History of Life and Death

by

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Freeditorial

PARTICULAR TOPICS

OR

Articles of Inquiry concerning Life and Death.

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1. Inquire into the Nature of Durable and Non-Durable inanimate bodies, and likewise in Vegetables; not in a full and regular inquiry, but briefly, summarily, and as it were only by the way.

2. Inquire more carefully touching the desiccation, arefaction. and consumption of bodies inanimate and vegetable; of the ways and processes whereby they are effected, and withal the methods whereby they are prevented and retarded, and, bodies are preserved in their own state.. Also inquire touching the inteneration, softening,- and renewal of bodies, after they have once commenced to become dry.

Neither however need this inquiry be perfect or exact; as these things should be drawn from the proper title of Nature Durable; and as they are not the principal questions in the present inquiry, but only shed a light on the prolongation and restoration of life in animals; wherein, as has been observed before, the same things generally happen, though in their own manner. From the inquiry concerning inanimate and vegetable bodies pass on to the inquiry of animals, not including man.

3. Inquire into the length and shortness of life in animals, with the proper circumstances which seem to contribute to either of them.

4. Since the duration of bodies is of two kinds, the one in their simple identity, the other by repair; whereof the former takes place only in bodies inanimate, the latter in vegetables and living creatures, and is performed by alimentation; inquire likewise touching alimentation, with its ways and process; yet this not accurately (for it belongs to the titles of Assimilation and Alimentation) but as before, in passing only. From the inquiry concerning animals and things supported by nourishment pass on to that concerning man. And having now come to the principal subject of inquiry, that inquiry should be more accurate and complete on all points.

5. Inquire into the length and shortness of men's lives, according to the times, countries, climates, and places in which they were born and lived.

6. Inquire into the length and shortness of men's lives, according to their parentage and family (as if it were a thing hereditary); and likewise according to their complexion, constitution, habit of body, stature, manners and time of growth, and the make and structure of their limbs.

7. Inquire into the length and shortness of men's lives according to the times of their nativity; but so as to omit for the present all astrological and horoscopical observations. Admit only the common and manifest observations (if there be any); as, whether the birth took place in the 7th, 8th, 9th, or 10th month, whether by night or by day, and in what month of the year.

8. Inquire into the length and shortness of men's lives according to their food, diet, manner of living, exercise, and the like. With regard to the air in which they live and dwell, I consider that ought to be inquired under the former article concerning their places of abode.

9. Inquire into the length and shortness of men's lives according to their studies, kinds of life, affections of the mind, and various accidents.

10.Inquire separately into the medicines which are supposed to prolong life.

11.Inquire into the signs and prognostics of a long and short life; not into those which betoken that death is close at hand (for they belong to the history of medicine); but into those which appear and are observed even in health, whether taken from physiognomy or otherwise.

So far the inquiry touching the length and shortness of life is instituted in an unscientific and confused manner; but I have thought it right to add a systematic inquiry, bearing on practice by means of Intentions; which are of three kinds. Their more particular distributions I will set forth when I come to the inquiry itself. The three general intentions are; the prevention of consumption; the perfection of repair, and the renovation of that which is old.

12.Inquire into the things which preserve and exempt the body of man from arefaction and consumption, or at least which check and retard the tendency thereto.

13.Inquire into the things which belong to the general process of alimentation (whereby the body of man is repaired), that it may be good and with as little loss as possible.

14.Inquire into the things which clear away the old matter and supply new; and likewise those which soften and moisten the parts that have become hard and dry.

But since it will be difficult to know the ways to death, unless the seat and house (or rather cave) of death be first examined and discovered; of this too should inquiry be made; not however of every kind of death, but of such only as are caused, not by violence, but by privation and want. For these alone relate to the decay of the body from age.

16.Inquire into the point of death and the porches which on all sides lead to it; provided it be caused by want and not by violence.

Lastly, since it is convenient to know the character and form of old age; which will be done best by making a careful collection of all the differences in the state and functions of the body between youth and old age, that by them you may see what it is that branches out into so many effects; do not omit this inquiry.

17.Inquire carefully into the differences of the state and faculties of the body in youth and old age; and see whether there be anything that remains unimpaired in old age.

NATURE DURABLE.

The History.

1. Metals last so long that men cannot observe yla of irt-qutr the period of their duration. And even when they do dissolve from age, they dissolve into rust, not through perspiration. Gold however is affected neither way.

2. Quicksilver, though a moist and fluid body and easily made volatile by fire, yet (as far as we know) neither decays nor collects rust by age alone without fire.

3. Stones, especially the harder kinds, and many other fossils are exceedingly durable, even when exposed to the air; and much more so when buried in the earth. But yet they collect a kind of nitre which acts as rust upon them. Precious stones and crystals last even longer than metals, but after a length of tune they lose somewhat of their brilliancy.

4. It is observed that stones facing the north decay sooner than those which face the south, as may be seen in obelisks, churches, and other buildings. But iron on the contrary rusts sooner on the south than on the north side, as is shewn on the iron bars or grating of windows. And there is nothing strange in this, seeing that in all putrefactions (and rust is one) moisture accelerates dissolution, as dryness does in simple arefaction.

5. Vegetables when cut down and no longer growing, as the stems or trunks of the harder trees and the timber manufactured from them, last for some ages. But there is a great difference in the parts of the trunk. Some, like the elder, are fistulous, with a soft pith in the middle, and a harder exterior; but in solid trees like the oak, the interior part (which is called the heart of the tree) is snore durable.

6. The leaves, flowers, and even the stalks of plants are of short duration, and unless they putrefy, turn into dust and ashes; but the roots are more durable.

7. The bones of animals last long, as may be seen in charnelhouses where they are stored. Horns also and teeth are very durable, as is seen in ivory, and the teeth of the sea-horse.

8. Skins and hides are very durable, as appears from old parchment books. Paper likewise lasts for many, ages, though less durable than parchment.

9. Things which have passed through the fire, like glass or bricks, become very durable. Flesh and fruit also last longer in a cooked than in a raw state. And this is not only because the preparation in the fire prevents putrefaction; but also because, when the watery humour is discharged, the oily humour can support itself longer.

10. Of all liquids, water evaporates the quickest, oil the slowest; as may be seen, not only in the liquids themselves, but also in their compounds. For if paper be moistened with water so as to acquire some transparency, yet it will soon lose it again and turn white, by reason of the evaporation of the water. On the other hand if the paper be dipped in oil, the transparency lasts for a long time, because of the slow evapo-ration of the oil. And this is the reason why forgers lay oiled paper on an autograph, by means of which they attempt to draw the lines.

11. All gums last a very long time; as do wax and honey.

12. But the equality or inequality of the accidental condi-tions of bodies contributes as much as the things themselves to their duration and dissolution. Thus timber, atones, and other bodies last longer, if always in the air or always in the water, than if they be sometimes wet and sometimes dry. Stones dug out of the earth and placed in buildings last longer, if they lie in the same direction and point to the same quarter of the heaven as they did in the quarry. This happens likewise in the removal and transplantation of plants.

Major Observations.

1. Let it be assumed, as is most certain, that all tangible bodies contain a spirit of pneumatic body concealed and en-veloped in the tangible parts; that by this spirit all dissolution and consumption is commenced; it follows that the antidote against them is the detention of this spirit.

2. This spirit is detained in two ways; either by a close confinement, as in a prison, or by a kind of voluntary detention. This continuance is likewise invited in two ways; namely, if the spirit itself be not very impetuous or pungent, and if more-over it be not much excited by the external air to come forth. Therefore there are two durable substances; namely, the Hard and the Oily; whereof the former binds down the spirit, the latter partly soothes it, and partly is of that nature that it is less acted upon by the air; for air is of the same substance as water, and flame as oil. So much therefore touching nature durable and non-durable in inanimate subjects.

13. Herbs which are said to be of a colder sort, as lettuce, purslane, wheat, and all kinds of corn, are annual, and perish yearly, both in root and stalk. Yet there are likewise some cold plants that will last three or four years, as the violet, strawberry, burnet, primrose, and sorrel; but borage and bugloss, although they seem so like alive, differ in death; for the borage is an annual, the bugloss longer lived.

14. But most hot plants bear age and years better; as hyssop, thyme, savory, pot-marjoram, balm, wormwood, germander, sage, and the like. Fennel dies in the stalk, but springs again from the.root. Basil and sweet marjoram stand age better than cold; for if they are planted in a warm and well sheltered spot they will live more than one year. A knot or figure of hyssop (such as they have in gardens for ornament), clipped twice a year, has been known to last for forty years.

15. Shrubs and bushes live for sixty years; some even twice as long. A vine may continue to bear at sixty. Rosemary also in a favourable situation will live for sixty years; evergreen thorn, and ivy for snore than a hundred. The age of the bramble is not observable, since by bowing its head to the ground it strikes new roots, so that it is difficult to distinguish the old from the new.

16. Of the larger trees the longest lived are the oak, the holm-oak, the mountain ash, the elm, the beech, the chesnut, the plane, the fig, the lotus, the wild olive, the olive, the palm, and the mulberry. Of these, some come to the age of eight hundred years, and the most short-lived reach two hundred.

17. Fragrant and resinous trees are in their wood or timber even more durable than those just mentioned; but they are not so long-lived. Such are the cypress, fir, pine, box, and juniper; but the cedar, being assisted by its enormous bulk, almost equals the former in age.

18. The ash, lively and rapid in its growth, lasts for a hundred years or a little more; as sometimes also do the birch, maple, and service tree ; but the poplar, lime, willow, and that which they call the sycamore, and walnut, are not so long-lived.

19. The apple, pear, plum, pomegranate, citron, lemon, medlar, cornel, and cherry, sometimes reach their fiftieth or

16 Bacon Vsixtieth year; especially if from time to time they are cleared of the moss that covers some of them.

20. In general, the size of a tree and the hardness of its timber have (if there be nothing adverse in other respects) some connection with their length of life. Trees likewise that bear mast or nuts are generally more long-lived than those that bear fruit or berries. Trees which come into leaf and shed their leaves late last longer than those that are early either in fruit or leaf. Wild trees live longer than orchard trees; and in the same kind trees that have an acid fruit are longer-lived than those with a sweet one.

A Major Observation.

Aristotle has noted well the distinction between plants and animals, as regards alimentation and renovation, namely, that the bodies of animals are confined within their own bounds; and that after they have come to their full growth, they are continued and preserved by nourishment, but put forth nothing new except hair and nails, which are regarded as excretions; so that of necessity the juices of animals must soon grow old; whereas in trees, which from time to time put out new branches, new shoots, new leaves, and new fruits, it happens that these parts are always fresh, and untouched by age.1 But since everything fresh and young draws in nourishment with more strength and vigour than that which has commenced to fade, it happens withal that the trunk, through which the sap passes to the boughs, is itself moistened and refreshed in the passage by a richer and more abundant aliment. And this is further shown (though it was not observed by Aristotle, who likewise has not so clearly expressed that which I have just mentioned,) by this; that in hedges, copses, and pollards, the cutting off of the branches or suckers strengthens the stem or trunk and makes it longer-lived.

DESICCATION; THE PREVENTION OF DESICCATION; AND

THE INTENERATION OF THAT WHICH HAS BEEN DRIED.

The History.

With reference(('Aristot. De Long. et Brevit. Vitro, c. 227)1. Fire and intense heat dry some things but to the 2nd yqr~t~ a of in. melt others. °1 In one and the same fire, clay grows hard and wax melts."' Heat dries the earth, stones, wood, cloth, skins, and all bodies that cannot be melted. It melts metals, wax, gums, butter, tallow, and the like.

2. But if the fire be very strong it will in the end dry up even the things which it has melted. For metals, with the exception of gold, having lost their volatile part in a strong fire, become lighter and more brittle; and oily and fat substances become burnt, scorched, dried up, and crusted.

3. Air, especially open sir, manifestly dries, but never melts. Thus roads and the soil when moistened by rain are dried; washed linen exposed to the air is dried; herbs, leaves, and flowers are dried in the shade. But the air acts much quicker either when brightened by the sun's rays (if only it does not produce putrefaction), or when stirred by a gale of wind, and in thorough draughts.

4. Age dries most, but slowest of all things; as is -the case in all bodies, which (if putrefaction does not intervene) become dry with age. Not however that age is anything of itself (seeing it is only a measure of time), but the effect is produced by the innate spirit of the body, which sucks out the moisture of the body, and flies out with it; and by the external air, which multiplies itself upon the innate spirits and juices of the body, and preys upon them.

5. Cold has of all things the greatest property of drying; for dryness cannot take place without contraction, and this is the peculiar work of cold. But since men have a very powerful heat in fire, but a very feeble degree of cold (for there is nothing besides that of winter, or perhaps ice and snow, or nitre); the desiccations of cold are weak and easily dissolved. Yet still we see that the surface of the earth is more dried by frost and March winds than by the sun; for the same wind that sucks up the moisture strikes the ground with cold.

6. Smoke from the fire has a drying power, as is shown in bacon and oz-tongues hung up in chimnies. And so fumigations of olibanum, lign aloes, and the like, dry the brain and cure catarrhs.

7. Salt, by a somewhat longer process, dries not only the outside but the inside also; as in salt flesh or fish, which by a long salting are manifestly hardened within.

I Virg% Eclog. vial. 80. Limus ut hic durescit, et haec ut cera llquescit Uno eodemque igne."

8. Hot gums applied to the skin dry and wrinkle it; as likewise do some astringent waters.

9. Strong spirit of wine dries as well as fire; so as to blanch the white of an egg put into it, and to toast bread.

10. Powders dry, like sponges, by sucking up the moisture; as is seen in the - powder thrown on ink after writing. The polished surface likewise and closeness of the body (which does not permit the vapour of moisture to enter through the pores) accidentally dries it by exposure to the air; as is seen in precious stones, looking-glasses, and sword-blades, which, if you breathe upon them, appear at first covered with a vapour, though it Boon disperses like a little cloud. And so much for desiccation.

11. In the eastern parts of Germany, at the present day, they make use of cellars as granaries to keep wheat and other grain. A covering of straw of some depth is laid on the floor below and round the grain, to keep off and absorb the moisture of the cellar; by which means the grain is preserved for twenty or thirty years, not only from rotting, but (what pertains more to the present inquiry) in such a state of freshness as to make excellent bread. The same custom is said to have prevailed in Cappadocia, Tbrace, and some parts of Spain.'

12. The situation of granaries at the tops of houses, with windows to the east and north, is very convenient. Sometimes two floors are constructed, an upper and a lower one; whereof the upper one is perforated with holes, that the grain (like sand in an Hour-glass) may continually fall through the chinks, and after a few days be shovelled up again, so as to keep the grain in constant motion. Now we must observe that a contrivance of this- kind not only prevents the corn from rotting, but preserves freshness and checks desiccation; because, as was before remarked, the discharge of the watery humour, which is accelerated by the motion-and the wind, preserves the oily part that would otherwise escape with the watery moisture in its proper substance. On some mountains likewise where the air is pure dead bodies will remain many days without much decay.

13. Fruits, as pomegranates, lemons, apples, pears, and the like; and flowers, as roses and lilies, are kept a long time in close earthen vessels. Not however that then they are entirely free from the affection of the external air, which conveys and insinuates its inequalities through the sides of the vessel, as is shown in heat and cold; so that besides carefully stopping the mouths of the vessels, it will be good likewise to bury them in the earth. Or it will answer the same purpose if you sink them in water, provided the water be sheltered, as wells and cisterns in houses; but in this case glass vessels should be substituted for earthen.

Pliny, xviii. 73.

14. In general, things kept in the earth, or in cellars, or in water, preserve their freshness longer than things kept above ground.

15. It is said that in conservatories of snow (whether in the mountains, in natural pits, or in artificial wells), if an apple, chesnut, nut, or anything of the kind happen to fall in, it will be found many months after, when the snow has melted, or even in the snow itself, as fresh and fair as if it had been gathered the day before.

16. Country people keep grapes by covering the bunches with meal, which, though it makes them less pleasant to the taste, yet preserves their juice and freshness. Likewise all the harder fruits last for a long time, not only in meal, but also in sawdust, and even in heaps of grain.

17. It is a common opinion that bodies are preserved fresh in liquors of their own kind, as in their proper menstrua ; as grapes in wine, olives in oil, and the like.

18. Pomegranates and quinces are preserved by dipping them in sea or salt water, and presently taking them out again, and drying them in the open air in a shady place.

19. Bodies suspended in wine, oil, or lees of oil keep long; much longer in honey and spirit of wine, but the longest of all (according to some) in quicksilver.

20. Fruits covered with wax, pitch, plaster, paste, or other coat or covering, long retain their freshness.

21. It is manifest that flies, spiders, ants, and the like, that have accidentally been inclosed and buried in amber or even the gums of trees, never afterwards decay; though they are soft and tender bodies.

22. Grapes and other fruits are preserved by hanging them up in the air. For in this there is a double advantage; one, that all the bruising or pressure, which happens when they are laid on hard bodies, is avoided; the other, that there is an equal play of the air on all sides of them.

23. It has been remarked that in vegetable bodies neither putrefaction nor desiccation commence alike in every part; but chiefly in that part through which during life aliment was drawn. Hence some recommend to cover up applestalks and fruitstalks with melted wax or pitch.

24. Large wicks of candles or lamps consume the tallow or oil quicker than small ones; cotton-wicks quicker than those of rush, straw, or twig; torches of juniper or fir burn quicker than those of ash; and all flame stirred and fanned by the wind burns faster than in a calm; and therefore slower in a lantern than in the open air. Lamps in tombs are said to last for a very long time.

25. The nature likewise and preparation of the aliment, no less than the nature of the flame, contributes to the length of time they burn. For wax lasts longer than tallow, moist tallow longer than dry, hard wax longer than soft.

26. Trees, if the earth about their roots be stirred, every year, last for a shorter time; if every five or ten years, for a longer. Cutting off buds and shoots contributes to their length of life; but manuring, laying chalk and the like about their roots, or much irrigation, though it increases their fruitfulness, shortens their existence. And so much for the prevention of desiccation and consumption.

The inteneration of bodies which have been dried, though the most important part of the matter, presents but few experiments; and I will therefore combine with them some things which happen to animals and even to man.

27. Willow bands used to bind trees become more flexilbe by being steeped in water. The ends of birch twigs likewise are placed in pots of water to prevent them from withering. Bowls that have cracked from dryness, by being placed in water, close and become whole again.

28. Leathern boots grown hard and stiff with age are softened by being greased with tallow before the fire; and if they are put before a fire alone they get some softness. Bladders and parchment which have become hard, are softened by warm water with an infusion of oil or any fat substance; and more so if besides this they are slightly rubbed.

