegetable gum may be changed into the acid of ſugar.

USE OF FAT. The cellular membrane, in general, is the *primary conſtituent principle* of nearly

all the ſolid parts; for into it they are almoſt all reſoluble by maceration. Thus it conſtitutes the *figure* of all the parts, and ſtrengthens them in their *ſituations*.

The USE of the OIL, contained in the cellular membrane, is multiplex.

1. It facilitates *muſcular motion* by its lubricity; thus every muſcle, and each ſingle fibre, is involved in adeps. Thus macilent old men are very inactive.

2. It impedes the *coalition of the parts*. Thus after that the adeps is conſumed by ſuppuration, the ſkin grows to the muſcles, and they to the bones; whence mobility of the muſcles is prevented.

3. It keeps off the *cold of the atmoſphere*. Thus lean people are more ſuſceptible of cold than fat: and in the extreme cold of northern regions, birds and fiſhes are defended by a great quantity of adeps: thus alſo, oily oint-

ments are the beſt prophylactics, or preventives againſt chilblains.

4. It gives *whiteneſs* to the tender ſkin; for it is tranſparent through it: thus the whiteſt parts are thoſe which have the greateſt proportion of fat, as the breaſts; and hence infants are ſo white.

5. It gives the *beautiful toroſity* to the body, leſt the bones project in an uncomely manner; and the ſkin not diſtended with fat, contract into unſightly wrinkles: thus in hectics, the bones of the cheeks protrude, and the ſkin of macilent old people is rugous, and olivaceous.

6. It defends ſome parts from *compreſſion*, like a cuſhion: thus the nates of a man, accuſtomed to ſit continually, are very fat, to prevent their being hurt by the hardneſs and friction of the ſeat.

7. An oil, tranſuding cloſe to the hairs, through the inorganic pores of the cutis, *lubricates*

the ſkin, prevents it from being dried by the air, and preſerves it clean and ſmooth.

8. Laſtly, the adeps appears to be the *promptuary*, in which, animal oil, by means of animal gas, or carbonated hydrogene, (which continually exhales from the arteries to this oil) is gradually converted into a nutritious *jelly*; which, abſorbed by the lymphatic veſſels, is carried with the chyle into the blood. In the fœtus of four months inſtead of adeps, there is mere jelly. Laſtly, from long continued want, leanneſs of the body is induced.

THE CUTANEOUS PERSPIRABLE MATTER.

THE inviſible vapour, exhaling from the external ſurface of the whole body.

The SECRETORY ORGAN, is compoſed of the extremities of the cutaneous arteries, which perforate the ſurface of the ſkin and epidermis, and diffuſe a vapour into the atmoſphere.

This exhalation is demonſtrated,

1. By a *looking-glaſs*, or *poliſhed plate of iron*, which, upon being applied to the naked and warm ſkin, is defaced with the mark of the vapour, which ſoon diſappears.

2. A thick *miſt* may be *conſpicuouſly* ſeen, aſcending from the whole ſurface of the body of thoſe who work in ſubterraneous and cold mines, that are filled with a denſe air.

3. The *encreaſed weight* of the body, from ſuppreſſed; and the *diminiſhed* weight, from encreaſed perſpiration.

The SMELL in an healthy man is ſcarcely any, or fatuous, is called *animal*, and is perceptible when many men live or ſleep together in a ſmall and confined chamber. This ſmell appears *proper*, not only to every man and animal, but alſo to each individual; or the dog would be unable to purſue the wild beaſt it had never ſeen, or to find his loſt maſter in a crowd of men.

The TASTE in an healthy man is none, or fatuous. CONSISTENCE: Rather vaporous. COLOUR: None. SPECIFIC GRAVITY: Not known; but it appears to be heavier than atmoſpheric air, and is therefore ſlowly elevated in it.

The QUANTITY OF THE PERSPIRATION is immenſe, if the magnitude of the cutaneous ſecretory organ be compared with a copious vapour, exhaling from one lung. For if a man in twenty-four hours conſume ſix pounds of food and drink, and inhale one pound through the ſkin and lungs, he returns in twenty-four hours to his former weight; the excretion from his bowels will be five ounces, and that of urine, three pounds: hence, it follows, that the inſenſible perſpiration excreted by the ſkin and lungs, in this period, will be forty-in three ounces.