29. Very old trees, which have long stood untouched, if the earth about their roots be stirred and opened out, manifestly become as it were young again, and put out new and tender leaves.

30. Old draught oxen, entirely worn out, if turned into a fresh pasture, put on new flesh, tender and young, so as even to taste like young beef.

31. A spare and strict diet of guaiacum, biscuit, and the like (such as is used in the cure of venereal diseases, inveterate catarrhs, and the beginning of dropsy,) reduces men to great leanness, by consuming the juices of the body. But these when they begin to be renewed and recruited, appear much more fresh and youthful, so that I judge wasting diseases well cured to have prolonged the lives of many.

Major Observations.

1. It is strange how men, like owls, see sharply in the darkness of their own notions, but in the daylight of experience wink and are blinded. They talk of the elementary quality of dryness, of desiccants, and of the natural periods of bodies, by which they are corrupted and consumed; but in the meantime they observe

nothing of any moment, either of the beginnings, or of the intermediate and last acts of desiccation and consumption.

2. The process of desiccation and consumption is performed by three actions, which are derived, as was mentioned. before, from the innate spirit of bodies.

3. The first action is the Attenuation of Moisture into Spirit; the second is, the Egress or Escape of the Spirit; the third is, the Contraction of the Grosser Parts of the Body, immediately after the emission of the spirit. And this last is that desiccation and induration whereof I am now principally treating; the two first only consume.

4. With regard to Attenuation, the matter is obvious. The spirit inclosed in all tangible bodies does not forget itself, but whatever it finds therein, that it can digest, work upon, and turn into itself, that it plainly alters and subdues, multiplying itself thereby and generating new spirit. This is confirmed by one proof, which may do for all; that bodies thoroughly dried lose in weight, and become hollow, porous, and sonorous from within. Now it is most certain that the spirit which pre-exists in the body adds nothing to the weight, but rather takes away from it; and therefore it must needs be that this spirit has turned into itself that moisture and juice of the body, which befcre weighed; by which means the weight is diminished: This then is the first action; namely, the Attenuation of Moisture and its Conversion into Spirit.

5. The second action, namely the Egress or Escape of the Spirit, is likewise very manifest This escape, if it takes place all at once, is even apparent to the sense; in vapours to the sight, in odours to the smell; but if it is gradual, as in old age, it is imperceptible to the sense, though it is the same process. Besides, if the texture of the body is so close and tenacious as to prevent the spirit from finding any pores or passages of escape, the spirit in its efforts to get out drives before it the grosser parts of the body and thrusts .them beyond the surface; as may be seen in the rusting of metals and the corruption of all fat bodies. This then is the second action; namely, the Egress or Escape of the Spirit

6. The third action is a little more obscure but equally certain; namely the Contraction of the Grosser Parts after the Emission of the Spirit. In the first place, after the emission of the spirit, bodies seem to be manifestly contracted and to fill less space; as the kernels of nuts when dried do not fill the shell; beams and planks of wood, which at first lay close together, when dried start asunder; bowls and the like crack from dryness; for the parts of the body contract themselves together, and being contracted necessarily leave vacant spaces between them. Secondly, this is shown by the wrinkles of dried bodies ; the effort of contraction having so much power as in the meantime to draw the parts together and raise them up ; for things that are contracted at the extremities are raised in the centre. And this may be seen in paper, old parchments, the skin of animals, and the rind of soft cheese, all which

with age become wrinkled. Thirdly, this contraction shows itself better in things which are not only wrinkled by heat, but are also folded, crumpled, and as it were rolled up by it; as may be seen by holding paper, parchment, and leaves to the fire. For contraction by age, being a slower process, generally only wrinkles, but contraction by fire being more speedy likewise curls up in folds. But in most bodies, which do not admit of wrinkling or folding, there is a simple contraction, shrinking, induration, and desiccation, as was laid down at first. And if the escape of the spirit and consumption of the moisture is so great as not to leave body enough to unite and contract itself, then the contraction necessarily ceases, the body becomes putrid, and nothing but a little dust hanging together, which with a slight touch is dissipated and passes into air; as may be seen in bodies much decayed, in paper and linen burnt to tinder, and in corpses which have been long embalmed. This then is the third action; namely, the Contraction of the Grosser Parts of the Body after the Emission of the Spirit.

7. It should be observed that fire and heat only dry accidentally, their proper work being to attenuate and dilate the spirit and moisture. But it follows by accident that the other parts contract themselves; whether only to avoid a vacuum, or from some simultaneous motion, whereof I aim not now speaking.

8. It is certain that putrefaction as well as arefaction is caused by the innate spirit, though it proceeds in a very different way. For in putrefaction the spirit is not simply discharged, but is in part detained, whence it produces strange effects. And the grosser parts likewise are not so much locally contracted as collected severally each to its own kind.

LENGTH AND SHORTNESS OF LIFE IN ANIMALS.

The History.

With reference

With regard to the length and shortness of life in

to the 3rd

Article of inquiry. animals, the information to be had is small, observation careless, and tradition fabulous. Among domestic creatures a degenerate life spoils the constitution ; in wild animals severity of weather curtails the natural duration.

Neither is this information much advanced by what may appear to be concomitants; namely, the size of the body, the time of gestation in the womb, the number of young, the time of growth, and the like; for these things are complicated, concurring in some cases and not in others.

1. The age of man (as far as can be gathered from any certain account) exceeds in length that of all other animal, with the exception of a very few. The concomitants in his case are generally regular, his stature and proportion lark, his gestation nine months, his offspring commonly single, his age of puberty fourteen, his time of growing up to twenty.

2. The elephant, on undoubted authority, exceeds the ordinary run of human life. The story that its period of gestation in the womb is ten years is fabulous 1 ; that it is two years or at least more than one is certain. It is of an immense size, and grows even to the thirtieth year; the teeth are extremely strong, and it has been observed that the blood is colder than that of any other animal. It sometimes lives two hundred years.

3. Lions have been considered long-lived because many of them are found toothless 2 ; but this is a fallacious sign, since it might proceed from their strong breaths.

4. The bear is a great sleeper; a dull and indolent beast, but not remarkable for long life. His period of gestation, which is very short (hardly forty days), is on the contrary a sign of a short life.

5. The fox seems to have many things suitable for a long life; be is very well clothed, feeds on flesh, and lives in holes; but yet he is not noted for longevity. Certainly he belongs to the canine race, which is short-lived.

6. The amel is long-lived; a lean, sinewy creature, which commonly reaches fifty and sometimes one hundred years.'

7. The horse lives only to a moderate age, scarce ever reaching forty, and ordinarily only twenty years. But for this shortness of life he is perhaps indebted to man, since we have now no horses of the sun that range at large in fresh pastures. Yet the horse grows up to its sixth year, and has generative powers in old age. The mare likewise goes longer with young than a woman, and less often produces two at a birth. The ass lives to about the same age as the horse; but the mule longer than either of them.

8. Stags are famed for long life, but upon no certain ground.5 There is however some story of a stag with a collar round its neck, being found with the collar buried in fat 6 But the longevity of the stag is the less credible, 'because it comes to its

prime at five years; and not long after, the borns (which they shed and renew annually) grow closer in front, and less branched.

I Pliny, viii. 10. x Aristot. Hist An. ix. 4.1. ' Id. lb. vi. 30.

4 Id. ib. Vt. 26. and AM 9. 1 Id. ib. vi. 29. 1 Pliny, Vill. 50.

9. The dog is short-lived, its age never reaching beyond twenty, and not often to fourteen. It is an animal of a very hot nature, and lives unequally, being mostly either in violent motion or asleep. It likewise brings forth many in one litter, and goes with them nine weeks.

10. The ox also for its size and strength is short-lived, about sixteen years; the male being somewhat more long-lived than the female. Yet the cow seldom has more than one at a birth, and goes with calf about six months. They are of a dull and fleshy nature, easily fatted, and graminivorous.

11. Sheep seldom live to ten years', though they are a creature of moderate size, and excellently clothed; and what is strange, though they have very little bile in them, their wool is more curled and twisted than the hair of any other animal. The rams do not generate till the third year, and their powers continue till the eighth. The ewes bear young as long as they live. The sheep is a sickly animal, and seldom reaches its full age.

12. The goat lives to about the same age as the sheep, and does not much differ from it in other respects. Though he is a more active creature and his flesh is somewhat firmer, which should make him more long-lived; yet he is much more lascivious, which shortens his existence.

13. Swine sometimes live for fifteen or even for twenty years; and though their flesh is moister than that of any other animal, yet this seems to have no effect upon their length of life. Of the wild species nothing certain is known.

14. Cats live between six and ten years; an active animal, and of an acrid spirit, whose seed (according to AElian) burns the female; whence an opinion has prevailed, "that the cat conceives with pain and brings forth with ease." They eat voraciously, and rather swallow than chew their food.

15. Hares and rabbits scarcely reach to seven years. Both creatures are very prolific, carrying at once the young of several conceptions. They differ in this; that the rabbit lives in holes, the hare above ground ; and that the flesh of the hare is of a darker colour.

16. Birds in the size of their bodies are far less than beasts.

Pliny, vii]. 75.

An eagle or a swan by the side of an ox or a horse, and an ostrich by the side of an elephant, appear small.

17. Birds are excellently clad; since for warmth and close fitting to the body, feathers are better than either wool or hair.

18. Birds, though they hatch many at once, yet do not carry them all together in their bodies, but lay the eggs separately; whence the young are provided with a more plentiful aliment.

19. Birds masticate little, if at all, so that their food is often found whole in their crops. But yet they break the shells of fruits, and pick out the kernels. They are thought to be of a hot and strong digestion.

20. The flight of birds is a mixed motion formed by the motion of the limbs and that of carriage, which is the most healthy kind of exercise.

21. Aristotle remarked well concerning the generation of birds (but he, did wrong to transfer the observation to other animals), that the seed of the male contributes less to generation, but supplies activity rather than matter; whence in many respects prolific and unprolific eggs are not distinguishable.'

22. Almost all birds come to their full growth the first year or a little after. It is true that the plumage in some, and the bill in others takes years to come to perfection; but not the size of the body.

23. The eagle is considered long-lived, though its exact age is not ascertained. It is reckoned lilcewise as a sigh of' longevity, that he casts his beak, which makes him grow young; again; whence comes the proverb, " the old age of the eagle." But perhaps it is not the renewing; of the eagle which casts the bill, but the casting of the hill which renews the eagle; for when the beak becomes too hooked, the eagle has great difficulty in feeding.

24. Vultures likewise are said to be Ion.--Iivc(l, so its almost to reach a hundred years. Kites also, and all carnivorous birds and birds of prey, are long-lived. The natural ago of the hawk cannot be certainly decided, seeing that it, leads a servile and degenerate life for the use of man. But twine hawks have sometimes been known to live for thirty years, and wild ones for forty.

25. The raven likewise is reported to live long, sometimes for one hundred years. It feeds on carrion, is not much on the wing, but of sedentary habits, and with a very darkcoloured flesh. The crow, which is like the raven in every respect, except in size and voice, has a somewhat shorter life; yet it is still reckoned among the long livers.

26. The swan is known for certain to be very long-lived, and not unfrequently exceeds one hundred years. It is a bird of most excellent plumage, living on fish, and perpetually carried, and that in running waters.

27. The goose also is one of the long livers; though it feeds on grass and that kind of nourishment. But the wild goose is especially long-lived ; so that it passed into a proverb among the Germans, " older than a wild goose."

28. Storks ought to be very long-lived, if the old story is true, that they never went to Thebes, because that city was so often captured.' For if this were the case, they either could remember more than one age, or the old ones must have told the story to their young. But all things are full of fables.

29. The story of the phoenix again is so intermixed with fable, that if there was any truth in it, it is completely obscured. But there is nothing very remarkable in that which was looked on as a wonder; namely, how it was always accompanied in its flight by a great number of other birds. For this may be seen anywhere if an owl flies in the daytime, or a parrot escapes from a cage.

30. The parrot has certainly been known to live sixty years in England, in addition to its age when brought over. It is a bird which will live on all kinds of meat, masticates its food, and from time to time casts its beak; of a bad and mischievous temper, and with a black flesh.

31. The peacock lives twenty years'; but it does not get the Argus eyes before the third year; it is slow in walking, and has white flesh.

32. The dung-hill cock is lascivious, pugnacious, and shortlived; a very lively bird, that likewise has white flesh.

33. The Indian or Turkey cock lives longer than the former. It is an irascible bird, with very white flesh.

34. Wood-pigeons axe long-lived, sometimes reaching to fifty years ; a bird of the air, that builds and sits on high. Doves and turtle-doves are short-lived, not exceeding eight years.3

Cf. Pliny, x. 34. ° Cf. Arlstot Hist. An. vi. 9.

' Id. ib. Ix. 7. and Pliny, x. 52.

35. Pheasants and partridges sometimes live sixteen years. They are birds that have large broods; with flesh rather darker than that of the pullet tribe.

36. The blackbird is said to be the longest lived of all small birds. It is an impudent bird, but a good singer.

37. The sparrow is observed to be very short-lived 1, which in the male bird is attributed to its lasciviousness. The linnet, which is not much bigger than a sparrow, has been known to live for twenty years.

38. Of ostriches nothing certain is known, since those kept in England have unfortunately not been found to live long; of the ibis it is only known that it is long-lived, but its age is not recorded.

39. The age of fish is more uncertain than that of land animals, because from living under water they are less observed. Most of them have no respiration, and therefore the vital spirit is confined more closely; and though they take in some refrigeration through their gills, yet it is not so continual as by breathing.

40. From living in the water they avoid the desiccation and depredation of the external air. Yet there is no doubt but that the external water entering and abiding in the pores of the body is even more prejudicial to life than the air.

41. They are said to be cold-blooded. Some of them are very voracious, and feed even on their own species. The flesh is softer and less firm than that of land creatures; but they fatten exceedingly, so that an immense quantity of oil is extracted from whales.

42. Dolphins are reported to live about thirty years, an experiment having been made on some of them by cutting off their tails. They continue to grow for ten years.'

43. They tell a strange story of fishes, that after some years they diminish much in body, while their heads and tails retain their former size.

44. In Caesar's fishponds lampreys were sometimes found to live sixty years.' Certainly from long habit they grew so tame that Crassus the orator wept over one of them.'

45. The pike is found to be the longest lived of all fresh water fish, and sometimes lasts forty years. It is a voracious fish, with a dry and firm flesh.

46. Carp, bream, tench, eels, and the like, are not thought to live more than ten years.

47. Salmon are quick of growth but short of life; as also are trout; but perch are slow of growth and long of life.

48. How long the vast mass of matter in whales and sharks is governed by the spirit is not certainly known; nor in seals, sea-hogs and innumerable other kinds of fish.

49. Crocodiles are said to be very long-lived, and likewise to be remarkable for the time of their growth, so that it is thought that they are the only animals which continue to grow as long as they live. They are oviparous, voracious, savage, and excellently protected against the water. Concerning the age of the other kinds of shell fish, I find nothing certain is known.

Major Observations.

From the neglect of observations, and the complication of causes, it is difficult to discover any rule for the length and shortness of life in animals. Some few things however I will note.

1. More birds than beasts are long-lived (as the eagle, vulture, kite, pelican, raven, crow, swan, goose, ibis, parrot, woodpigeon, and the like); though they complete their growth in a year, and are of less size. Certainly they are excellently protected against the inclemency of the weather; and as they, generally live. in the open air, they resemble the inhabitants of pure mountains, who are long-lived. Their movements likewise, which (as has been mentioned elsewhere) are partly by carriage and partly by motion of the limbs, shake and fatigue them less, and are more healthy. Neither do birds in the first stage of their existence suffer compression or want of aliment in the mother's womb, because the eggs are laid separately. But the principal cause, as I take it, is that birds are made more of the substance of the female than of the male, whence they have a less hot and fiery spirit.

2. It may be laid down that animals which have more of the substance of the female than of the male are longer-lived; as I have just said, birds are. Again, that those which have a longer period of gestation partake more of the substance of the(Pliny, vial.)female than of the male, and are therefore more long lived Insomuch that even in men (as I have observed in some instances), those who are most like their mother do in my opinion live the longest; as also do the children of old men, by young wives, provided the fathers be healthy and not sickly.

3. The beginnings of things are most susceptible both of damage and of help; and therefore the less pressure and the more nourishment that the foetus receives in the womb the more likely is it to be long-lived. This happens either when the young are brought forth at separate times, as in birds; or when the birth is single, as in animals which only bring forth one at a time.

4. A long period of gestation lengthens life in three ways. First, as has been said, the young partakes more of the substance of the mother; secondly, it comes forth stronger;, and thirdly, it is later in undergoing the predatory action of the air. Besides, it denotes that the periods of nature revolve in larger circles. And though sheep and omen, which remain about six months in the womb, are short-lived, yet this arises from other causes.

5. Graminivorous and herbivorous animals are short-lived;but those which live on flesh, or even seeds or fruits (as birds do), are long-lived. For stags, which are long-lived, look for half their food (as they say) above their heads; and, the goose, besides grass, picks up something in the water to benefit it.

6. The covering of the body I judge to add greatly to longevity, as it prevents and repels the intemperances of the air which so strangely weaken and undermine the body; and with this birds are excellently provided. And though sheep which are well covered are short-lived, this must be attributed to the manifold diseases of the animal and the living upon grass alone.

7. The principal seat of the spirits is doubtless in the head; and though this is commonly referred only to the animal spirits, yet it applies to all. And there is no question that the spirits most absorb and consume the body, so that a larger quantity of them or a greater inflammation and acrimony greatly shortens life. It appears to me therefore that the great cause of longevity in birds is that they have such small heads for the size of their bodies; whence men likewise who have very Urge heads are, I think, shorter lived.

8. Carriage, as has been before observed, I judge more than any other motion to contribute to longevity. Water--birds, as the swan, are carried on the water; and all birds are carried as they fly, using however from time to time a strong exertion of the limbs. So also are fishes in swimming, but their length of life is uncertain.

9. Animals which come later to perfection (I am not speaking of growth in stature only, but of the other steps to maturity; as man puts out first his teeth, then his signs of puberty, then his beard, &c.), axe longer-lived; for it indicates that the periods return in wider circles.

10. The gentler kinds of animals, as the sheep and dove, are not long-lived; for bile acts as a whetstone or spur to many functions of the body.

11. Animals whose flesh is somewhat dark-coloured live longer than those with a white flesh; for it denotes that the juice of the body is firmer, and less easily dissipated.

12. In every corruptible body quantity itself contributes much to the preservation of the whole. For a large fire is not so soon quenched; a small quantity of water evaporates sooner; a twig withers sooner than the trunk. Generally therefoer (I speak of kinds, not of individuals) animals of a larger bulk arc more long-lived than those of a smaller; unless there is some other powerful cause to prevent it.