The Quantity, however, VARIES remarkably, reſpect to,

1. *Climate.* In *warm* climates, more is perſpired than in *cold*, where the excretion of urine is greater than that of perſpiration. In *temperate*

regions (on an average) more is perſpired through the year, than is paſſed off by urine.

2. *The time of the year.* In winter, the perſpiration is much leſs than the excretion of urine.

3. *Age. Young perſons* excrete more perſpirable matter than *old people*, who diſcharge more urine, and leſs perſpirable matter.

4. *Food or Drink.* Thus the excretion of urine is encreaſed by diuretic wines, as Auſtrian and Rheniſh; and that from the ſkin by diaphoretic wines, as the generous Hungarian, &c. Thus alſo the perſpiration is diminiſhed from too little or tenaceous foods.

5. *Regimen. Exerciſe* promotes perſpiration, *reſt*, the renal ſecretion. *Terror* ſuppreſſes tranſpiration, *joy* encreaſes it. In warm climates perſpiration is naturally diminiſhed by *ſleep*, if the body be naked; but augmented, if covered with cloths.

QUALITY. The vapour exhaling from the ſkin, and received in a veſſel, reſembles an aeriform, permanently elaſtic, fluid; precipitating lime from lime-water, and is unfit for the nouriſhment of flame, or the reſpiration of animals.

The CONSTITUENT PRINCIPLES appear to be,

1. *Water,* attenuated into vapour, by the matter of heat.

2. *Animal gas,* or carbonated hydrogene. As the production of carbonated air with the oxygene of the atmoſphere ſhews.

3. *Azotic gas.* For water, in which a man has bathed ſoon becomes putrid. Carbonated hydrogene, chemically combined with azote, would appear to conſtitute *putrid miaſma.* May not this be the origin of putrid fever, in thoſe narrow confined chambers in which there are many perſons?

In the *open air*, which has a great portion of oxygene, the carbonated hydrogene appears to be changed by it into water and carbonic air.

USE:

1. The perſpirable matter *liberates* the blood, from ſuperfluous animal gas, azote, and water.

2. It eliminates the noxious and heterogeneous *excrements* of the third coction; hence the acid, rancid, leguminous or putrid perſpiration of ſome men.

3. It *moiſtens* the external ſurface of the body, leſt the epidermis, cutis, and its nervous papillæ be dried up by the atmoſpheric air.

4. It *counter-balances* the ſuppreſſed pulmonary tranſpiration of the lungs; for when it is ſuppreſſed, the cutaneous is encreaſed: hence the nature of both appears to be the ſame.

SWEAT.

THE very copious excretion of the perſpirable aqueous matter, through the ſkin, ſo as to be viſible in the form of very little drops adhering to the epidermis.

The SECRETORY ORGAN, is compoſed of the dilated extremities of the cutaneous arteries, through which the cutaneous perſpirable water is eliminated.

The SMELL OF SWEAT, in an healthy man, is fatuous and animal. TASTE: Manifeſtly ſalt, and ammoniacal.

CONSISTENCE: vaporous and aqueous. SPECIFIC GRAVITY: Greater than water.

COLOUR: For the moſt part yellowiſh, from the paſſage of the ſubcutaneous oil, and ſebaceous matter of the ſubcutaneous glands. Sometimes it is reddiſh, from the globules of the cruor paſſing through, eſpecially under the axillæ.

The QUANTITY, is ſometimes ſo profuſe, as not only conſpicuoſly to moiſten the linen, but alſo the thicker garments.

The CONSTITUENT PRINCIPLES are,

1. *The Cutaneous perſpirable matter*,

2. *The Glandular ſmegma* and *ſubcutaneous oil*: hence linen is ſtained with a yellowiſh colour, and leanneſs is brought on.

3. *The ſerum of the blood*. This affords an immenſe quantity of water, and the albuminous and ſaline part of the ſweat. It makes the linen of a viſcid rigidity, and of a ſalt taſte. Glaſs-blowers ſometimes excrete ſo acrid a ſweat, that ſalt has been ſeen collected in cryſtals on their faces.

SWEAT *varies* in reſpect to,

1. The *temperature of the Atmoſphere*. Thus men have a more copious, viſcid, and higher co-

loured ſweat, on ſummer-days, and in warm countries, than in colder regions.

2. *Sex.* The ſweat of a man is ſaid to ſmell more acrid than that of a woman.