ALIMENTATION; AND THE WAY OF NOURISHING.

1. Nourishment should be of an inferior nature

Article- and a simpler substance than the body nourished. Plants are nourished by earth and water, animals by plants, men by animals. There are animals likewise which feed on flesh, and man himself feeds partly on plants; but man and carnivorous animals could hardly be nourished by plants alone. From time and habit they might perhaps be nourished by fruits and seeds that had passed the fire, but not by the leaves of plants or herbs; as has been proved by the order of the Feuillans.

2. Too near a relationship or similarity of substance between the nourishment and the thing nourished does not turn out well. Graminivorous animals do not touch flesh; even of carnivorous animals few eat the flesh of their own species ; nor do men that are cannibals feed ordinarily upon man's flesh, but take to it either for revenge on their enemies, or from some unnatural custom. A field is not well sown with the grain which grew in it, nor is the sucker or shoot grafted on its own stock.

3. The better the aliment is prepared, and the nearer it assimilates to the substance of the thing nourished, the more fruitful do plants become, and the more do animals fatten. For no shoot or sucker planted in the ground is so well nourished as if it were grafted on a stock well suited to its nature, where it found its nourishment digested and prepared. Neither (it is said) will the seed of an onion or the like, put into the earth, produce so large a plant as it would if it were first grafted into the root of another onion, and then put into the earth. Again, it has been recently discovered that shoots of wild trees, as the elm, oak, ash, and the like, bear far larger leaves when, grafted on other stocks than they do naturally. Men likewise are better nourished by cooked than by raw food.

4. Animals are nourished through the mouth, plants through the roots, the foetus of animals in the womb through the navel cord, and birds for a short time by the yolk of their eggs, some of which is even found in their crops after they are hatched.

5. All aliment moves principally from the centre towards the circumference, or from the inside towards the outside. But it should be observed that trees and plants are rather nourished through the bark and outside, than through the pith and inside; for if even a narrow strip of bark be peeled off all round the trunk the tree soon dies. And blood in the veins of animals nourishes the flesh beneath it as well as that above it.

6. In all alimentation there are two actions, extrusion and attraction; whereof the former proceeds from an interior, the latter from an exterior function.

7. Vegetables assimilate their aliment simply and without excretion ; for gums and tears are rather exuberances than excretions, and knobs are diseases. But the

substance of animals having a better perception of its like, is the more fastidious, and rejects the useless and assimilates the useful matter.

8. It is curious that all the aliment, which sometimes produces such large fruit, should have to pass through such a, slender neck as the fruitstalk ; for fruit never grows to the stem without a stalk.

9. It should be observed that the seed of animals is only fruitful when fresh, but that the seeds of plants retain the power of nourishment for a long time. But yet shoots will not grow unless they are put in fresh; and roots will soon lose their vegetative power if they are not covered with soil.

10. In animals the degrees of nourishment vary according to the age. For the foetus in the womb the juices of the mother are enough: after birth, milk; afterwards, meat and drink; and in old age heavier and more savoury meats are generally the most pleasing.injunction. The point of most importance to the present inquiry is to examine clearly and carefully whether nourishment may not be supplied from without, at all events otherwise than through the mouth. We know that milk-baths are used in consumptions and wasting diseases, and that there are some physicians who consider that some alimentation may be supplied by clysters. By all means pay attention to this: for if nourishment can be made to pass either from without, or otherwise than through the stomach, then the weakness of digestion which attacks old men may by these means be compensated and the power of digestion as it were restored.

LENGTH AND SHORTNESS OF LIFE IN MAN.

With reference 1. Before the flood men lived according to 6th,h?th. 6th. Scripture many hundred years, yet none of the

ert i lth

Articles. patriarchs reached to a thousand. Neither can this longevity be imputed to grace or the holy line. Fur of the patriarchs before the flood there are counted eleven generations, but of the sons of Adam by Cain only eight; which would make Cain's descendants the more long-lived.

Immediately after the flood this longevity was reduced by a half; at least in such as were born after the flood (for Noah who was born before it arrived at the age of his ancestors, and Shem lived 600 years).' And when three generations had passed the life of man was reduced to about a fourth of his original age; that is, to about 200 years.

2. Abraham lived 175 years 1; a man of noble spirit, and prosperous in all his ways. Isaac attained to 180 years 2 ; a chaste man, and of a quiet life. Jacob after many sorrows and a numerous family reached his 147th yearn; a man patient, gentle, and cunning. Ishmael, a warlike man, lived 137 years.4 Sarah (the only woman whose age is recorded) died in the 127th year of her ageb ; a woman of a fair countenance, and of a noble spirit, an excellent wife and mother, and no less distinguished for her frankness than for her duty to her husband. Joseph likewise, a wise and politic man, who passed his youth in afflic-tion but his after age in great prosperity, lived 110 years.s Levi his elder brother completed his 137th year 7; a man of a re-vengeful nature, and impatient of insult. The son of Levi, and likewise his grandson, the father of Moses and Aaron, reached nearly the same age.e

3. Moses lived 120 years'; a man of courage, and yet of the greatest meekness, and hesitating in his speech. But he himself in his Psalm declared. the life of man to be only threescore years and ten, and if a man be strong, fourscore years 1°; which certainly has been the general standard of life up to the pre-sent day. Aaron, who was three years older, died the same year as his brother"; a man readier of tongue, easier -and less firm in character. Phineas, Aaron's grandson, is com-puted to have lived (perhaps by extraordinary grace) 300 years, if at least the war of the Israelites against the tribe of Benjamin la (wherein Phineas was consulted) took place in the same order of time as is recorded in the history; he was a man exceedingly zealous. Joshua, a warrior, a renowned and ever successful general, lived 110 years.1a Caleb his contem-porary appears to have lived to about the same age. Ehud the judge seems to have been a centenarian at least; for after the conquest of the Moabites the Holy Land had rest for eighty years under his government 14 ; he was a bold and active man, who had in a manner devoted himself for the people:

4. Job after the restoration of his prosperity lived 140 years' ;

I Gen. xxv. 7. 2 Gen. xxxv. 28. ° Gen. xlvii. 28.

s Gen. xxv. 17. ' Gen. xxib. 1. ' Gen. 1. 26

T Exod. vi. 16. ° Exod. vi. 18. and 20. ® Deut. xxxiv. 7.

1° Psalm xo. 10. « Numb. xxxiii. 29. 'z Judges. xx. 28.

1. Josb. xxiv. 29. ~~ Judges, iii. 3,0. " Job, xni. 16.

and before his afflictions he was old enough to have grown-up suns; he was a man politic, eloquent, charitable, and a model of patience. Eli the priest lived ninety-

eight years' ; a corpu-lent man, of a quiet temper, and indulgent to his children. Elisha the prophet seems to have been above 100 at his death, since we find that he lived sixty years after the assumption of Elijah, and at that time the boys mocked him as a bald-head.' He was a vehement and severe man, a strict liver, and a despiser of riches. Isaiah the prophet seems to have been a centenarian, for he is found to have exercised the gift of prophecy for seventy years; but the time he commenced to prophesy and the time of his death are both uncertain. He was a man of wonderful eloquence, and the evangelical prophet, being full of God's promises of the New Testament, as a skin full of sweet wine.

5. Tobias the Elder lived 158 years: the Younger, 127 years 3 ; both men compassionate and charitable. At the time of the captivity likewise, many of the Jews who returned from Babylon appear to have been of a great age; since (though there was an interval of seventy years) they are said to have remembered both temples, and to have wept for the disparity between them.' After the lapse of several ages, in tile time of our Saviour, Simeon is found to have reached 90 years; a religious man, full of hope and expectation. At the same time likewise Anna the prophetess is proved to have lived more than 100 years 5 ; for she had lived with her husband for seven years, and been a widow for eighty-four, and to these must be added the years of her virginity, and those which followed her prophecy of our Saviour. She was a holy woman, passing her life in prayer and fasting.

6. The instances of longevity mentioned in heathen authors are not to be depended on; both by reason of the fables, to which relations of this kind are very prone, and the fallacies in the calculations of years. In the accounts extant concern-ing the Egyptians there is certainly nothing remarkable as to longevity. For the longest reign of any of their kings did not exceed fifty or fifty-five years; which is nothing, seeing that modern reigns are sometimes as long. The kings of Arcadia are fabulously reported to have been very long-lived.1 Certainly it is - a mountainous and pastoral country, and the mode of life pure and uncorrupted; but yet, seeing that Pan was its tutelar deity, everything belonging to it appears to have been Panic, superstitious, and fabulous.

I Sam. iv. 15. 2 2 Kings, ii. 23. ° Tobit, ziv. 11. 14.

1 Ezra, iii. 12. 1 St. Luke, Iii. 36, 37.

7. Numa the Roman king was an octogenarian a ; a man peaceful, contemplative, and devoted to religion. M. Valerius Corvinus was a centenarian; since forty-six years elapsed between his first and sixth consulship.a He was a very brave and warlike man, affable, popular, and always fortunate.

8. Solon the Athenian lawgiver, and one of the seven wise men, lived for more than 80 years.' He was a man of noble spirit, but popular, and devoted to his country; at the same time learned, and yet not averse to pleasure and the softer kind

of life. Epimenides of Crete is said to have lived 157 years; but the case has something of prodigy in it, since for fifty-seven of them he is said to -have lain concealed in.a cave.b Half a generation after this, Xenophanes of Colophon lived 102 years, or even longer; for he left his native country at twenty-five, travelled full seventy-seven years, and then returneds ; but how long he lived after his return does not appear. He was a man who wandered -no less in his mind than in his body; so that in consequence of his opinions his name was changed from Xenophanes to genomanes ; he was doubtless a man of vast conceptions, breathing nothing but infinity.

9. Anacreon the poet lived beyond 80 7 ; a man amorous, voluptuous, and a wine-bibber. Pindar the Theban completed his 80th year"; a sublime poet, with a certain novelty and originality of mind, and a great worshipper of the gods. So-phocles the Athenian lived to the same age 9 ; a poet of a lofty style, entirely devoted to writing, and neglectful of his family.

10. Artaxerxes the Persian king lived 94 years 1°; a man of a dull intellect, averse to important business, loving glory much, but ease more. Agesilaus, king of Sparta, at the same period attained to 84 years It; a moderate man, and a philo-sopher among kings; but nevertheless ambitious, warlike, and active both in war and business.

Pliny, vii. 49. ° Lucian, Macrobii, 8. ° Pliny, vii. 49.

' Diog. LaerL L 62. ° Pliny, vii. 49. ° Diog. Laert. is. 19.

' Lucian, Macrob. 26. ° Fabricius, Bibilotb. (lraca, G. 14.

° Lucian, Mauub. 34. ~° Lucian Macrob. 15. 11 Plut. In Agesil. p.618.

11. Gorgias of Leontini lived 108 years' ; a rhetorician, who made great display of his wisdom, and visited many countries, instructing youth for pay; and a little before his death said, "° that he had no cause to complain of old age." a Protagoras of Abdera lived 90 years.a He likewise was a rhe-torician, but professed not so much to deal with the whole circle of knowledge as to teach civil business and the art of govern-ment; yet he, like Gorgias, was a great traveller. lsocrates of Athens completed his 98th year'; being likewise a rhetorician, but an extremely modest man, who avoided the forum, and only opened his school at home. Democritus of Abdera lived to 109.6 He was a great philosopher, and a true student of nature, if ever Greek was; a great traveller in countries, but a greater still in the works of nature; a diligent experimenter; and (as Aristotle objects) a follower of similitudes rather than an observer of the laws of argu-ment. Diogenes of Sinope lived 90 years 6 ; a man free towards others, but despotic over himself, delighting in poor diet, and patience. Zeno of Citium lived 98 years 7 ; a high-minded man, a scorner of opinions, of great acuteness, yet not of a troublesome kind, but such as rather engaged and took men's minds than constrained them; wherein Seneca afterwards

resembled him. Plato the Athenian fulfilled his 80th year e; a man of a great spirit, but loving quiet, in contemplation sublime and imaginative, in manners polite and elegant, but yet rather composed than merry, and of a majestic carriage. Theophrastus of Eresium lived 85 years 9; a man pleasant for his eloquence and his great variety of information; who only picked out the sweets of philosophy and did not meddle with the unpleasant or the bitter. Carneades of Cyrene, many years afterryards, likewise reached his 85th year"; a man of easy eloquence, who delighted both himself and others with the pleasant and agreeable variety of his knowledge. Orbi-lius in Cicero's time, who was neither a philosopher nor a rhetorician, but a grammarian, lived nearly 100 years ll ; first a soldier, then a schoolmaster; a man naturally harsh and rough, both with his tongue and pen, and very severe to his pupils.

Puny, vii. 49. ° Cie. de Senect. 5. ° Diog. Ix. 55.

Lucian. Macrob. 23. ° Diog. Laem ix. 43

° Diog. Laert. vi. 76. ' Diog. Laert. vii. 28.

° Lucian Macrob. 21. ; Dlog. Laert. ill. 2. ° Dlog. Laert. v. 40.

~° Dlog. Laert, iv. 65. ; Luc. Macrob. 20.

~~ Suetonius, De illuntr. Granuuat. c. 9

12. Q. Fabius Maximus was augur for sixty-three years 1, and therefore he must have been above eighty when he died; though it is true that in the augurship noble birth was usually more regarded than age. He was a wise and cautious man, moderate in all his ways of life; and uniting courtesy with severity. Masinissa the Numidian king exceeded 90 years, and had a son after he was eighty-five.2 He was a bold man, confident of fortune, who experienced many vicissitudes in his youth, but was uniformly fortunate in his old age. M. Porcius Cato lived for more than 90 years 3, a man of iron both body and mind, severe in speech, a lover of party strife, fond of agriculture, and physician both to himself his family.

13. Terentia, the wife of Cicero, lived for 103 years a woman oppressed by many sorrows, first by the banish-ment of her husband, then by the quarrel between them, and lastly by his final misfortune; she was likewise often troubled with the gout. Luceia must have lived a good deal beyond 100 years 5 ; since she is said to have acted for a full century on the stage, playing perhaps at first the part of a girl, and lastly that of a decrepit old woman. It is unknown in what year of her age Galeria Copiola, who was both an actress and a dancer, was first brought on the stage ; but ninety nine years after her first appearance she was brought back to the stage on the dedication of the theatre by Pompey the Great, not now as an actress, but as a wonder. And this is not all; for she was exhibited again at the votive games in honour of Augustus.'

14. There was also another actress, a little inferior in age but of a higher rank, who lived nearly 90 years; namely, Livia Julia Augusta, wife of Augustus, mother of Tiberius.7 For if the life of Augustus was a play (as he himself signi-fied, when on his death bed he told his fizends to give him a °° plaudite " as soon as he expired), so certainly was Livia an excellent actress, who could so well unite obedience to her husband with power and authority over her son. She was .a courteous woman, yet matronly, busy, and tenacious of power.

i Pliny, vll. 49. • Valerius ritaximus, De Gratis.

e Cf. Cie. De Senect. 10. and ne Amic. 3. 4 Pliny, vil."49.

5 Pliny, vii. 49. ° Pliny, vil. 49.

', Cf. Liu Cassius, P. 611., amt Pliny, xiv. 8.

Junia, the wife of C. Cassius, and sister of M. Brutus, lived also to 90 ; since she lived sixty-four years after the battle of Philippi.' She was a woman of noble spirit and great wealth, unhappy by reason of the fate of her husband and her nearest relations, and her long widowhood, but yet much respected.

15. The 76th year of our Lord, in the reign of the Emperor Vespasian, is memorable as furnishing a kind of calendar of longevity.' For in this year a census (which gives the best and most trustworthy information as to the ages of men) was taken, and in that portion of Italy which lies between the Apennines and the Po there were found 124 men who had reached or passed their hundredth year; namely, fifty-four men 100 years old, fifty-seven men 110, two men 125, four men 130, four men 135 or 137, and three men 140. Besides these, Parma in particular returned five men, of whom three were 120, and two 130 years old; Brixillum one man of 125 ; Placentia one of 131 ; and Faventia, one woman of 132. A town (then called Velleiacum), situated on the hills surrounding Placentia, re-turned ten, of whom six' had completed their 110th, and four their 120th year; and Ariminum, one man aged 150 years, named M. Aponius.

Admonition. To avoid prolixity, I have thought fit both in the instances already recounted and in those which I am going to recount, to bring forward no age less than 80 ; and I have appended to each a character or biographical notice, true and very short, but such as in my judgment has some bearing upon longevity (which is in no alight degree influenced by fortune and habits); either because such persons are com-monly long-lived, or on the contrary because such persons, though not apt to live long, yet sometimes may.

16. Of the Roman, Greek, French, and German emperors, up to our time, containing a list of about 200 princes, only four have been found to reach the age of 80. To these we may add the two first emperors, Augustus and Tiberius; the latter being 78, the former 76 3; and both of whom might perhaps have reached 80,

if Livia and Caligula had so willed it. Augustus (as has been mentioned) lived 76 years; a man of a moderate disposition, vehement in accomplishing his designs, but in other respects quiet and serene, temperate in his diet, but not so in his amours, and fortunate in everything. In his thirtieth year he had so severe and dangerous an illness that his life was despaired of; when the physician Antonius Musa, after all the rest had applied hot remedies as suited for the disease, cured him by a contrary system of cold medicines' ; and this perhaps contributed to his length of life. Tiberius lived to be two years older; a man (as Augustus said of him a) of slow jaws, that is, of slow but strong speech ; bloodthirsty, intemperate, and one who made lust part of his diet; and yet he took good care of his health, for he used to say that a man must be a fool who -called in or consulted a physician after he was thirty. The elder Gordian lived 80 years, and yet died a violent death, before he had scarce tasted the sweets of empire. He was a man noble and magnificent, learned and a poet, and up to the very time of his death uniformly fortunate. The Emperor Valerian lived 76 years before he was taken prisoner by the Persian king Sapor ; he lived after his captivity seven years in the midst of insult, and in the end died a violent death. He was a man of indifferent capacity, and not active; but of a somewhat higher reputation than he proved himself equal to in action. Anastasius, surnamed Dicorus, lived 88 years; a man of a sedate temper, but low-spirited, superstitious and timid. Anicius Justinianus lived 83 years; an ambitious man, personally indolent, but successful and famous through the valour of his generals; uxorious, and not his own master, but under the guidance of others. Helena of Britain, the mother of Constantine the Great, was an octo-genarian. She was a woman who never interfered in public affairs, either during the reign of her husband or of her son, but entirely devoted herself to religion; she was high-minded, and always prosperous. The Empress Theodora (who was the sister of Zoe, the wife of Monomacbus, after whose death she reigned alone) lived above 80 years. She was a busy woman and fond of empire, excessively fortunate, and rendered credulous by her prosperity.

17. From secular princes, I will now turn to the principal persons in the Church. St. John, the apostle and beloved disciple of our Saviour, lived 93 years; rightly denoted by the emblem of the eagle, breathing nothing but divine love, and distinguished as a seraph among the apostles by reason of the fervour of his charity. St. Luke the Evangelist lived to 84 t ; an eloquent man, a traveller, the inseparable companion of St. Paul, and a physician. Simeon the son of Cleophas, called the brother of our Lord, and Bishop of Jerusalem, lived 120 yearsa, and was then cut off by martyrdom; a high-spirited man, stedfast in the faith, and full of good works. Polycarp, the disciple of the Apostles, and Bishop of Smyrna, seems to have lived for more than 100 years before he suffered martyrdom ; a man of high soul, heroic patience, and incessant in his labours.a Dionysius the Areopagite, the contemporary of the Apostle Paul, seems to have lived 90 years. From the high flight of his divinity he was surnamed °° the Bird of Heaven;" and he was no less distin-guished for his works than for his meditations. Priscilla and Aquila, first the hosts of the Apostle Paul, and then his fellow-labourers, lived in a happy and

famous wedlock for at least 100 years, since they were alive under the papacy of Sistus I. They were a noble pair, and given to all charity; who, besides other great consolations (which were doubtless vouchsafed to the early founders of the Church), had this great additional blessing of conjugal union. St. Paul the hermit reached 113 years. He lived in a cave, on such simple and hard diet as would appear scarce sufficient to support life; passing all his time in meditations and soliloquies, and yet not illi-terate, or an idiot, but a learned man. St. Antony, the first founder, or (according to some) the restorer of the monkish orders, reached the age of 105'; a devout man, and con-templative, but yet a good man of business; his manner of life was rough and austere, but yet he lived in a kind of glorious solitude, and not without authority. For he both had his monks under him, and moreover many Christians and philosophers came to visit him, as a living image, not without some feelings of adoration. St. Athanasius was above 80 when he died; a man of invincible firmness, always commanding fame, and never giving way to fortune; free towards those above him, courteous and acceptable to those below; practised in contentions, and both courageous and prudent therein. St. Jerome, by the authority of most writers, exceeded. 90 years ; a powerful writer and a manly speaker; learned both in languages=and sciences, and a great traveller. In. his old age he was. more austere in his living; but though. his life was private his spirit was high, and his light shone far out of his obscurity.

I Baronius, i. 586. = Eusebius, Hist. iii. 29.

3 Eusebius, Mist. iv. 15. 4 St. Athatias. Vita S. Auton. c. 89.

18. The Popes of Rome, up to the present time, are in number 241. Of these only five have. reached or exceeded 80 ; but many of the early popes had their, natural life -cut short by martyrdom. John XXIII., Pope of Rome, com-pleted his 90th year; a man of a restless disposition, who being fond of change altered many things, some to the better, not a few merely to something else; but a great accumu-lator of wealth and treasure. Gregory XII., who was created Pope during a. schism, a kind of an _ interres, died in his 90th year; but his papacy was so short, that I find nothing, to observe concerning him Paul III. lived to 81; a man of sedate temper and deep wisdom, a learned man and an astro-loger, and very careful, of his health; but, like the old.. priest Eli, indulgent to his relations. Paul IV. lived 83 years; a man naturally harsh and severe, of a haughty and imperious spirit, of a passionate temper, but eloquent and ready of tongue. Gregory XIII. likewise reached the same age; a truly good man, sound in mind and body, politic, temperate, and- full of good and charitable works.

19. The cases which follow. are promiscuous in their order, more doubtful in authority, and more scanty in observation. Arganthonius, king of Cadiz in Spain, lived 130 or (according to some) 140 years, for eighty of which he was on the throne.' Of his manners, .habits of life, and the time in which he lived, nothing is recorded. Cinyras, king of Cyprus, is said to have lived 150 or 160 years in that

island, then reputed happy and voluptuous.a Two Latin kings of Italy, father and son, are said to have lived 800 and 600 years respectively; but this is only recorded by certain philologists, who (though otherwise credu-lous enough) have themselves doubted the truth of this story, nay, rather condemned it' Some kings of Arcadia are mentioned as having lived 300 years.' The country certainly is well adapted for long life, but perhaps the matter is exag-gerated by fables. There is a story of one Dando in Elyria who lived 500 years, without any of the inconveniences of old age.' It is said that among the Epii, which is a part of _lEtolia, all the people are very long-lived, many of them having been known to live 200 years. One of them especially, by name Litorius, a man of gigantic stature, had reached to 300.3 On the top of Mount Tmolus (anciently called Tempsis) many of the inhabitants are said to have lived 150 years.' The Es-senes among the Jews are related to have generally lived above 100 years 5; but that sect lived on a very simple diet, after the Pythagorean order. Apollonius of Tyana exceeded 100 years s; a man beautiful for his age, and truly wonder-ful; regarded as a god by the heathens, as a sorcerer by the Christians; a Pythagorean in his diet, a great traveller, of immense renown, and worshipped almost as a god; never-theless towards the close of his life he had to undergo accusa-tions and disgrace, though he contrived to escape in safety. But lest his longevity should be attributed to his Pythagorean diet alone, and to show that he derived some of it from his family, it may be mentioned that his father likewise lived 130 years. It is certain that Q. Metellus lived upwards of 100 years' ; and after a successful administration of several consul-shipa, being in his old age made Pontifex Maximus, he held that sacred office for twenty-two years ; yet his voice never faultered in repeating the vows, neither did his hands tremble in performing the sacrifices. Appius Ca;cus was certainly very old, but his age is not recorded." He was blind for the greater part of his life; but no way softened by this misfortune, he governed a numerous fanuly, a great retinue of clients, nay, the state itself, with a vigorous hand. Nay, in his last days, when carried on a litter into the senate, he spoke most ear-nestly against making peace with Pyrrhus. The beginning of his speech is very memorable, as showing the invincible strength and vigour of his mind. °° For these many years," said he, °~ conscript fathers, have I borne my blindness with extreme

Pliny, vii. 49. 2 Pliny, vii. 49.

' Valerius Maximus, xiii. 6. ; Pliny, Al. 49.

Pliny, vi:. 49. ° Joseph. De Bello Judaic. il.

° Philostr. in Vit. Appoll, c. 13.

° Val. Max. viii. 13. ° VaL Max. viii. 13.

impatience; but now I could even wish myself deaf also, when I hear you talking of such dishonourable .counsels." i M. Perpenna lived 98 years; having survived all those whose vote he as consul had asked in the senate (that is, all the senators

during his year of office); and also, with the exception of seven, all those whom' a little after as censor he had elected into the senate.a Hiero, king of Sicily in the time of the second Punic war, was almost a centenarian $; a man moderate both in his government and manners, a- wor-shipper of the gods, a strict observer of friendabip, liberal, and uniformly fortunate. Statilia, of a noble family, in the time of Claudius, lived 99 years'; Clodia, the daughter of Ofilius, 115.5 Xenophilus, an old Pythagorean philoso-pher, lived 106 years s; a hale and vigorous old man, with a great reputation among the people for learning. The Cor-cyreans were anciently reputed long-lived, but now their age is of the ordinary length. Hippocrates of Cos, the famous physician, lived 104 years, and by the length of his life approved and credited his own art. He was a man of wisdom as well as learning, much given to experiments and observation, not striving after words or methods, but picking outthe very nerves of science and so setting them forth. Demo-naz, a philosopher (both by practice and profession) in the time of Adrian, lived almost to 100 7; a man of high mind and master of his mind, and that truly without affectation; a despiser of the world, but courteous and polite. When his friends asked him about his burial, he replied, °° Take no care about my burial, for stench will bury a corpse." °° Do you wish, then," said they, 11 to be thrown out to the doga and birds?" °° If," said he, °° in my lifetime I did my best to benefit man, what harm is there if, when I am dead, I likewise do something for the animals?" A people- of India called Pandorae are very long-lived, lasting even for 200 years.$ They say also (which is more strange) that their hair, which is nearly white in boyhood, turns black in old age, before it grows hoary; though indeed it is common every-where for light hair in the boy to turn darker in the man. The Seres likewise, another Indian people, with their palm-wine,

I Plat L 594. z Pliny, vii. 49. 5 Val. Mm AB. 13.

a Pliny, vii. 49. ' id. ib. ° Lucian, Macrob. c. 18.

7 Lucian, Demonax, 66. ° May, vii. 2.

are reputed to live as long as 130 years.' Euphranor the gram-marian continued to teach in his school till he was above 100.2 The elder Ovid, the father of the poet, lived 90 years; he was of a different character from his son, as he despised the Muses and dissuaded his son from poetry.a Asinius Pollio, the friend of Augustus, exceeded 100 years.' He was a man extremely luxurious, eloquent, and devoted to literature; but yet violent, proud, cruel, and selfish. It is a common idea that Seneca was very old, and no less than 114. But this cannot be true; for fir from being a decrepit old man when he was appointed tutor to Nero, he was on the contrary exceedingly active in the go-vernment. Besides, a little before, in the middle of the reign of Claudius, he was banished for adultery with some noble ladies, a thing not compatible with such an age. Johannes de Temporibus among all the men of later times is by tradition and common report reputed long-lived, even to a miracle or

rather a fable, his age being said to be above 300. He was by birth a Frenchman, and served under Charlemagne. Gartius of Aretium, great grandfather to Petrarch, lived 104 years. He always enjoyed good health, and at the end felt a decay of strength rather than any malady ; which is the true dissolution by old age. Many Venetians of high rank were long-lived; as the Doge Franciscus Donatus, Thomas Contarenus and Franciscus illolinus procurators of 8t. Mark, and others. But the most memorable instance is that of the Venetian Cornaro, who being of sickly body in his youth, began for the sake of his health to measure his meat and drink by weight. This custom led by degrees to a fixed diet, and the diet to a very long life, of even more than 100 years', with unimpaired faculties and constant health. Guillaume Postel, a Frenchman, in our time, lived nearly 120 years; the top of his moustache being still black, and not at all grey. He was a man of dis-ordered brain and unsound mind, a great traveller sad mathe-matician, and somewhat tainted with heresy.

20. In England I imagine there is scarce any village of any size in which an octogenarian man or woman may not be found. A few years ago, at a May-game in Herefordshire, a lnorrice dance was performed by eight men, whose united ages made up 800 years; some of them' exceeding 100, by as much as others fell short.

Of. Pliny, vii. 2. 2 Suidas in v. Apion.

3 I)vid, Tristia, iv. 10. 77 ' Cf. Pliny, xxii. 53.

Flourcn,, De la Longcviti•, p. 33.

21. In Bethlehem hospital in the suburbs of London, insti-tuted for the support and custody of lunatics, there are found from time to time madmen who live'to a great age:

22. The ages of nymphs and demons of the air, who are represented as mortal, yet as very long-lived (a thing that has been -admitted by the superstition and credulity of the ancients, and even by some in modern times), I hold to be fables and dreams, especially as they agree neither with philosophy nor religion.

And so much for the history of longevity in man considered in individual cases or next to individual. I will now proceed to observations by certain heads.

23. The lapse of ages and the succession of generations do not appear to have at all diminished the length of life. For from the -time of Moses to the present day the course of man's life has stood at about eighty years, not gradually and insensibly de-clining, as might have been expected. There are periods indeed in every country when men are longer or shorter lived. Longer generally, when they are less civilised, live on simpler diet, and are more given to bodily exercise; shorter, when they are more civilised and given more to ease and luxury; but these things come and go in their turns; the succession of generations .has nothing to do with them.

And no' doubt the same holds. good with the other animals ; since neither oxen nor horses, nor sheep and the like, have become more short-lived in these latter times. Therefore the great diminution of age was caused by the flood; and may perhaps by the like great accidents (as they call them), ouch as particular inundations, long droughts, earthquakes and the like, be caused again. And this seems to hold good like-wise in the size or stature of the body. For neither has this deteriorated through the succession- of generations; though Virgil (following the common opinion) prophesied that pos-terity would be smaller than the men of that age; and there-fore in speaking of the ploughing of the ~Emathian and Amo-nian fields, he says, °1 the husbandman will wonder at the huge bones that shall be dug up." i It is certain indeed, from remains found in old tombs and caverns in Sicily and

I Virg. Georg. L 499.: 11 Grandiaque effossis mirabitur ossa sepulcris,"

elsewhere, that men of gigantic stature formerly existed; but now for 3000 years, a time whereof our information is certain, no instance of the kind has occurred in those places. But yet in this, as in the former case, certain changes have taken place by reason of the manners and customs of the people. And these things are the more to be observed, because an idea has settled itself in the minds of men that a continual decline is going on, both in the length of life and the size and strength of the body, and that everything decays and deteriorates.

24. Men generally live longer in cold and northern climates than in warm ones. And this must needs be; for the skin is tighter, the juices of the body less easily dissipated, the spirits less eager to consume and more easily repaired, and the air, as being only slightly warmed by the sun's rays, less predatory. But below the equinoctial line, where there are two summers and two winters, and a greater equality in the lengths of day and night, men likewise (if nothing else prevents them) live to a considerable age, as in Peru and Ceylon.

25. Islanders generally live longer than those that live on continents. Men do not live so long in Russia as in the Ork-neys, nor so long in Africa, though in the same latitude, as in the Canaries and Azores. The Japanese likewise live longer than the Chinese, though the latter have a mania for long life. And in this there is no wonder, seeing the sea-breeze warms and cherishes in cold countries, and cools in hot.

26. Inhabitants of high places live longer than of those which lie low; especially if they are not the tops of bills, but lands generally elevated, like Arcadia in Greece, and part of .2Etolia, where the natives were very long-lived. The same would hold good of mountains themselves, because of the greater clearness and purity of the air, if it were not for an accident; namely, that the air is tainted by the vapours rising from the vallies and resting there. Among the snow-mountains therefore no remarkable longevity is found; not in the Alps, nor the Pyrenees, nor the Apennines; but on the lower hills and even in vallies men are more long-lived.

However, on the tops of the mountains running towards Ethiopia, and. Abys-sinia, where, as the soil consists of sand, little or no vapour settles on the mountains, men are very long-lived, and even at this day often complete 150 years.

Pliny, vii. 17. 2 Pliny, vii. 2.

27. Marshes and fens, especially if they are flat., are favour-able to natives, but prejudicial to strangers, as far as longevity is concerned. And what may appear strange, salt marshes which are covered at high water are less healthy than those of fresh water.

28. The particular countries remarkable for the longevity of their inhabitants are Arcadia, IEtolia, India on this side the Ganges, Brazil, Ceylon, Britain, Ireland, the Orkneys, and.the Hebrides. As for that which is said by one of the ancients, that the Ethiopians were long-lived, it is report of no value.'

29. The salubrity of the air, especially in any degree of perfection, is a mysterious thing, and better discovered by-ex-periment than by discourse and conjecture. The experiment may be tried by a lock of wool, if, on being exposed for a few days to the open air, it loses little weight; or by a piece of meat remaining long fresh; or by the water in a thermometer rising and falling through a small space. Of these things and the like make further inquiry.

30. The equality of the air, as well as the goodness and purity, is important for longevity. Variety of hill and valley, though pleasant to the eye and the sense, is suspected .with regard to longevity; but a plain moderately dry, yet not too barren or sandy, nor entirely devoid of trees and shade, is most adapted to long life.

31. Inequality of the air, as has been just now said, is bad for dwelling in; but change of air in travelling, when one is accustomed to it, is good, and therefore.great travellers have been long-lived. So likewise men who have passed their whole lives in the same cottage or on the same spot, are-long-lived. For the air to which a man is accustomed is less pre-datory; but change of air is more nourishing and restoring.

32. Though it has been observed that the continuation and number of generations have nothing to do with the length and shortness of life, yet the immediate condition of the parents, both on the father's and mothers side, is doubtless very im-portant. Some are begotten by. old men, some by young, and some by men in the prime of life; some when their fathers are healthy and well-disposed, others when weak and sickly; some when full or drunk ; others after sleep, or in the inorn-ng ;

Pliny, vii. 2. Herod. iii. 23.

some again after a long intermission, and others after a frequent repetition of the conjugal act; some (as generally in the case of bastards) in the heat of passion, others when desire begins to cool, as in the case of long-married couples. The same things must be considered on the mother's side, together with her condition, health, and diet while she is with child, and the time of gestation, whether it be ten months or less. To reduce all this to a rule for longevity is diffi-cult, and the more so because what a man would think best may perhaps prove the worst. For that alacrity in generation which produces children strong and active will have a tendency to stop longevity, by reason of the acri-mony and inflammation of the spirits. I have before ob-served, that to have more of the mother's blood contri-butes to longevity ; and in like manner I suppose everything in moderation to be the best; conjugal affection to be better than meretricious; the morning to be the best time for generation; and a state of body not too lusty and full, and the like. It should also be well observed that a robust habit of body in the parents is better for them than for the child, especially in the mother. Plato therefore judged wrongly that the virtue of generations was impaired, because women did not use the same mental and bodily exercises as men.' For the contrary is true, and the difference of strength between the male and female is most beneficial to the child; and the more delicate or tender the mother or nurse is, the more nourishment does she afford to the child. The Spartan women, who did not marry before twenty-two (or twenty-five, according to some 2), and were therefore called Andromanx, did not produce a nobler or more long-lived offspring than the Roman, Athe-nian, or Theban women did, who were marriageable at twelve or fourteen. And if there was anything remarkable in the Spartans, it was rather due to their simple living than to the late marriage of the women. But experience shows, that some families are for a time long-lived; so that longevity, like diseases, is for certain periods hereditary.

33. Persons of fair complexion, skin, and hair, are less Iona-lived than those who are dark, red, or freckled. Too high a colour in youth is not so good a sign of longevity as paleness.

(Plato, Rep. v. § 3. T Plutarch, Comp. Lycurg. cum Numa, i. p. 77.)

A hard skin is better than a soft one; and herein I do not mean that thick and spongy skin, called the goose-.skim= but one which is both hard and close; and a deep wrinkled brow is a better sign than a smooth and shining one.

34. Rough and. bristly hair gives a better prospect of long life than that which is soft and delicate. Curls also, if they be stiff, indicate the same; but the contrary.if soft and glossy. Likewise thick curls are better than long locks.

35. Early or late baldness is a thing immaterial; for many bald men have been long-lived. Nor are early grey hairs (though they appear to be the precursors of old age) any sure sign; for many who have turned grey early have lived late. Nay,

premature greyness without baldness is a sign of longevity; but the contrary if it be attended with it.