3. *Age.* The young are more ſubject to ſweat than the aged, who during the exceſſive heat of the ſummer, ſcarcely ſweat at all.

4. *Ingeſta.* An *alliacious* ſweat is perceived from eating garlic; a *leguminous*, from peas; an *acid*, from acids; a *fetid*, from animal food only; and a *rancid* ſweat, from fat foods; as is obſerved in Greenland. A long abſtinence from drink, cauſes a more *acrid* and *coloured* ſweat; and the drinking a great quantity of cold water in ſummer, *a limpid* and *thin* ſweat.

5. *Medicines.* The ſweat of thoſe who have taken muſk, even moderately, and aſafœtida, or ſulphur, ſmells of their reſpective natures.

6. *Region of the body.* The ſweat of the *head* is greaſy; on the *forehead*, it is more aqueous; under the *axillæ*, very unguinous; and in the interſtices of the *toes*, it is very fetid, forming in the moſt healthy man blackiſh ſordes.

7. *Diſeaſes.* In this reſpect, it varies very much, in regard to quantity, ſmell, and colour; for the ſweat of gouty perſons is ſaid to turn vegetable juices to a red colour, and is of a cretaceous nature. Some men alſo have a lucid ſweat, others a ſweat tinging their linen of a cærulean colour.

USE:

In a very healthy man, the ſweat is ſcarcely obſervable, unleſs from an error of the ſix non-naturals. Its firſt effect on the body is always prejudicial, by exhauſting and drying it; although it is ſometimes of advantage.

1. By ſupplying a *watery excretion*; thus when the urine is deficient, the ſweat is often more

abundant. In this manner an aqueous diarrhæa is frequently cured by ſweating.

2. By eliminating at the ſame time, any *morbid matter*. Thus various miaſmata are critically expelled, in acute and chronic diſeaſes, with the ſweat.

THE PUTREFACTION OF THE HUMAN BODY.

THE putrefaction of the dead body, by which it is decompoſed and diſſipated in the atmoſphere, in the form of putrid gas.

The REQUISITES to the putrid fermentation, are,

1. *A certain degree of humidity*. Thus bodies putrefy *ſooner* immerſed in water; and more *ſlowly* when buried in *very dry* earth, which, abſorbs the moiſture from the body.

2. *The acceſs of atmoſpheric air.* Thus bodies putrefy *ſooner* when expoſed to the open air, than when *buried.* In like manner, animal ſubſtances, in the exhauſted receiver of an air-pump, go very ſlowly into putrefaction. Animals putrefy quickeſt in *vital air*; ſlower in *carbonic*; and in *muriatic* air, the ſloweſt.

3. *A temperature of heat* of at leaſt ten degrees. Thus bodies putrefy *ſooner* in ſummer, than in winter. If the heat be *conſiderable*, and ſuddenly applied, then the body is dried into a mummy. If the cold be *intenſe*, bodies may be preſerved free from putrefaction for many months.

The fluids of the body are firſt diſſipated in the air; then the ſoft parts; and, at length, after ages, the ſubſtance of the bones themſelves, volatilized by putrefaction, totally evaporate. For coffins have been found, which had been depoſited for centuries, and well cloſed, in which not the leaſt appearance of a body could be detected.

The dead body, therefore, does not reſolve itſelf into earth, to be mixed with the duſt, but into air, from which it was made. For the ſoil of burying-places, in which, for ages, an immenſe number of bodies have putrefied, is not at all elevated; and, were it otherwiſe, the whole ſurface of the earth, would, by this time, from the accumulated bodies of dead men and animals, have become a maſs of animal earth: which is no where found to be the caſe.

Nor are dead bodies, when depoſited in the earth, the *food of worms*. For theſe are only found in bodies expoſed to the atmoſphere, or at leaſt ſuperficially buried, and not in thoſe to which the air has no acceſs.

The PHENOMENA OF A PUTREFYING BODY, are,

1. *Emphyſematous ſwelling*, whence ariſes the diſpoſition in drowned bodies to ſwim, after a time, on the ſurface. This intumeſcence, or ſwelling, ariſes from the converſion of the putrefying fluids into the gaſeous ſtate.

2. *A cadaverous odour* is exhaled, which is ſpecific and affects the noſtrils.