36. Hairiness of the upper parts of the body is a sign of short life; and men with hairy breasts, like manes, are short-lived; but hairiness in the lower parts, as the thighs and legs, indicates longevity.

37. Tallness of stature (unless it is excessive), in a body well made and not too slender, but especially if it is accom-panied by activity, is a sign of long life. But, on the contrary, men of short stature live longer, if they are less active, and slower of motion.

38. With regard to the proportion of the body; those who are short in the body but long in the legs live longer than those who are long in the body and short in the legs. So. like-wise, those who are wider below and narrower above, the body rising as it were to a point,.are more long-lived, than men with broad shoulders, who taper downwards.

39. Leanness, if the passions are settled, calm, and easily controlled; or a full habit, if they be choleric, excitable and obstinate, betoken a long life. In youth corpulency foreshows an early death, but in old age it is more indifferent.

40. To grow long and slowly is a sign of longevity, and the taller the stature the better the sign. But, on the other hand, rapid growth to a great stature is a bad sign, but to a shorter-stature less bad.

41. Firmness of flesh, a muscular and sinewy body, buttocks not spread out more than is required for sitting, and veins some-what prominent, indicate a long life; the contrary to these a short one.

42. A head small in proportion to the body; a moderate-sized neck, neither too long and slender, nor too thick and sunk into the shoulders; wide nostrils, whatever the form of nose; a large mouth; ears gristly, not fleshy; teeth strong and close set, not weak and scanty, are signs of long life; and much more so if new teeth come late in life.

43. A broad chest, but rather drawn in than prominent; shoulders somewhat round and bowed (as they call it); a flat stomach; a large hand, with few lines in the palm; a short round foot; thighs not very fleshy; and a calf not drooping but firm, are signs of longevity.

44. Eyes rather large, with an iris of a greenish colour; senses not too acute; a pulse slow in youth, but quicker as age increases; a power of holding the breath easily and long; the bowels more costive in youth, and looser in old age, are likewise all signs of longevity.

45. On the connection between longevity and the times of nativity nothing has been observed worth recording, except some astrological observations which I dismissed in the Topics. An eight months' child is deemed not only not long-lived, but not likely to live. Children born in the winter are considered to live long.

46. A Pythagorean or monastic diet according to the stricter rules, or one exactly regulated like that of Cornaro, seems to have a strong tendency to prolong life. Yet on the other hand, of such as live freely and in the common way, the greatest glut-tons, and those most devoted to good living, are often found the most long-lived. The middle diet, which is esteemed temperate, is commended, and contributes to health, but not to longevity. For the stricter diet generates few spirits, and those of a sluggish nature, which consume the body less; and the freer diet affords abundant nourishment, which restores the body more; but the middle diet does neither. For where extremes are prejudicial, the mean is the best; but where extremes are beneficial, the mean is mostly worthless. But the strict diet likewise requires watching, lest the spirits being few should be oppressed by too much sleep; little exercise, lest they should be discharged; and chastity, lest they should be ex-hausted. But the full diet on the contrary requires plenty of sleep, frequent exercise, and seasonable use of venery. Baths and ointments such as have been in use are more suited for luxury than the prolongation of life. But all these sub-jects I will discourse of more fully when I come to inquire of intentions. In the mean time we should not neglect the, ad-vice of Celsus', a wise as well as a learned physician, who advises variety and change of diet, but with an inclination rather to the liberal side; namely, that a man should at one time accustom himself to watching, at another to sleep, but oftener to sleep; sometimes fast and sometimes feast, but oftener feast; sometimes strenuously exert, sometimes relax the fa-culties of his mind, but oftener the latter. But doubtless a well-regulated diet most contributes to the prolongation of life; and I never met a very old man, who on being asked had not observed some peculiarity of diet; some one thing, some another. I remember an old man above a hundred, being brought as a witness about some ancient prescription, who when at the end of his evidence he was familiarly asked by the judge, °C what means he had taken to live so long," answered unex-pectedly, and amidst the laughter of the audience, °° By eating before I was hungry, and drinking before I was thirsty." But of these things (as I said) I will speak hereafter.

47. A life spent in religious and holy offices seems to contri-bute to longevity. This kind of life_is attended with leisure, admiration and contemplation of heavenly things, pure joys, noble hopes, salutary fears, sweet sorrows, and lastly, con-tinued renewals, by observances, penances and atonements, which have all a strong tendency to prolong life. And if besides these there is a strict diet to harden the substance of the body, and lower the spirits, no wonder if remarkable longevity ensue; like that of Paul the Hermit, Simeon Sty-lites the columnar anchorite, and many other hermits and anchorites.

48. Next to this life comes that of letters, as that of the philosophers, rhetoricians, and grammarians. Here also life is passed in leisure, and in meditations which, having no relation to the affairs o£ life, breed no anxiety, but delight by their variety and freedom. These men live as they please, passing their days and hours in the things they like best, and mostly in the company of youth, which is more cheerful. But there is a great difference in the longe-vity of philosophers, according to their different tenets.

The best philosophies for the purpose are those which have some touch of superstition, and deal with sublime coutem-plations, as the Pythagorean and Platonic; those likewise 'which comprised within themselves the survey of the universe, the variety of nature, unbounded, deep and noble thoughts concerning the infinite, the stars, the heroic virtues, and the like, were good, as were those of Democritus, Philolaus, Xeno-phanes, the astrologers and the stoics ; and so were those which contained no deep speculation, but from common sense and common opinions discussed questions calmly on either side, without any laborious inquiry. Such were the sects of Carneades and the academicians, the rhetoricians and gram-inarians. But on the other hand, philosophies dealing with troublesome subtleties, dogmatic, weighing and wresting everything to the standard of certain principles; and lastly, those that were crabbed and narrow, were bad; and such were mostly the sects of the peripatetics and schoolmen.

49. A country life is likewise adapted to longevity. It is much out of doors and in the open air, not indolent but active, living generally on fresh and home-made food, and free from care and envy.

50. I have also a good opinion of a military life in youth. Many famous warriors have certainly been long-lived, as Cor-vinus, Camillus, Xenophon, Agesilaus, and many others both ancient and modern. And it doubtless tends to longevity to have all things growing smoother and easier as age comes on: so that a youth spent in toil may sweeten old age. The mili-tary passions likewise, excited in the desire for contest and the hope of victory, appear to me to infuse such a warmth into the spirits as is advantageous to longevity.

MEDICINES FOR THE PROLONGATION OF LIFE.

In connection The present system of medicine only regards with the preservation of health and the cure of diseases; but of the things that properly .relate to longevity it makes little mention, and only by the way. I will however set forth the medicines of note in this kind, namely, those that are called °1 cordials." For it is probable that remedies taken to defend and fortify the heart, or more correctly the

spirits, against poisons and diseases, may, 'if judiciously selected and .transferred to diet, tend likewise in some degree to prolong life; and in doing this I will not heap them promiscuously together, as is usually done, but select the best.

1. Gold is used in three forms; either in what is called potable gold, or in wine in which gold has been quenched; or in substance, as gold leaf and filings. With regard to potable gold, it is now given as a strong cordial in dangerous or desperate maladies with tolerable success. But it appears to me that the spirits of salt by which the solution is made, rather than the gold itself, supplies the virtue that is found therein; but this is carefully suppressed. Now if gold could be opened without corrosive waters, or by corrosive waters (provided they had no poisonous qualities) that were after-wards well washed, I conceive it would be a useful thing.

2. Pearls are taken, either in a fine powder or in a kind of paste or solution made by the juice of very sour and fresh lemons. Sometimes they are given in aromatic confections, sometimes in a fluid form. Pearls no doubt have some affinity with the shells wherein they grow, and perhaps may have nearly the same qualities as the shells of crawfish.

3. Of crystals two are chiefly regarded as cordials, the emerald and the jacinth; ,which are given in the same forms as pearls, excepting that, as far as I know, their solutions are not used. But I am somewhat suspicious of these glassy jewels, by reason of their roughness.

Admonition. I will mention afterwards how far and in what manner these things here mentioned may be used with advantage.

4. Bezoar stone is of approved virtue for refreshing the spirits and raising a gentle perspiration. The unicorn's horn has lost its reputation, yet it still stands as high as hartshorn, the bone of the stag's heart, ivory, and the like.

5. Ambergris is one of the best things for soothing and com-forting the spirits. Here follows an enumeration of the simple cordials, by name only: their virtues being sufficiently known.

Hot. Saffron: folium In- Cold. Nitre: roses: violets dim : lignum aloes: citron strawberry plants: strawber-rind : balm: basil: clove gil- ries_: the juice of sweet le-lyflowers : orange flowers: moms : the juice of oranges rosemary: mint: betony : car- the juice of apples: borage duus benedictus. bugloss: burnet: sandal-wood: camphire.

Admonition. As I am now discoursing only of those medi-cines which may be transferred into diet, all strong waters and chemical oils (which as some trifler says

lie under the planet of Mars, and have a violent and destructive power), nay, all acrid and pungent spices, are to be rejected; and it should be observed how waters and fluids may be com-pounded from the preceding simples; not phlegmatic distilled waters, nor on the other Band burning waters from spirits of wine, but such as are more temperate, yet lively, and emitting a grateful vapour.

6. I am in some doubt whether frequent bleeding tends to longevity; but I rather incline to believe that it does, if it be turned into a habit, and other things are favourable thereto. For it discharges the old juices of the body and lets in new.

7. Some wasting diseases likewise, if well cured, do in my opinion assist longevity. For the old juices being consumed they supply new ones; and as one says, °° to recover health is to renew youth." It would be well therefore to induce some artificial diseases, as is done by strict and emaciating diets, whereof I will speak hereafter.

THE INTENTIONS.

In connertion Having now finished the inquiry according to 13th the 12th the subjects, namely, inanimate bodies, vegetables 13th, and 14th D Au„9• animals> and man> I will draw nearer to the matter

Transition. and commence an inquiry according to intentions ;

such as I fully believe to be true and proper, and as it were the pathways of mortal life. In this part nothing of any value has been hitherto inquired; and men's thoughts concerning it have been superficial and unprofitable. For when on the one side I hear men talk of comforting the Natural Heat, and the Radical Moisture, of meats which breed good blood, that is, neither burning nor phlegmatic, and of the reviving and refreshment of the spirits, I suppose them to be well meaning men who talk thus; but none of these things are effectual for the end. But when on the other side I hear discourses on medicines prepared from -old (because forsouth gold is not subject to corruption); on the use of precious stones to refresh the spirits, by reason of their secret properties and brilliancy; that if balsams and the quintessences of living creatures could be received and detained in vessels, there would be good hope of immortality; that the flesh of serpents and deer by a kind of sympathy have power to renew life, be-cause the one casts its slough, the other its horns (they should have added likewise the flesh of the eagle, for the eagle casts its beak); that a certain man who found an ointment buried in the earth, and anointed himself therewith from head to foot, excepting only the soles of his feet, lived in consequence 300 years, free from all disease, except swellings on the soles of his

feet; that Artefius, when he felt his spirit failing, drew into himself the spirit of a strong young man, thereby killing him, but continuing his own life for many years by means of that other man's spirit; when I hear of fortunate hours, ac-cording to the figures of heaven, in which medicines for the prolongation of life are to be collected and prepared; of planetary seals by which virtues may be extracted and brought down from heaven to prolong fife, and such like fables and superstitions, I wonder exceedingly that men should be so demented as to be imposed upon by them. Lastly, I pity the hard fortune of mankind in being surrounded on all sides by things frivolous and unprofitable. With regard to my own Intentions, I trust that they both come close to the point, and are far removed from idle and credulous superstitions; being likewise, I conceive, of such a nature that while posterity may add much to the things which satisfy these intentions, they will find little to add to the intentions themselves.

There are however a few things that are yet of great importance, whereof I would have men forewarned.

First, I am of opinion that the duties of life are preferable to life itself. Wherefore, if there be anything which may exactly answer our intentions, yet interferes at all with the offices and duties of life, I reject it. I may perhaps make some light mention of things of this kind, but I by no means insist upon them. For I do not enter into any serious or accurate discourse either of living in caves, like the cave of Epimenides, where the sunbeams and changes of temperature never penetrate; or of perpetual bathing in prepared liquors; or of shirts and cerecloths so applied that the body should always be in a kiPA of case; or of thick covers of paint on the body, after the manner of savages; or of that exact regulation of food and diet which makes the preservation of life its sole object, to the neglect of everything else (such as that of Herodicus among the ancients t, and Cornaro of Venice in our days, though with more modera-tion); or of any such strange, nice, and inconvenient matters. But I prescribe such remedies and precepts as will neither pre-vent the duties of life, nor hinder and embarrass them too much.

Secondly, on the other hand, I warn men to give up trifling, and not to imagine that so great a work as the stopping and turning back of the powerful course of nature can be performed by a morning draught, or the use of some precious drug; but to consider it certain that a work of this kind must necessarily be very laborious, and consist of many remedies, and those aptly connected with one another. For no man can be so dull as to believe that what has never yet been done can be done, except by means hi:herto unattempted.

Thirdly, I candidly admit that some of the propositions here laid down have not been proved by experiment (for my course of life permits not of that), but are only derived, with what appears to me the best reason, from my principles and hypo-theses (whereof I insert some and reserve others in my mind), and as it were cut and dug out of the rock and mine of nature herself. Yet I have not been careless,

but (seeing that I was dealing with the body, whereof the Scripture says that it is above raiment), have used all prudence and circumspection in propounding such remedies, as, if by chance they are not fruitful, are at least safe.

Fourthly, I would have men duly to observe and distinguish that the same things which conduce to health do not always conduce to longevity. For some things which are of use to cheer the spirits and to strengthen and invigorate the functions, yet take away from the sum of life. Again, there axe other things very beneficial in prolonging life, yet that are not without danger to the health unless guarded against by proper means. On these points however, as occasion requires, I will not; neglect to exhibit proper cautions and admonitions.

Lastly, I have thought it right to propose sundry remedies, according to each intention, but the choice and order thereofto leave to discretion. For to describe exactly the things most suitable to the different constitutions of bodies, to the different kinds and respective ages of life, in wbat order they are to -be taken, and how their whole practice. is to be administered and governed, would be too long a work, and unfit to be published.

In the Topics I propounded three Intentions; namely, the Prevention of Consumption, the Perfecting of Repair, and the Renovation of Decay. But seeing that what I am about to say is something more than mere words, I will draw out these three Intentions into ten Operations:

1. The first operation is upon the spirits, to renew their freshness.

2. The second operation is upon the exclusion of air.

3. The third operation is upon the blood, and the sangue-fying heat.

4. The fourth operation is upon the juices of the body.

5. The fifth operation is upon the bowels, for the extrusion. of aliment.

6. The sixth operation is upon the outer parts of the body, for the attraction of aliment.

'T. The seventh operation is upon the aliment itself, for the insinuation thereof.

8. . The eighth operation is upon the final act of assimilation..

9. The ninth operation is upon the intencration of the parts after they have begun to dry.

10. The tenth operation is upon the purgation of the old juice, and the substitution of new.

Of these operations the four first belong to the first inten-tion, the four next to the second, and the two last to the third. But as this part concerning Intentions points to practicc, under the title of history I will include not only experiments--and observations, but also counsels, remedies, explanations of causes, assumptions, and all things relating thereto.

I.

THE OPERATION UPON THE SPIRITS, THAT THEY MAY -RE-

TAIN THEIR YOUTH AND RENEW THEIR VIGOUR.

The History.

1. The spirits are the agents and workmen that produce all the effects in the body. This appears manifcst both by general consent and by innumerable instances.

2. If it were possible for young spirits to be put into an old body, it is probable that this great wheel might put the lesser wheels in motion, and turn back the course of nature.

3. In every kind of consumption, whethgr by fire or age, the more the spirit of the thing, or the heat, preys upon the moisture, the shorter is the duration of that thing. This occurs everywhere, and is plain.

4. The spirits are to be put into such a temperament., and such a degree of activity that (as one says) they shall not drink and absorb, but only sip the juices of the body.

5. There are two kinds of flames; the one active but weak, as the flame of straw or chips, that consumes and dis-charges lighter substances, but has little effect upon the harder; the other strong and steady, as the flame of large timber and the like, which attacks likewise hard and tough bodies.

6. The brisk and yet weak flame dries up bodies, and make them effete and sapless; whilst the strong flame softens and melts them.

7. Of dissipating medicines, some only draw forth the thinner parts of tumours, and thereby harden them; but some discuss them vigorously, acid thereby soften them.

8. Of purging and clearing medicines likewise, some carry suddenly off the more fluid parts, and some draw the more obstinate and viscous.

9. The spirits should be clad and armed with such a heat that they may prefer rather to pluck asunder and undermine the hard and obstinate parts, than to discharge and carry off such as are weak and prepared; for by this means the body becomes fresh and firm.

10. The spirits should be so tempered and ordered, as to become in substance dense, not rare; in heat lasting, not eager; in quantity sufficient for the offices of life, not redundant or excessive; in motion settled, not starting or irregular.

11. Vapours evidently operate powerfully upon the spirits; as is shown by sleep, intoxication, melancholy and mirthful passions, and recovery of the spirits in swoons and fainting fits by odours.

12. The spirits are condensed in four ways; by putting them to flight, by cooling, by soothing, or by quieting them. And first of their condensation by flight.

13. Whatever puts to flight from all sides drives the body to its centre, and therefore condenses.

14. Opium is by far the most powerful and effectual means for condensing the spirits by flight; and next to it opiates and soporifics in general.

15. The power of opium to condense the spirits is very remarkable; for perhaps three grains will in a short time so coagulate them that they cannot separate, but are quenched and rendered immoveable.

16. Opium and similar drugs do not put the spirits to flight by their coldness (for they have parts manifestly warm), but contrariwise they cool by putting the spirits to flight.

17. The flight of the spirits by means of opium and opiates is best seen when they are applied externally; for the spirits instantly retire and will return no more, but the part mor-tifies and turns to a gangrene.

18. Opiates give relief in great pain, as the stone, or amputation of a limb; principally by putting the spirits to flight.

19. Opiates draw a good effect from a bad cause; for the flight of the spirits is bad, but the condensation thereof by that flight is good.

20. The Greeks imputed much to opium, both for health, and prolongation of life; but the Arabs still more; so that their higher medicines (which they call °° God's Hands ") have opium for their basis and principal ingredient, with a mixture of other things to counteract and correct the noxious qualities thereof; such are treacle, mithridate, and the like.

21. All remedies successfully used in pestilential aid ma-lignant diseases to check and curb the spirits, lest they become unruly and turbulent, may be advantageously transferred to the prolongation of life. For the condensation of the spirits, which is best secured by opiates, is beneficial in both cases.