3. *The whole ſurface of the body* acquires a yellow tinge, interſperſed, here and there, with greeniſh, livid, and black ſpots. Theſe by degrees burſt, and emit an intolerable putrid fetor, deſtructive to man.

4. At length, the ſwelling, after a ſhort time, *ſubſides*, the ruptured ſpots diſcharge a cadaverous *ſanies*, by which the whole body is changed into a brown, or greeniſh pultaceous maſs; and the cadaverous ſtench is again emitted, though weaker.

5. This putrid maſs at length dries into a browniſh, black, friable ſubſtance. This change is effected, for the moſt part in eighteen months, and at longeſt within three years.

6. Of all the parts of the body, *the bones* reſiſt decompoſition the longeſt, on account of their earthy compages; but at length they give way. AUGUSTUS, when he viſited the tomb of

ALEXANDER THE GREAT, found the body, to all appearance, in the moſt perfect ſtate of preſervation; on the ſlighteſt touch, however, the unconquered hero, the former *Alexander*, crumbled into duſt!

The deeper an animal body is buried in the earth, the more ſlowly it putrefies; in a *calcareous*, more ſpeedily than in an *argillaceous*; but the quickeſt of all in a *moiſt ſandy ſoil*. If the ſandy ſoil be very dry, and friable, defended from the air and rain, the gaſes conſtantly emitted, are abſorbed by the ſand; and the body, in this ſtate, is converted into a *mummy*.

The bodies of *women*, are more readily convertible into mummy, than thoſe of *males*, on account of the greater ſubtilty of their humours.

Out of fifty-two bodies dug up in this ſtate, from a cemetery at Paris, one only was a male.

Sometimes, though rarely, the ſoft parts are changed into a SAPONACEOUS SUBSTANCE, ſoluble in water; which, chemically examined, conſiſts

of a peculiar oil, and volatile alkali. This change takes place when a number of bodies are ſo buried together, without any intermediate earth, that the gaſeous fluids, which are emitted, are not ſuffered to eſcape. In this caſe, one portion of the hydrogene combines with carbone, and forms oil; the other portion, with azote, is changed into volatile alkali, producing, when mixed, a ſaponaceous maſs; as was obſerved in the burying-ground at Paris.

The Gaſes which eſcape from bodies, putrefying in the open air, *conſiſt*,

1. *Of alkaline air*, which is produced from the azote and hydrogene afforded by the ſoft parts, and then impregnated with fixed air. Hence it is, that the putrid ſanies of the body effervesces with acids, and changes the ſyrup of violets to a green colour.

2. *Of carbonated inflammble air*, which ariſes from the oil and decompoſed animal gluten.

3. *Of phoſphorated inflammable air*, whence the *ignes fatui*, obſervable about burying-grounds; and the luminous appearance and fiſhy odour of ſome bodies.

4. *Of fixed*, or carbonated *air*, produced by the union of oxygene and carbone; and which, afterwards, in part aerates the volatile alkali.

5. *Of azotic air*, extricated from the animal gluten of the ſoft parts. From this ariſes the greeniſh tinge of the parts.

6. *Of putrid air*, which ſeems to be generated from the chemical union of carbonated inflammable air with the azotic. This miaſma is the moſt noxious to man, by inducing putrid fever; and is that which generates the ſpecific odour, which is called cadaverous.

The PROXIMATE CAUSE of putrefaction, is the ceſſation of the action of the vital principle; hence, the laws of *vital affinity* ceaſe to operate, and thoſe

of *chemical attraction* take place; which give rise to the *products of putrefaction* just mentioned.

To Live, may be defined the property of acting from an intrinsic power; hence the life of an animal body appears to be threefold.

1. *Its Chemical life*, which consists in that attraction of the elements, by which the vital principle, diffused through the solids and fluids, defends all the parts of the body from putrefaction. In this sense it may be said, that every atom of our body lives *chemically*, and that life is destroyed by putrefaction alone.

2. *Its Physical life*, which consists in the irritability of the parts. This physical property remains for some time after death. Thus the heart, or intestines, removed from the body whilst still warm, contract themselves on the application of a stimulus. In like manner, the serpent, or eel, being cut into pieces, each part moves and palpitates for a long time afterwards. Hence these parts may be said to live, *physically*, as long as they continue warm and soft.

3. *Its Phyſiological life* conſiſts in the action of inorganic parts, proper to each, as the action of the heart and veſſels; ſo that, theſe actions ceaſing, the body is ſaid to be *phyſiologically* dead. The phyſiological life ceaſes firſt, next the phyſical, and finally, the chemical periſhes.

USE OF THE PUTREFACTION OF THE BODY. The ſoil of our earth, by abſorbing the products of putrefaction, is rendered black, and abounds in fertility; and hence becomes the principal food of plants. It is evident, therefore, that the body of man, by death and putrefaction, does not periſh, but only loſes its organic ſtructure, by a continual circulation of the elements; the deſtruction of one, becoming the generating cauſe of another.

FINIS.

AN

ALPHABETICAL VIEW

OF THE

NEW TERMS

ADOPTED BY THE

AUTHOR,

WITH THEIR

ANCIENT SYNONIMA.

A.

ACID lactic.	*Sour whey, galactic acid.*
Acid lithic.	*Acid of bezoar.* *Lithiasic acid.*
Acid malic.	*Acid of apple.* *Mulusian acid.*
Acid oxygenated muriatic.	*Aerated muriated acid.* *Dephlogisticated marine acid* of Scheele.
Acid phosphoric.	*Acid of phosphorus.* *Acid of urine.*
Acid saccho-lactic.	*Acid of the sugar of milk.*
Acid sebacic.	*Acid of fat.* *Acid of tallow.*

NEW NAMES, *adopted by the* AUTHOR.	*Their* OLD NAMES.
Acid sulphuric.	*Acid of sulphur.* *Vitriolic acid.* *Oil of vitriol.* *Spirit of vitriol.*
Aroma.	*The odorous principle.*
Azote.	*Vitiated air.* *Impure air.* *Phlogisticated air.* *Phlogisticated gas.* *Atmospherical mophets.*

C.

Carbonated hydrogene gas.	*Inflammable gas with charcoal.*
Carbone.	*Pure charcoal.*

G.

Gas, azotic.	*Vitiated air.* *Impure air.* *Phlogisticated air.* *Phlogisticated gas.* *Atmospherical mophets.*
Gas, carbonated hydrogene.	*Inflammable gas with charcoal.*

H.

Hydrogene.	*Basis of inflammable air or gas.*

NEW NAMES, *adopted by the* AUTHOR.	*Their* OLD NAMES.
I.	
Iron oxydated. Iron oxyd of.	*Saffron of Mars.*
L.	
Lactic acid.	*Sour whey, galactic acid.*
Lithic acid.	*Acid of bezoar.* *Lithiasic acid.*
M.	
Malic acid.	*Acid of apples.* *Mulusian acid.*
Milk, sugar of.	*Sugar, or salt of milk.*
O.	
Oxydated iron. Oxyd of iron.	*Saffron of Mars.*
Oxygenated muriated acid.	*Aerated muriated acid.* *Dephlogisticated marine acid* of Scheele.
P.	
Phosphoric acid.	*Acid of phosphorus.* *Acid of urine.*
Potash.	*Fixed vegetable alkali.* *Caustic vegetable fixed alkali.*

NEW NAMES, *adopted by the* AUTHOR.	*Their* OLD NAMES.
	S.
Saccho-lactic acid.	*Acid of the sugar of milk.*
Sebacic acid.	*Acid of fat.* *Acid of tallow.*
Soda.	*Fixed mineral alkali.* *Caustic soda.* *Marine alkali.* *Mineral alkali.*
Sugar of milk.	*Sugar, or salt of milk.*
Sulphuric acid.	*Acid of sulphur.* *Vitriolic acid.* *Oil of vitriol.* *Spirit of vitriol.*

AN

ALPHABETICAL VIEW

OF THE

ANCIENT TERMS

ADOPTED BY THE

AUTHOR,

WITH THEIR

NEW NAMES,

FROM THE

CHEMICAL NOMENCLATURE

Of Messrs De Morveau, Lavoisier, Bertholet, and De Fourcroy.

A.

ACID cærulic.	Prussic acid.
Acid of nitre.	Nitric acid.
Acid, oxygenated of salt.	Oxygenated muriatic acid.
Acid perlated.	Saturated phosphate of Soda.
Acid of salt.	Muriaticacid.
Acid of sugar.	Oxalic acid.
Acid of sulphur.	Sulphuric acid.