22. The Turks find opium, even in large quantities, innocent and cordial, so that they even take it before a battle to give them courage. But to us, except in small quantities, and with strong correctives, it is fatal.

23. Opium and opiates are clearly found to excite the sexual passion, which shows their power to strengthen the spirits.

24. Distilled water of the wild poppy being doubtless a mild opiate, is successfully given in surfeit, fevers, and various diseases; and let no one wonder at the variety of its use. For this is common to opiates, as the spirits being strengthened and condensed will fight against any disease.

25. The Turks use likewise a kind of herb, called " coffee," which they dry, grind to powder, and drink in warm water. They affirm that it gives no small vigour both to their courage and their wit. Yet this taken in large quantities will excite and disturb the mind; which shows it to be of a similar nature to opiates.

26. There is a certain root, celebrated through all the Fast, called °° betel," which the Indians and others use to carry in their mouths, and chew ; whereby they are wonderfully re-freshed, and enabled to endure fatigues, and throw off dis-orders, and strengthened for sexual intercourse. It appears to be a kind of narcotic, because it blackens the teeth ex-ceedingly.

27. The use of tobacco has immensely increased in our time. It affects men with a kind of secret pleasure, so that persons once accustomed to it can scarce leave it otl: It tends no doubt to relieve the body, and remove weariness; and its virtue is commonly thought to lie in this, that it opens the passages and draws off the humours. But it may be more properly referred to the condensation of the spirits; for it is a kind of henbane, and manifestly affects the head, as all opiates do.

28. Humours are sometimes generated in the body, which are a kind of opiates themselves; as is found in some kinds of melancholy, wherewith if a man be seized, he is very long-lived.

29. Simple opiates, which are likewise called narcotics and stnpefactives, are opium itself, which is the juice of the poppy, the plant and seed of the poppy, henbane, mandragora, hem-lock, tobacco, and nightshade.

30. Compound opiAes are, treacle, mithridate, trifera, la-danum of Paracelsus, diacodium, diascordium, philonium, and pills of houndstongue.

31. From these observations certain directions or advices may be drawn for the prolongation of life, according to this intention, namely, the condensing of the spirits by opiate.

32. From youth upwards, therefore, let there be ec-ery year a kind of opiate diet. Let it be taken at the end of May; for in summer the spirit: are most wasted and weakened, and there is less fear of cold humours. Let the opiate be of a superior kind, not so strong as those in use, either as to the quantity of opium or to the proportion of very hot ingredients. Let it be taken in the morning between sleeps. Let the diet at the time be more simple and sparing, without wine, spices, or things that produce vapours. Let the medicine be taken only on alternate days, and be continued for a fortnight. Such directions appear to me to answer the intention satis-factorily.

33. Opiates may not only be taken through the mouth, but likewise inhaled in the form of smoke; but it should be such as not to excite the expulsive faculty too strongly, nor draw out the humours, but only to work upon the spirits within the brain for a short time. Wherefore a suffumigation of tobacco, lign-aloes, dried leaves of rosemary, and a little myrrh, inhaled in the morn-ing through the mouth and nostrils, would be very beneficial.

34. In the powerful opiates, as -theriacum, mithridate, and the rest, it would not be amiss, especially in youth, to take the distilled waters rather than the bodies themselves. For in distillation the vapour rises, while the heat of the inodicine generally settles; and distilled waters in the virtues conveyed by vapours are mostly good, in others weak.

35. Some medicines have a degree, weak and secret,- and therefore safe, of opiate virtue. These impart a slow and abundant vapour, but not malignant, as opiates do. And hence they do not put the spirits to flight, but yet they collect and somewhat thicken them.

36. The medicines that make opiates are, first of all saffron and its flowers; then Indian leaf, ambergris, a preparation of coriander seed, amomum and pseudamomum, lignum Rho-dium, orange-flower water, or better still, the infusion of fresh orange-flowers in oil of almonds, nutmegs pricked full of holes and soaked in rose-water.

37. Though opiates, as has been mentioned, are to be used seldom and at certain times, yet this secondary kind may be taken frequently and in daily diet, and will conduce greatly to the prolongation of life. An apothecary of Calieut, by the use of amber, is said to have lived 160 years; and the nobles of Barbary, where the common people are short-lived, are found by a use of the same means to be long-lived. Our own an-cestors, who were longer-lived than we arc, made great use of saffron, in cakes, broths, and the like. And so much for the first means of condensing the spirits; namely, by opiates and their subordinates.

38. I now come to inquire into the second way of con-densing the spirits, namely by cold. For condensation is the proper work of cold; and it is done without any malignity, or unfriendly quality. The operation, therefore, is safer than by opiates, though somewhat less powerful, if used only at intervals, as opiates are. But then since it may be used in moderation familiarly and as a part of daily diet, it has much more power than opiates to prolong life.

39. Refrigeration of the spirits takes place in three ways; by respiration, by vapours, or by aliments. Of these the first is the best, but mostly out of our power; the second likewise is strong, and yet within our reach; the third is weak and circuitous.

40. Air clear and pure, that has nothing fuliginous in it before it is inhaled into the lungs, and not much exposed to the sun's rays, best condenses the spirits. Such air is found either nn dry mountain tops, or on plains open to the wind, yet some-what sheltered from the sun.

41. With regard to the refrigeration and condensation of spirits by vapours, the root of the operation I place in nitre, as a thing specially created for this purpose. To this opinion I am led by the following considerations.

42. Nitre is a kind of cold aromatic, as is apparent to the sense itself. For it bites and tries the tongue and palate with cold, as aromatics do with heat; and it is the only one, as far as we know, that does this.

43. Almost all cold things (at least all things cold properly, and not accidentally, as opium) have a weak and poor supply of spirit; and, on the other hand, things full of spirit are almost all hot. Nitre is the only body found in the vegetable world which abounds with spirit and yet is cold. For cam-phor, which is full of spirit, and yet produces the effects of cold, refrigerates only by accident; inasmuch as, being thin and without acrimony, it assists perspiration in inflammations.

44. In the practice of congealing and freezing fluids that has lately come into use, by applying snow and ice to the exterior of the vessel, nitre is also used, and no doubt excites and strengthens the congelation. It is true that common bay salt is likewise used for this purpose, which rather supplies activity to the cold of the

snow than gives a coldness itself; I have heard however that in hot countries, where there is no snow, congelation is produced by nitre alone; but this I have not proved.

45. Gunpowder, which consists principally of nitre, is said, when taken in a draught, to inspire courage, and to be often used by soldiers and sailors before a battle, as opium is by the Turks.

46. Nitre is successfully administered in burning and pesti-lential fevers to relieve and subdue their destructive heats.

47. Nitre in gunpowder has evidently a great aversion to flame, which causes that wonderful blast and explosion.

48. Nitre is found to be as it were the spirit of the earth. For it is most certain that any earth, though pure and unmixed with nitrous matter, if it be so laid up and covered as to be free from the rays of the sun, and produce no vegetable matter, will collect a great quantity of nitre. And from this it appears that the spirit of nitre is inferior, not only to the spirit of animals, but also to the spirit of vegetables.

49. Animals that drink nitrous water evidently grow fat, which is a sign of the cold in nitre.

50. Land is most enriched by nitrous bodies; for all manure is nitrous, which is a sign of the spirit in nitre.

51. From this it appedrs that the human spirits can be cooled and condensed by the spirit of nitre, and made more crude and less eager. As therefore strong wines, spices, and the like, inflame the spirits and shorten life, so, on the other hand, nitre composes and restrains the spirits and tends to longevity.

52. Nitre may be taken in food with salt-ten parts of salt to one of nitre; or from three to ten grains may be mixed in morning broths or draughts. But in whatever way it is taken, if it only be in moderation, it is very beneficial to longevity.

53. As opium plays the principal part in condensing the spirits by flight, and has at the same time its less powerful but safer subordinates, which may be taken more frequently, and in greater quantity, as was before mentioned; so likewise nitre, which condenses the spirits by cold and (as they say now-a-days) by a-'kind offrescour, has its own subordinates.

54. All things which have a somewhat earthy smell, like the smell of pure and good earth, lately turned or dug, are subordinates to nitre. The principal of these are borage, bugloss, langue de bceuf, burnet, strawberry plants, straw-berries, raspberries, raw cucumbers, raw apples, vine leaves, vine buds, and violets.

55. Next to these come those which have a certain fresh-ness of smell, with a certain inclination to heat, yet not entirely devoid of that cooling property. Such are balm, green citrons, green oranges, distilled rose-water, roasted pears, and pale, red, and musk roses.

56. It should be observed that the subordinates of nitre further the intention better in a raw than in a cooked state ; because that spirit of cooling is dissipated by fire. They are therefore best taken either infused in liquid, or raw.

57. In the same way as the condensation of the spirit by the subordinates of opium is in some degree performed by smells, so likewise is that caused by the subordinates of nitre. Therefore the smell of the pure and fresh earth in following the plough, or digging or weeding, is an excellent composer of the spirits. Leaves falling in woods and hedges towards the close of autumn, and most of all dying strawberry leaves, supply a good coolness to the spirits. The smell of violets, wallflowers, bean-blossoms, sweet briar, and clary, taken while they are growing, is of a lilce nature.

58. 1 knew also a nobleman, who lived to a great age, who every morning, directly he awoke, had a clod of fresh earth placed beneath his nose for him to smell.

59. It is certain that the cooling and tempering of the blood by cold things, as endive, chicory, hepatica., puralane, and the like, do as a consequence cool the spirits also; but it is by a slow and indirect process, whereas vapours operate immediately.

So much then for the condensation of the spirits by cold. The third process of condensation was said to be by that which I call the soothing of the spirits; the fourth, by the quieting of their alacrity and over-activity.

60. All things soothe the spirits that are pleasing and friendly to them, and yet do not excite them too much to go forth; but contrariwise induce a state in which the spirit, being as it were contented with themselves, enjoy their own society, and betake themselves to their proper centre.

61. If you recollect the things before set down as subor-dinates to opium and nitre, there is no need of further inquiry on this subject.

62. With regard to the quieting of the violence of the spirits, I will speak of it presently when I come to inquire concerning their motions. Now, therefore, having spoken of the condensa-tion of spirits (which belongs to the substance of them), I come to the degree of heat therein.

63. The heat of the spirits should be, as was said, of that kind which is robust but not eager, and loves rather to undermine tough and obstinate parts than to carry o$ the weak and thin.

64. We must be cautious about spices, wine, and strong drink, and use them very temperately, with intervals of absti-nence; and so likewise with regard to savory, marjoram, penny-royal, and all herbs which bite and burn the palate. For they supply to the spirits a heat not operative but predatory.

65. Those that yield a robust heat are principally elecam-pane, garlic, carduus benedictus, young watercress, germander, angelica, zedoary, vervain, valerian, myrrh, spikenard, elder flower, and chevril. The use of these with care and judgment, sometimes in food, sometimes in medicines, will satisfy this operation.

66. It is fortunate likewise that the grand opiates are also of great service to this operation, in that they yield by compo-sition such a heat as is desired, but can scarce be obtained, from simples. For the introduction of those intensely hot things (as spurge, pellitory, stachys-agra, dragonwort, pistachio nut, castor oil, aristolochium, opopanax, ammoniac, gum resin, .and the like, which cannot be taken internally by themselves), to counteract the narcotic power of opium, constitutes that temper of medicine which is now required; as is well shown in this, that theriacum, mithridate, and the rest, are not acrid and do not bite the tongue, but have only a slight bitterness and a strong scent, and only betray their heat in the stomach, and in their subsequent operations.

67. The sexual appetite often excited, but seldom gratified, conduces likewise to this robust heat of the spirits; as also do some other passions, of which I will speak hereafter. And so much for the heat of the spirits in relation to the prolongation of life.

68. Of the quantity of the spirits, that they be not exuberant, and given to ebullitions, but rather stinted and moderate (for a small flame does not prey so much as a large one), the inquiry will be short.

69. It seems to be approved by experience that a spare and almost Pythagorean diet, such as is prescribed by the stricter orders of monastic life, or the institutions of hermits, which regarded want and penury as their rule, produces longevity.

70. To this kind of life belong water-drinking, a hard couch, cold air, a spare diet (that is, of herbs, fruits, flesh, and fish, potted and salted rather than fresh and hot), a hair shirt, frequent fastings, frequent watchings, few sensual pleasures, and the like. For all these diminish the spirits and reduce them to such a quantity as is only enough for the offices of life; whence their depredation is less.

71. But if the diet shall be a little more generous, and without so much rigour and mortification, yet so long as it is regular and consistent, it produces the same result. For in flames likewise we see that a somewhat greater flame, if it be steady and calm, consumes less of its fuel than a smaller flame that is blown about, and alternately strong and weak. The regimen and diet of Cornaro of Venice has demonstrated this well, seeing that for so many years he ate and drank by exact weight, whereby he exceeded 100 years of age, with his strength and senses unimpaired.

72. Zee should likewise take care that a body fully nourished, and not reduced by any of these spare diets, does not neglect a seasonable use of sexual intercourse, lest the spirits grow too full, and soften and destroy the body. So much therefore for a moderate, and as it were frugal, quantity of spirits.

73. Next follows the inquiry for restraining the motions of the spirits; for motion evidently alternates and inflames them. This restraint is effected in three ways; namely, by sleep, by avoiding strong labour, too much exercise, and all fatigue, and by controlling uneasy affections. And first concerning sleep.

74. The story goes that Epimenides slept many years in a cave without needing any food; for in sleep the spirits are less predatory.

75. Experience tells us that some animals, as dormice and bats, sleep through the whole winter in holes and corners; such power has sleep to stop vital consumption. The same likewise is thought to be the case with bees and drones, though sometimes deprived of their honey; also with butterflies, and flies.

76. Sleep after dinner, wherein vapours not unpleasing (as being only the first dews of food) rise to the bead, is good for the spirits, but bad and prejudicial to all other things that relate to the health. In extreme old age however the same principle holds with regard to food and sleep, for both should be taken frequently, though little at a time. And at the very end of life, mere rest, and a kind of perpetual repose, is good, especially in the winter.

77. But as moderate sleep tends to longevity, so much more if it be calm and undisturbed.

78. The procurers of calm sleep are violets, lettuce (espe-cially when boiled), syrup of dry roses, saffron, balm, apples eaten at bedtime, and a malmsey toast, especially if first infused in musk roses. It would be useful therefore to make up some pill or small draught of these compounds, and take it familiarly. Things likewise which close up firmly the mouth of the stomach, as a preparation of coriander seed, quinces, and roast pears, induce sound sleep. But above all for young men, and especially for those who have Strong stomachs, a good drink of cold water at bedtime is beneficial.

Injunction. Of voluntary or procured trances, and of thoughts intent and profound (provided they are not un-comfortable), I know nothing certain. They contribute no doubt to this intention, and condense the spirits, even more powerfully than sleep; seeing they lull and suspend the senses as much, or even more. Of these make further inquiry. And so much for sleep.

79. With regard to motion and exercises; fatigue and all motion and exercise that is too rapid and violent, as running, games at ball, fencing, and the like, are injurious; as also those exercises in which our strength is exerted and strained to the uttermost, as leaping, wrestling, and the like. For it is certain that the spirits being distressed either by swiftness of the mo-tion or extreme efforts, become afterwards more active and predatory. On the other hand, exercises which provoke a mo-tion tolerably strong, yet not too rapid, or requiring the utter-most strength, such as dancing, archery, riding, playing at bowls, and the like, are not injurious but rather beneficial.

I now come to the affections and passions of the mind, to see which of them are prejudicial to longevity, which profit-able.

80. Great joys attenuate and diffuse the spirits, and shorten life; ordinary cheerfulness strengthens the spirits, by calling them out, and yet not wasting them.

81. Sensual impressions of joys are bad; ruminations of joys in the memory, or apprehensions of them in hope or imagina-tion, are good.

82. Joy suppressed and sparingly communicated comforts the spirits Tore than joy indulged and published.

83. Grief and sadness, if devoid of fear, and not too keen, rather prolong life; for these contract the spirits, and are a kind of condensation.

84. Great fears shorten life. For though both grief and fear distress the spirit, yet grief causes only a simple contrac-tion ; whereas fear, through cares respecting the remedy and hopes intermixed, causes a turmoil and vexation of the spirits.

85. Suppressed anger is likewise a kind of vexation, and makes the spirit to prey upon the juices of the body. But anger indulged and let loose is beneficial, like those medicines which induce a robust heat.

86. Envy is the worst passion, and preys on the spirits, which again prey on the body. And it is so much the worse, because it is always at work, and (as they say) keeps no holi-days.

87. Compassion for another man's misfortune, which does not appear likely to befall ourselves, is good. But that which may by some similitude be reflected on the person pitying is bad, because it excites fear.

88. A light shame hurts not, because it slightly contracts the spirits and then diffuses them; and therefore bashful persons are generally long-lived. But shame for a great disgrace, and of long continuance, contracts the spirits even to suffocation, and is pernicious.

89. Love, if not unfortunate, and too deeply wounding, is a kind of joy, and is subject to the same laws as were laid down for joy.

90. Hope is of all affections the most useful, and contributes most to prolong life, if it be not too often disappointed, but feed the imagination with the prospect of good. They therefore who set up and propose some definite end as their mark in life, and continually and gradually advance thereto, are mostly long-lived; insomuch that when they arrive at the summit of their hopes, and have nothing more to look forward to, they commonly droop and do not long survive;, so that hope appears to be a kind of leaf joy, which may be spread out over -a vast surface like gold.

91. Admiration and light contemplation are of very great effect in prolonging life. For they detain the spirits on pleasing subjects, and. do not permit them to become tumultuous; un-quiet, and morose. And hence all contemplators of nature, who had so many and such great wonders to admire, as De-mocritus, Plato, Parmenides, and Apollomus, were long-lived. The rhetoricians likewise, who did but taste matters lightly, and busied themselves rather about light of speech than the darkness of, things, as Gorgias, Protagoras, Isocrates, and Se-neca, were long-lived. And certainly as old men are gene-rally talkative and garrulous, so talkative persons very often grow to a great age; for it betokens a light contemplation, and one that does not greatly distress or vex the spirits; whereas subtle, acute, and eager inquisition shortens life; for it fatigues and preys upon the spirits.

So much then for the motion of the spirits by the affections of the mind. But I will add some other general observations on the spirits, which do not fall under the preceding division.

92. Particular care should be taken that the spirits are not too often dissolved. For attenuation precedes dissolution, and the spirit once attenuated is not easily recovered again and con-densed. Dissolution is caused by too great labours, too violent affections of the mind, too profuse perspirations, too large. eva-cuations, warm baths, and intemperate or unseasonable_gratifi-eation of lust; also by too many cares and disquietudes, and anxious expectations;- and lastly by malignant

diseases,, and severe pains and anguish of the body. All which should (as indeed the common physicians advise) be as far as possible avoided.

93. The spirits are delighted both with things accustomed, and with things new. But it contributes wonderfully to preserve the vigour of the spirits if we neither use customary things till they glut, nor new things before we feel a lively and vigorous appetite for them. Care and judgment there-fore should be employed to break off customs before they be-come tiresome; and to curb the desire of new things for a season till it becomes more strong and quick. Moreover, the course of life should, if possible, be so ordered that it may have many and various restorations; and the spirits may not grow torpid by perpetual intercourse with the same things. For though Seneca' said well, °° A fool is always beginning to live," yet this folly, like many others, contributes to longevity.

94. It is to be observed with regard to the spirits (although the contrary course be commonly followed), that when men perceive their spirits to be in a good, calm, and healthy state (which may be known by a quiet and cheerful disposition of mind), they should cherish and not change them; but if the spirits are in a disturbed and untoward state (as will be shown by sadness, heaviness, and other indisposition of mind), they should at once subdue and alter them. Now the spirits are continued in the same state by restraint of the affections, temperance of diet, abstinence from sexual intercourse, refraining from labour, and moderate rest. They are overpowered and altered by the contrary; namely, by violent affections, profuse feasting, im-moderate indulgence of the sexual appetite, arduous labours, intense study, and business. It is however the common prac-tice of men, when they are the most merry and best disposed, to apply themselves most to feasting, love, labour, contentions, and business. But if a man should wish for long life, he ought (though it may seem strange) to adopt the contrary system; for good spirits should be cherished and continued, spirits ill disposed should be discharged and altered.

95. Ficinus says well, « That old men, to comfort their spirits, should frequently recall and ruminate on the acts of their childhood and youth." 2 Such remembrance is no doubt the peculiar recreation of all old men; and hence it is that they delight in the society of their old schooifellows, and love to visit the places of their education. Vespasian indeed had this feeling so strong, that when he was emperor he could no way bring himself to change his father's house, humble though it was, lest he should lose sight of familiar objects and the recollection of his boyhood. Nay, he used on holidays to drink out of a wooden cup, tipped with silver, which had belonged to his grandmother.'

96. The thing above all others most pleasing to the spirifs is a continual advance to the better. Youth and manhood should therefore be so ordered as to leave new comforts for old age, whereof the principal is moderate rest. And therefore old men in honourable places who do not retire to a life of leisure, offer violence to thernselv es. A remarkable instance of this is found in the case of Cassiodorus,

who had so much authority with the Gothic kings of Italy that he appeared to be the soul and life of their affairs; yet afterwards, when nearly eighty years of age, he retired into a monastery, where he lived to be a hundred. Herein, however, two cautions are required; one, that they do not wait till the body is entirely worn out and diseased, for in such bodies all change, even for the better, accelerates death; the other, that they do not give themselves up to mere inertness, but have something to entertain the minds and thoughts in a quiet way; for which the best kind of amusement is reading, and next building and planting.

97. Lastly, the same action, endeavour, and labour, which if undertaken cheerfully and with good will refreshes the spirits, if it be attended with aversion and dislike preys upon and prostrates them. It will therefore promote longevity if a man either so arrange his life that it shall be free, and pass as he likes, or else obtain such command over his mind that, what-ever necessity fortune may impose, it may rather lead than drag him.

98. Nor must it be forgotten, as bearing on the government of the affections, that especial care is to be paid to the mouth of the stomach, chiefly to prevent it from being too much relaxed. For this part has more power over the affections, especially the daily ones, than either the heart or the brain; excepting only such as are caused by powerful vapours, as in drunkenness and melancholy.

99. So much then for the operation upon the spirits, that they may retain their youth and renew their freshness; which I have paid the more attention to, because physicians and other authors are mostly silent on these operations; but principally because the operation upon the spirits for the renewal of them is the easiest and nio~t compendious way to the prolongation of life. And it is most compendious for two reasons; the one, because the spirits act compendiously on the body; the other, because vapours and affections act compendiously on the spirits; so that these go to their end as it were in a straight line, other things more circuitously.

II.

THE OPERATION UPON THE EXCLUSION OF THE AIR.

Tht History.

1. Exclusion of the external air tends in two ways to pro-long life. First, because most of all things, next to the in-ternal spirit, the external air (although it is as life to the human spirit, and contributes very much to health) preys upon the juices of the body and hastens its desiccation; whence the exclusion of the air conduces to longevity.

2. The second effect of the exclusion of the air is much more deep and subtle; namely, that the body being closed up, and not perspiring, detains the spirit within, and turns it upon the harder parts of the body, which are thereby rendered soft and tender.

3. The reason of this process is explained in the desiccation of inanimate bodies. And it may be taken for an infallible axiom, that the emission of the spirit dries bodies, but the detention thereof melts and softens them. And it may be further assumed that all heat properly attenuates and moistens, but contracts and dries only by accident.

4. A life in eaves and holes, where the rays of the sun do not enter, may perhaps tend to longevity; for the air of itself, unexcited by heat, has not much power to prey upon the body. Certainly, on looking back, it appears from many remains and monuments that the size and stature of men were anciently much greater than they have been since, as in Sicily and some other places; and such men generally lived in eaves. Now there is some affinity between length of age and largeness of limbs. The cave of Epimenides likewise passes current among the fables. And I suspect that the life of the columnar ancho-rites was something like the life in caves, for there neither the rays of the sun penetrated, nor did the air admit of great changes or inequalities. It is certain that both the Simeons, Daniel Saba, and other stylites, were very long-lived. Modern an-chorites likewise, shut up within walls or pillar, are often found long-lived.

5. Next to the life in caves is the life on mountains. For as the heat of the sun does not penetrate into caves, so on the tops of mountains, where there is no reflection, it has less power. But this must be understood of mountains where the air is clear and pure; that is, where from the dryness of the vallies mists and vapours do not ascend; as in the mountains that surround Barbary, where, even at the present day, men often live 150 years, as I have observed before.

6. Now air of this kind in caves and mountains has of its own nature little or no predatory power. But air such as ours is, rendered predatory by the heat of the sun, should as much as possible be excluded from the body.

7. The air is kept of and excluded in two ways; first, by closing the pores; secondly, by filling them up.

8. Closing of the pores is assisted by coldness of -the air itself, by nakedness, which hardens the shin, by washing in cold water, and by astringents applied to the skin, as mastich, myrrh, and myrtle.

9. But this operation will be much better served by baths, seldom used however (especially in summer), consisting of such astringent mineral waters as may be safely applied; such as chalybeate and vitriol waters; for these powerfully contract the skin.

10. As for filling up the pores, paints and such like thick unctuous substances, and (which may be most conveniently used) oil and fat things, no less preserve the substance of the body than oil colours and varnish preserve wood.

11. The ancient Britons painted themselves with woad,-and were extremely long-lived. The Picts likewise had the same custom, and are even supposed by some to have derived their name from it.

12. At this day the natives of Brazil and Virginia use to paint themselves, and are said, especially the former, to be very long-lived; insomuch that five years ago the French Jesuits met with some of them who remembered the building of Fernamburg, which happened 120 years before, they being then grown up.

13. Johannes de Temporibus, who is said to have reached the age of three hundred, on being asked how he had preserved himself, is reported to have answered, " By oil without, and honey within."

14. The Irish, especially the wild Irish, are, even to this day, very long lived. In truth, they say that within these few years the Countess of Desmond lived to 140, and shed her teeth three times. Now the Irish have a custom of standing naked before the fire, and rubbing and as it were pickling themselves with old salt butter.

15. These same Irish are accustomed to wear shirts and linen rubbed with saffron, which, though it was introduced to prevent putrefaction, yet I consider tends to lengthen life. For saffron is the best tiling I know for the skin, and to com-fort the flesh, seeing it is a wonderful astringent, and has be-sides an oiliness and subtle heat without any acrimony. Indeed I remember an Englishman who, on crossing the Channel with a bag of saffron, to avoid paying duty, carried it for conceal-ment around his stomach, and although before he had always been very sea-sick, he was this time quite well and felt no nausea.

16. Hippocrates' advises to wear clean clothes neat to the skin in winter, but foul and smeared with oil in summer. The reason whereof appears to be, that in summer the spirits exhale most, and therefore the pores of the skin should be stopped.

17. I judge therefore that to anoint the skin externally with oil, either of olives or sweet almonds, contributes above everything to longevity. The anointing should take place every morning on rising; the oil should be mixed with a little bay salt or saffron. It should be done lightly with wool or a soft sponge, so as not to drop upon the body, but only to touch and moisten the skin.

18. It is certain that all liquids, even those of an oily nature, if in large quantities, draw something out of the body; but, on the other hand, in small quantities they are absorbed by the body. The anointing therefore, as I said, should be light, or the shirt itself should be smeared with oil.

19. It may perhaps be objected that this anointing with oil here recommended (though it has never been used by our-selves, and has been left off by the Italians) was formerly familiar to the Greeks and Romans, and part of their diet; and yet they were not more long-lived than the men of this age. But to this it may be justly answered, that oil was only used after bathing, except perhaps by the athletes; and hot baths are as contrary to this operation as anointings are favour-able to it; for the former opens while the latter closes the pores. Baths therefore, without subsequent anointing, are very bad; but anointing without bathing very good. Besides, this anointing was practised rather as a luxury, or (to view it in its best light) for the salve of health; and with no relation to longevity. Therefore they at the same time used precious ointments, which, though agreeable and pleasant in themselves, are hurtful to this intention by reason of their heat; so that Virgil was right in speaking of the use of casia as corrupting the use of clear oil.'

20. Anointing with oil in winter contributes to health by excluding the cold; in summer, it helps to detain the spirits and prevent the dissolution of them, and to repel the force of the air, which is then most predatory.

21. Anointing with oil being one of the most powerful ope-rations to advance longevity, I have thought it right to add some cautions, lest it endanger the health. These are four in number, answering to the four inconveniences which may follow thereon.

22. The first inconvenience is, that by keeping in perspi-rations it may engender diseases, from excrementitious humours. The remedy to be employed for this is by purges and clysters, so that a proper discharge may be obtained. For it is certain that discharge by perspiration is mostly good for the health, but bad for longevity. But moderate purgatives act upon the humours, and not as perspiration does, upon the spirits.

23. The second inconvenience is, that it may make the body hot and inflamed. For the spirit being shut in and prevented from perspiring is more fervent. The remedy for this is a diet mostly of a cooling nature, and medicines with cooling pro-perties

to be taken at certain times. But of these I will pre-sently inquire in the operation upon the blood.

24. The third inconvenience is, that it may oppress the head. For all closing of the pores externally strikes back the vapours, and sends them to the head. This may be completely remedied by purgatives, especially clysters, by firmly closing the mouth of the stomach with astringents, by combing and rubbing the head, and also washing it with convenient lies to cause an exhalation, and by not neglecting good and. suitable exercise to create a slight perspiration from the skin.

25. The fourth inconvenience is a more subtle evil; namely, that the spirit detained by the closing of the pores may pos-sibly multiply itself too much; because, when it does not escape, and new spirit is being continually generated, the spirit increases too much, and may thus become more predatory on the body. But this is not exactly the case; for all spirit (which like flame is fanned by motion) by being shut up becomes languid, and therefore less active and less able to propagate itself; hotter, no doubt, as flame is, but slow in motion. But this inconvenience also may be remedied by an occasional mixture of cooling medicines, as roses and myrtle, with the oil. For all hot thin=s are to be absolutely avoided, as was observed with regard to cinnamon.

26. It is likewise beneficial to wear next the skin garments which have in them something unctuous or oily, and not watery, for they draw less out of the body. And in this respect woollen garments are better than linen; at least it is certain in the spirits of odours, that scented powders lose their smell much sooner in linen than in wool. Linen therefore, though pleasant to the touch and in respect of cleanness, is to be suspected for this operation.

27. The wild Irish, when they are taken ill, do nothing more than take the sheets off the beds, and wrap themselves in the blankets.

28. Some assert that they derived much benefit to their health by wearing under their shirts, and next the skin, drawers and waistcoats of scarlet flannel.

29. It should be observed also that air accustomed to the body preys upon it less than new and frequently changed air; and therefore poor people, who always live at home by their own firesides, and do not change their abodes, are generally long-lived. But for the other operations I esteem a change of air to be beneficial, especially where the spirits are not altogether sluggish; but a mean should be used that may meet both cases, And this may be done by changing our place of abode at stated times, at the four seasons of the year, to suitable localities; that so the body may neither tra-vel too much, nor rest too long at home. And so much for operations by exclusion of the air, and avoiding its predatory. action.

III.

THE OPERATION UPON THE BLOOD, AND THE HEAT, WHICH CREATES BLOOD.

The History.

1. The two subsequent operations are as it were the con-verse of the two preceding, and are related to them as passives to actives. For the two preceding tend to make the spirit and the air less depredatory in their actions ; the two latter to make the blood and the juice of the body less liable to be preyed on. But as the blood is that which irrigates the juices and members, and prepares them, I will place the operation upon the blood first, and give three precepts concerning it; being few in number, but of great efficacy.

2. First, there is no doubt but that if the blood be brought to a cooler temper it will be the less easily dissipated. But since cold things taken through the mouth agree ill with many of the other intentions, it will be better to find some other things that are free from these inconveniences; and these are two in number.

3. The one is the use of clysters, especially in youth, not at all purgative or abstergent, but only cooling and slightly aperient. Of these the best are made from the juices of lettuce, purslane, hepatica, the greater houseleek, and the mucilage of the seed of fleawort, with some mild opening decoction, and the mixture of a little camphor. But in old age let houseleek and purslane be omitted, -and the juice of borage, endive, and the like be substituted in their place. And let the clysters be retained as long as possible, that is, for an hour or more.

4. The other is, the use, especially in summer, of fresh water baths, only just lukewarm, with no emollients at _all; as mallows, dog's mercury, milk and the like; but rather with a moderate quantity of new whey and roses.

5. But the chief point and novelty of the thing that I advise is this: before bathing anoint the body with oil mixed with some thickening substance, that the cooling property may be received, the water repelled, and yet the pores of the body may not be shut too closely. For when the external cold shuts up the body strongly, it is so far from promoting coldness, that it even prevents it, and excites heat.

6. Bladders filled with decoctions and cooling juices, and applied to the abdomen, produce a similar effect. For this also is a kind of bathing, where the body of the liquor is mostly excluded, and only the cooling property received.

7. There remains the third precept, which relates not to the quality, but to the substance of the blood; to make it more firm, less easily dissipated, and less subject to the heat of the spirit.

8. There is no confidence at the present day in the use of gold-leaf or filings, or powder of pearls, gems and coral, or the like, except so far as they may satisfy the present operation. Certainly as the Arabs, Greeks, and moderns have attributed such powers to these medicines, it would seem that there must be something in what so many men have proved and observed. Laying aside therefore all fantastic notions concerning them, I fully believe, that if something could be infused in very small portions into the whole substance of blood, over which the action of the spirit and heat should have little or no power, it would stop not only all putrefaction, but arefaetion likewise, and be very effectual in prolonging life. In this however several cautions are required. First, that the particles be re-duced to an extreme fineness; secondly, that such hard and solid things be free from all malignant qualities, lest when they are dispersed and concealed in the veins, they work some mischief; thirdly, that they be never taken with food, nor so as to remain long, lest they create dangerous obstructions about the mesentery; fourthly, that they be used seldom, lest they congregate and collect in the veins.

9. Let them therefore be taken on an empty stomach, in white wine mixed with a little oil of almonds, and use bodily exercise immediately after the draught.

10. For the simples which may satisfy this operation, three will be enough; namely, gold, pearls, and coral. For all metals except gold have some pernicious quality in their volatile part, neither can they be beaten out so finely as gold leaf.And transparent and glass-like gems I dislike, as I said before, for fear of corrosion.

11. But in my opinion, the safer and more effectual means would be the use of woods in infusions and decoctions; for these have power enough in them to give firmness to the blood, yet have not the same danger of causing obstructions. But they are most to be commended because they may be taken at meals; whence they will obtain an easier entrance into the veins, and will not pass off with the refuse.

12. The woods suited for this purpose are sandal, oak, and vine; for I reject the hotter woods, and such as are at all resinous. Yet to these I may add the dry and woody stalks of rosemary, which is a shrub as durable as many trees; and like-wise the dry and woody stalks of ivy, but not in such a quantity as to create an unpleasant taste.

13. Let these woods be taken, either boiled in broths, or infused in new wine, or beer, before it has settled. If in broths- (as is the case in guaiacum and the like), let them always be infused for a long time before they are boiled, that the firmer part of the wood as well as the looser may be drawn out. Ash-wood, though used for cups, I'regard with suspicion. And so much for the operation upon the blood.

IV.

THE OPERATION UPON THE JUICES OF THE BODY.

The History.

1. There are two kinds of bodies, as has been observed in the inquiry concerning inanimate bodies, which are consumed with difficulty; namely, the hard and the fat; as appears in metals and stones, in oil and wag.

2. The operation therefore must tend to make the juice of the body somewhat hard; and likewise somewhat fatty and moist.

3. Hardness is caused in three ways; namely, by aliment of a firm nature, by cold condensing the skin and flesh, and by exercise fermenting and binding the juices, that they be not soft and frothy.

4. Aliment should be of a nature that is least easily dissi-pated; as beef, pork, venison, goat, kid, swan, goose, and wood-pigeon, (especially if the flesh be slightly salted), salt and dried fish, cheese rather old, and the like.

5. Bread made of oatmeal, or with a mixture of peas in it, or rye or barley bread, is more solid than wheaten bread. And in wheaten bread that which has more of the bran in it is more solid than that made of fine flour.

6. The inhabitants of the Orkneys, who live on salt fish, and fish-eaters in general, are long-lived.

7. Monks and hermits who lived sparingly and on dry food were generally long-lived.

8. Pure water likewise, drunk often, makes the juices of the body less frothy. But by reason of the dullness of the spirit (which in water is certainly not very penetrating), the mixture of a little nitre with the water would I think be useful. And so much for the firmness of aliment.

9. With regard to the condensation of the skin and flesh by cold, persons living in the open air are generally more long-lived than those living in the house; and the inhabitants of cold countries than those of warm.

10. Too much clothing either in bed or on the back relaxes the body.

11. Washing in cold water is good for longevity; the use of warm baths bad; of bathing in astringent mineral .Haters I have spoken before.

12. With regard to exercise, an inactive life manifestly renders the flesh soft, and easily dissipated; whereas strong exercise, without too great perspiration or fatigue, renders it hard and compact. Exercise also in cold water, as swimming, is fiery good, and as a general rule, exercise in the open air is better than under cover.