ANCIENT NAMES, *adopted by the* AUTHOR.	*Their* NEW NAMES.
Acid of vinegar.	Acetous acid.
Acid of vitriol.	Sulphuric acid.
Acor mineral.	Mineral acid.
Acor of nitre.	Nitric acid.
Acor vitriolic.	Sulphuric acid.
Aerated alkali.	Carbonate of Potash.
Aerated alkaline salts.	Alkaline carbonates.
Aerated calx.	Carbonate of lime.
Aerated soda.	Carbonate of soda.
Ætherial oils.	Volatile oils.
Air alkaline.	Ammoniacal gas.
Air azotic.	Azotic gas.
Air carbonic.	Carbonic acid gas.
Air fixed.	Carbonic acid gas.
Air hepatic.	Sulphurated hydrogene gas.
Air inflammble.	Hydrogene gas.
Air inflammable carbonated.	Carbonated hydrogene gas.
Air mephitic.	Azotic gas.
Air phosphorated.	Phosphorized hydrogene gas.
Air phosphoric.	Phosphorized hydrogene gas.
Air phosphorated inflammable.	Phosphorized hydrogene gas.
Air vital.	Oxygene gas.
Air vitriolic.	Sulphureous acid gas.
Alcohol of wine.	Alcohol.
Alkali aerated.	Alkaline carbonate.
Alkali caustic.	Alkali.
Alkali dry volatile.	Carbonate of ammoniac.
Alkali fixed vegetable.	Carbonate of potash.
Alkali phosphorated mineral.	Phosphate of soda.
Alkali phosphorated volatile.	Phosphate of ammoniac.

ANCIENT NAMES, *adopted by the* AUTHOR.	*Their* NEW NAMES.
Alkali volatile.	Ammoniac.
Alkaline aerated salts.	Alkaline carbonates.
Alkaline air.	Ammoniacal gas.
Alkaline caustic salts.	Alkalies.
Alkaline salts.	Alkalies.
Ammoniacal spirit.	Solution of ammoniac.
Ammoniac sal.	Muriate of ammoniac.
Animal earth.	Calcareous phosphate.
Animal gas.	Carbonated hydrogene gas.
Animal oil.	Volatile animal oil.
Animal oil of Dippellius.	Volatile animal oil.
Aqua regia.	Nitro-muriatic acid.

C.

Cœrulic acid.	Prussic acid.
Calx aerated.	Carbonate of lime.
Calx muriated.	Muriate of lime.
Calx phosphorated.	Phosphate of lime.
Calx sebacic.	Sebate of lime.
Carbonated inflammable air.	Carbonated hydrogene gas.
Carbonic gas.	Carbonic acid gas.
Caustic alkali.	Alkali.
Caustic alkaline salts.	Alkalies.
Caustic soda.	Soda.
Charcoal, principle of	Carbone.
Corneous luna.	Muriate of soda.
Cremor tartar.	Acidulous tartrite of potash.
Culinary salt.	Muriate of soda.

ANCIENT NAMES, *adopted by the* AUTHOR.	*Their* NEW NAMES.
	D.
Digestive salt.	Tartrite of potash.
Distilled vinegar.	Acetous acid.
Dry volatile alkali.	Carbone of ammoniac.
	E.
Earth animal.	Calcareous phosphate.
Elastic vapour.	Gas.
Extractive matter.	Extract.
Extractive principle.	
	F.
Fat, oil of	Sebacic acid.
Fixed air.	Carbonic acid gas.
	G.
Gas animal.	Carbonated hydrogene gas.
Gas carbonic.	Carbonic acid gas.
Gas inflammable.	Hydrogene gas.
Gas vital.	Oxygene gas.
Gypsum.	Sulphate of lime.
	H.
Heat, matter of	Caloric.
Hepatic air.	Sulphurated hydrogene gas.

ANCIENT NAMES, *adopted by the* AUTHOR.	*Their* NEW NAMES.
	I.
Inflammable air.	Hydrogene gas.
Inflammable carbonated air.	Carbonated hydrogene gas.
Inflammable gas.	Hydrogene gas.
Inflammable phosphorated air.	Phosphorated hydrogene gas.
Juice lemon.	Citric acid.
	L.
Lemon juice.	Citric acid.
Light, matter of	Light.
Lime quick.	Calcareous earth or lime.
Luna corneous.	Muriate of silver.
	M.
Matter of heat.	Caloric.
Matter of light.	Light.
Matter extractive.	Azotic gas.
Mephitic air.	Phosphate of soda & ammoniac.
Microcosmic salt.	Mineral acid.
Mineral acor.	Phosphate of soda.
Mineral phosphorated alkali.	Muriate of lime.
Muriated calx.	Nitrous acid.
	N.
Nitre, acor of	Nitric acid.
Nitre, spirit of	Nitric acid diluted with water.

ANCIENT NAMES, *adopted by the* AUTHOR.	*Their* NEW NAMES.
O.	
Odorous principle.	Aroma.
Oil ætherial.	Volatile oil.
Oil animal.	Volatile animal oil.
Oil animal of Dippellius.	Volatile animal oil.
Oil of fat.	Sebacic acid.
Oil of tartar per deliquium.	Potash mixed with carbonate of potash in diliquescence.
Oxygenated acid of salt.	Oxygenated muriatic acid.
P	
Perlated acid.	Saturated phosphate of soda.
Phosphorated air.	Phosphorized hydrogene gas.
Phosphorated calx.	Phosphate of lime.
Phosphorated inflammable air.	Phosphorized hydrogene gas.
Phosphorated mineral alkali.	Phosphate of soda.
Phosphorated soda.	Phosphate of soda.
Phosphorated volatile alkali.	Phosphate of soda and ammoniac.
Phosphoric air.	Phosphorized hydrogene gas.
Principle of charcoal.	Carbone.
Principle extractive.	Extract.
Principle odorous.	Aroma.
Pyrites.	Sulphuret of iron.
Q	
Quick lime.	Lime, or calcareous earth.

ANTIENT NAMES, *adopted by the* AUTHOR.	*Their* NEW NAMES.
R	
Radical vinegar.	Acetic acid.
Regia aqua.	Nitro-muriatic acid.
S	
Sal ammoniac.	Muriate of ammoniac.
Salt, acid of	Muriatic acid.
Salt, culinary	Muriate of soda.
Salt, digestive	
Salt, fusible of urine	Phosphate of soda and ammoniac.
Salt, microcosmic	Phosphate of soda and ammoniac.
Salt, oxygenated acid of	Oxygenated muriatic acid.
Salt, of soda.	Soda.
Salt, spirit of	Muriatic acid.
Salts, aerated alkaline	Carbonates.
Salts, caustic alkaline	Alkalis.
Salts, alkaline	Alkalis.
Sebacic calx.	Sebate of lime.
Soda aerated.	Carbonate of soda.
Soda caustic.	Soda.
Soda phosphorated.	Phosphate of soda.
Soda, salt of	Soda.
Spirit ammoniacal.	Ammoniac.
Spirit of nitre.	Nitric acid diluted with water.
Spirit of salt.	Muriatic acid.
Spirit of vitriol.	Sulphuric acid diluted with water.

ANTIENT NAMES. *adopted by the* AUTHOR.	*Their* NEW NAMES.
Spirit of wine.	Alcohol.
Sugar, acid of	Oxalic acid.
Sulphur, acid of	Sulphuric acid.

T.

Tartar cremor.	Acidulous tartrite of Potash.
Tartar oil of, per deliquium.	Potash mixed with carbonate of potash in diliquescence.

V.

Vapour elastic.	Gas.
Vinegar distilled.	Acetous acid.
Vinegar radical.	Acetic acid.
Vital air.	Oxygene gas.
Vital gas.	Oxygene gas.
Vitriol, acid of	Sulphuric acid.
Vitriolic acor.	Sulphuric acid.
Vitriolic air.	Sulphureous acid gas.
Vitriol, spirit of	Sulphuric acid diluted with water.
Volatile alkali.	Ammoniac.
Volatile phosphorated alkali.	Phosphate of ammoniac.

W.

Wine, alcohol of	Alcohol.
Wine, spirit of	Alcohol.

Shortly will be published,

BY THE

TRANSLATOR,

AN

ANATOMICAL DICTIONARY,

CONTAINING

AN EXPLANATION OF ALL THE TERMS

IN THE

ANATOMY AND PHYSIOLOGY

OF THE

HUMAN BODY;

WITH AN ACCOUNT OF THE

SITUATION, USE, &c. &c. OF THE SOLIDS AND FLUIDS.

ALSO,

ANATOMICAL DIALOGUES,

FOR THE USE OF

STUDENTS.