13. Of frictions (which are a kind of exercise), seeing they rather call forth the aliment than harden, I will speak after-wards in their proper place.

14. Now therefore having spoken of the hardness of the juices, I come to their oiliness or moistness, which is a more perfect and powerful intention than induration, seeing it has no inconvenience, nor injurious effect. For all things whic relate to the hardness of the juices are of such a nature that while they prevent the waste of aliment they also hinder the repair thereof; whence the same things are at the same time favourable and hurtful to longevity. But things which per-tain to make the juices roscid are advantageous in both ways; for they render the aliment at once less easy to be dissipated, and more easy to be repaired.

15. But when it is said that the juice of the body should be made fat and roscid, it must not be understood to mean an obesity or visible fat; but a dewiness diffused, or (if you will) radical, in the very substance of the body.

16. Again, let no one imagine that oil, or the fat of meats or marrow, engender things like themselves, and satisfy this intention; for things once made perfect do not return to the same state. But the nourishment should be such, as after digestion and maturation to generate an oiliness in the juices.

1'I. Again, let no one imagine that -a mass of oil or fat by itself is difficult to dissipate, but that, in a mixture with other things it does not retain the same nature. For as oil by itself is much longer in wasting than water, so likewise it adheres much longer, and dries much slower on paper or linen; as I observed before.

18. For making the juices roscid, roast or baked meats are better than boiled. All preparations of meat with water. are bad; besides, oil is extracted more abundantly from dry bodies than from moist.

19. In general, a large use of sweet things is good for this operation on the body; as sugar, honey, sweet almonds, pine-apples, pistachio nuts, dates, raisins, currants, figs, and the like. And on the contrary, all acid and very salt or acrid things are opposed to it.

20. Nor let me be thought to favour the Manichmans and their diet, if I recommend a frequent use of seeds, nuts, and roots, in meats or their preparations; since all bread, which is the firmament of all food, is made either of seeds or roots.

21. But above all things, this operation depends most on-the nature of the drink, which is the vehicle of food. Let therefore the drinks in use be subtle, yet free from all acrimony and acidity ; as are those wines which, as the old woman says in Plautus are toothless with age," and beer of the same kind.

22. Mead, I imagine, would not be bad, if strong and old; but since all honey has some acidity in it (as may be seen by the corrosive water that the chemists extract from it, which can even dissolve metals), it would be better to make a similar drink with sugar, not lightly infused, but incorporated as firmly as honey in mead, and keep it for a year or six months; so that the water may lose its crudity, and the sugar may ac-quire subtlety.

23. Age in wine or liquor engenders subtlety in the parts of the liquor, and acrimony in the spirits; whereof the first is beneficial, the second hurtful. To avoid therefore this com-plication, put into the cask, before the wine has settled at all, a piece of well-boiled pork or venison, that the spirits of the wine may have something to prey upon and devour, and thereby lose their pungency.

24. In the same way, if beer were to be brewed not only of the grains of wheat, barley, oats, or peas, but should like-wise have about a third part of roots or fat pulps, as potato-roots, the pith of artichokes, burdock, or any other sweet and esculent roots, I conceive it would be a drink much more conducive to longevity than beer made entirely of grain.

25. All thins which have very fine parts, and yet have no acrimony or pungency, are very good in seasonings. And such a property is found to exist in soma few flowers, as ivy flowers, which infused in vinegar are even pleasant to the taste; marigold flowers, which are used in broths; and betony flowers. And so much for the operation upon the juices of the body.

v.

THE OPERATION UPON THE BOWELS, TO SEND FORTH THE ALIMENT.

The History.

1. Of the things which comfort the principal viscera (which are the seats of digestion), the stomach, liver, heart, and brain, for the proper performance of their functions (whereby aliment is distributed into the parts, the spirits are diffused, and reparation of the whole body is accomplished), inquire from physicians, and their descriptions and adviccs.

2. Of the spleen, gall, kidneys, mesentery, entrails, and lungs I make no mention, as they are only members minister-ing to the principal. And though in treating of health they sometimes come under especial consideration, because they each are subject to their own diseases, which if they be not cured attack likewise the principal viscera; yet for prolongation of life, repair of the body by aliment, and retarding the atrophy of old. age, if digestion and the principal viscera are in a good state, the rest will commonly work satisfactorily.

3. From the medical books which handle the comforting and preserving the four principal members, each person should select for himself the diet and system suited to his own bodily state. For preservation of health generally requires temporary medicines; but length of life is to be looked for from a proper diet, and a regular order of nutrient medicines. I will here however set down a few of them, selecting the best.

4. The stomach (which is the master of the house, as they say, upon whose strength all the other digestions depend) should be so fortified and strengthened as to be moderately warm; firm, not loose; clean, and not charged with oppressive humours; and yet (seeing it is supported by, itself rather than by the veins) never absolutely empty or fasting; lastly, it should be kept in good appetite, for appetite sharpens di-gestion.

5. I wonder how it is that the practice of taking warm drinks, which was common among the ancients, has fallen into disuse. I knew a very eminent physician who at . dinner and supper would swallow exceedingly hot soup with great avidity, and

soon afterwards wish it were returned; °1 for," said he, °1 I did not want the soup, but only the warmth."

6. I conceive it very beneficial that the first draught at sup-per of wine, beer, or whatever drink a man uses, be taken hot.

7. Wine, in which gold has been quenched, I think good once in a meal. Not that I believe that the gold has any special virtue, but because I know that the quenching of all metals in any liquor gives it a powerful astringency. Arid I select gold for this purpose because, besides the astringency which I want, it leaves no other metallic impression behind.

8. In the middle of a meal I conceive sops of bread dipped in wine to be better than wine by itself; especially if the wine in which the sop is dipped contain an infusion of rosemary and citron rind, with a little sugar to make in pass slower.

9. Quinces are certainly good for strengthening the stomach; but in my opinion they would be better used in conserves, which are made of strained juice and sugar, than in their solid state, because they load the stomach too much. These con-serves after dinner are best taken alone, but before dinner with vinegar.

10. The best simples for the stomach are, rosemary, ele-campane, mastich, wormwood, sage, and mint.

11. I approve of taking pills of aloes, mastich, and saffron, before dinner, especially in winter. But the aloe should not only be often washed with rose-water, but also steeped for some hours in vinegar in which gum-dragon has been dis-solved, and afterwards in fresh oil of sweet almonds, before it is made into pills.

12. Wine or beer, with an infusion of wormwood, a little elecampane, and yellow sandal wood, is good at times, and especially in winter.

13. In summer, a draught of white wine diluted with straw-berry water, in which a very fine powder of pearls and of the shells of crawfish, and (what may seem odd) a little chalk, have been infused, refreshes and strengthens the stomach ex-ceedingly.

14. In general, all morning draugbts, (such as are commonly used,) ofcooling things, aa juices,decoctions, whey, barley-water, and the like, are to be avoided; and nothing which is purely cold should be taken on an empty stomach. Such things, if necessary, are better taken five hours after dinner, or one hour after a light breakfast.

15. Frequent fasting is bad for longevity. All thirst should likewise be avoided; and the stomach should be kept clean, but always moist.

16. Fresh and good olive oil, in which some mithridate has been dissolved, rubbed on the spine opposite the mouth of the stomach, comforts the stomach wonderfully.

17. A small bag of scarlet wool, steeped in rough wine, in which myrtle, citron rind, and a little saffron have been infused, may be always worn on the stomach. So much therefore for the things which comfort the stomach; whereto many of the things useful in other operations are likewise beneficial.

18. The liver only requires to be kept free from heat, or dry-ness, and from obstruction; for that dissolution of it, which generates watery humours, is a regular disease. But the other two are induced by age.

19. The things described in the operation upon the blood are likewise of the greatest use here; but I will select and add a few more.

20. Let wine of sweet pomegranates, or if that cannot be had, a fresh extraction of their juice, be taken in the morning, with some sugar, a little fresh citron peel being put into the glass into which the juice has been squeezed, and three or four whole cloves; and let this be continued from February to the end of April.

21. Let watercresses be used in preference to all other herbs ; but young, not old; and let them be taken either fresh, or in soups, or in drinks; and next to them scurvy grass.

22. Aloes, however washed and corrected, are bad for the liver, and therefore should never be taken ordinarily. Rhubarb on the other hand is good for the liver, if three cautions are observed; first, to take it before food, lest it be too drying, or leave some trace of astringency behind it; secondly, to steep it for an hour or two in fresh oil of almonds, with rose-water, before it is infused elsewhere, or given in its substance; thirdly, to take it alternately, at one time simple, at another with tartar or a little bay-salt, lest it only carry off the lighter parts, and make the mass of humours still more stubborn.

23. I approve of wine, or a decoction of steel, being taken thrice or four times a year, to clear away the more powerful obstructions; provided however that it be always preceded by two or three spoonsful of fresh oil of sweet almonds, and be-fol-lowed by motion of the body, especially of the arms and stomach.

24. Liquids sweetened, and that with some fatness, are of special service to prevent the arefaction, saltness, parching, in short the old age of the liver; especially if they be well incor-porated with age. Let such be made of fruits and sweet roots; as wine and drinks of raisins, jujubes, dried figs, dates, parsnips, bulbous roots, potatoes, and the like, with sometimes a mixture of liquorice. A drink also made from Indian corn (which they call maize) with a mixture of sweet things is very beneficial. It is to be observed however that this intention of preserving the liver in a certain soft

and fat state is much more powerful than the other, which only relates to the opening of it, and tends rather to health than length of life; except that the obstruction that parches the liver is as prejudicial as the other kinds of arefaction.

25. Roots of chicory, spinage, and beet, stripped of their pith and boiled in water till they are tender, with a third part of white wine, and used as common salads with oil and vinegar, are to be recommended; as also are the buds or stalks of asparagus, the pulps of artichokes, burdock-roots properly boiled and prepared; and in spring time broths made of the young leaves of the vine and green blades of wheat. So much therefore for strengthening the liver.

26. The heart receives the most benefit or injury from the air we breathe, from vapours, and from the passions. And many of the observations made before concerning the spirits may be transferred hither. The undigested mass of cordials which have been collected by physicians is of little use to my inten-tion; but antidotes to poisons may be applied with sound judg-ment to strengthen and fortify the heart, especially if they are of a kind which does not so much destroy the peculiar nature of the poison as enable the heart and spirits to resist poison in gene-ral. With respect to cordials consult the table drawn up before.

27. The goodness of the air in places is better distinguished by experience than by signs. I consider it to be best in plains that are thoroughly exposed to the wind; if the soil is dry, and yet not altogether parched or sandy, and grows wild thyme, a kind of marjoram, and some scattered plants of calamint ; and is not entirely treeless, but interspersed with some groups here and there for shade; and where the sweet-briar has a musk and aromatic smell. Rivers I consider injurious, unless very small, clear and gravelly.

28. The morning air is ceitainly more invigorating, though the evening is preferred for enjoyment and delicacy.

29. Air stirred by a gentle wind is I consider healthier than a calm. The best is a wind from the west in the morning, and from the north in the afternoon.

30. Odours are very good to comfort the heart; not however that a good smell is the privilege of a good air. For as some airs are very pestilential, which do not smell so ill as others that are less pernicious, so on the other hand there are airs most healthy and favourable to the spirits which have either no smell or one not so pleasant and fragrant to the sense. In general, where the air is good, scents should only be used occasionally; for a continual odour, though of the best kind, somewhat oppresses the spirits.

31. Of all odours I recommend (as I have intimated be-fore) those of plants growing and not gathered, and taken in the open air; such as those of violets, pinks, and gilly-flowers, bean-blossoms, lime-flowers, the dust or flowers of vines, clary,

the yellow wallflower, musk roses (for other roses when growing give out little smell), strawberry plants, especially when dying, sweet-briar, especially in early spring, wild mint, and lavender flowers; and in hot countries, oranges, citrons, myrtle, and laurel. We ought therefore to walk or sit among the breaths of these plants.

32. To comfort the heart cooling odours are better than hot. The best fumigation therefore in the morning or the noon-day heats is by throwing an equal proportion of vinegar, rose-water, and strong wine on a bet iron plate.

33. Nor let me be thought to be sacrificing to Mother Earth, if I recommend in digging or ploughing to pour a quan-tity of generous wine upon the soil.

34. Pure orange-flower water, with a slight infusion of rose-water and fragrant wine, inhaled through the nostrils or inserted by a syringe, like an errhine, is good, if not done too often.

35. Mastication (though we have no betel) and holding in the mouth such things as cheer the spirits is very useful, though it be done continually. Make therefore grains or little cakes of ambergris, musk, lign-aloes, lignum rhodium, orrice root, and roses; and let them be made up with rose-water which has passed through a little Indian balsam.

36. The. vapours arising from things taken internally to fortify and cherish the heart ought to have three properties. They ought to be friendly, clear, and cooling. Warmth in vapours is bad; and wine itself which is supposed to have only a heating vapour is not entirely devoid of an opiate pro-perty. Those vapours I call clear which have more vapour than egbalation, and are not at all smoky, sooty, or oily, but moist and uniform.

37. Among that useless collection of cordials there are a few which should be used for diet; above all ambergris, saffron, and the grain of hermes, of the hotter kinds; and of the colder kinds, the roots of bugloss and borage, citrons, sweet lemons, and apples, Gold also and pearls, used in the way I have mentioned, may do some good, not only in the veins, but also in their passage, and in the region of the heart; namely, by cooling, without having any noxious property.

38. I am not entirely without faith in the virtue of the bezoar stone, for there have been many trials of it; yet it should by all means be taken in such a way as to communicate its virtue most easily to the spirits. It should not therefore be used in soups, syrups, rose-water, nor the like, but only in wine, cin-namon-water, or distilled liquor of that kind, and that not hot or strong, but weak.

39. Concerning the affections we have already inquired. I will only add this one remark, that every great, constant, and as they say, heroic desire, strengthens and enlarges the powers of the heart. And so much concerning the heart.

40. With regard to the brain, where the court and university of the animal spirits is held, the former inquiries concerning opium, nitre, and their subordinates, and the means for inducing quiet sleep, have some relation thereto. It is certain also that the brain is as it were under the protection of the stomach, and therefore the things which comfort and fortify the stomach by consent assist the brain, and may be transferred to this place. I will add a few remedies, three external, and one internal.

41. I recommend bathing the feet at least once a week in a bath made of lye, bay salt, sage, camomile, fennel, sweet mar-joram, spikenard, and the leaves of green angelica.

42. I recommend a fumigation every morning of dried rose-mary, dry bay twigs, and lign-aloes; for sweet gums oppress the head.

43. There must be great care not to apply hot things to the head externally; such as all kinds of spices, not even excepting the nutmeg. For these hot things we would bring down to the soles of the feet, and there alone apply them. A light anointing of the head however with oil, roses, and myrtle, with a little salt and saffron, I approve.

44. Remembering what I have said before concerning opiates, nitre, and the like, which so powerfully condense the spirits, I do not think it would be amiss if once a fortnight three or four grains of castor be taken in a morning broth, with a little angelica seed and calamus aromaticus. For these both strengthen the brain, and excite in that density of the substance of the spirits (which is so necessary for longevity) vivacity and vigour of motion.

45. With respect to the comforters of the principal viscera, I have proposed those things which are both proper and choice, and which may be safely and conveniently transferred to. a diet and system of life. For variety of medicines is the child of ignorance; and if it be true according to the proverb, that °° many dishes have made many diseases," it is not less true that many medicines have made few cures.. And so much for. the operation to send forth the aliment from the principal viscera.

VI.

TflI: OPERATION UPON THE EXTERIOR PARTS, FOR THE

ATTRACTION OF ALIMENT.

The History.

1. Although a good digestion performed by the internal parts is the principal thing for perfect alimentation, yet the actions of the exterior parts should also concur. And as the internal faculty sends forth and extrudes the nourishment, so outward faculties should attract and seize it. The weaker also tile digestive faculty is, the more need is there of the aid and concurrence of this faculty of attraction.

2. A strong attraction of the outward parts is principally ex-cited by motion of the body, whereby the parts, being warmed and comforted, invite and attract the nourishment more briskly.

3. The greatest care must be taken however that the same heat and motion, which call forth the new juice to the mem-bers, do not at the same time exhaust the member too much of that juice with which it was before moistened.

4. Frictions, especially in the morning, are most useful to this intention; but let this friction.be always followed.by a lib ht anointing of oil, lest the rubbing of the outward parts should make them, by perspiration, effete and exhausted.

5. Exercise, by which the parts rub and chafe themselves, is the next best thing to friction, provided it be moderate and (as has been said before) neither rapid, nor to the utmost strength, nor to lassitude. But in this, as well as in friction, there is the same reason and caution, that the body do not perspire too much. Wherefore exercise is better in the open air than under cover; and better in winter than in summer. Again, unction is not only to be employed when exercise is over, as in friction, but in the more violent exercises it is likewise to be used both at the beginning and at the end, as athletes do.

6. In order that exercise may dissolve as little as possible either the spirits or the juices, it should not be taken on an absolutely empty stomach. Wherefore, as exercise may neither be taken on a full stomach, as being very injurious to health, nor on an empty one, as being no less injurious to longevity, the morning repast should consist not of medicines, or draughts, or raisins, or figs, or the like, but simply of meat and drink, though in a very light and moderate quantity.

7. Exercises to distribute the juices over the body should affect all the members equally; not (as Socrates says) that the legs should move and the arms rest', nor the contrary; but that all the parts should share in the motion. It is of great use also for longevity that the body should never remain long in the same posture, but should change it every half hour at least, except during sleep.

8. Things used for mortification may be transferred to vivi-fication; for hair-shirts and flagellations, and all irritation of the outward parts, strengthen their attractive power.

9. Cardan recommends the application of nettles even in cases of melancholy; but I have no experience of the efficacy thereof, and I have some suspicions that the poisonous qualities of the nettles would by frequent applications create itches and other diseases of the skin. And so much for the attraction of aliment to the exterior parts.

VII.

THE OPERATION UPON THE ALIMENT, FOR THE INSINUA-

TION THEREOF.

The History.

1. The saying which forbids many dishes is for a censor rather than a physician. Or however it may be good for the preservation of health, yet it is prejudicial to longevity, because the various and somewhat heterogeneous mixture of aliments finds a better and quicker passage into the veins and juices than a simple and homogeneous diet does. Be-sides, it has great power to excite the appetite, which is the spur of the digestion. I approve therefore of a variety and frequent change of food suited to the seasons of the year, or other circumstances.

2. The doctrine likewise that meats should be simple, without sauces, is a simplicity of judgment; since good and well-chosen sauces are the most healthy preparations of food, and contri-bute both to health and longevity.

3. With meats hard of digestion, strong liquors and sauces that penetrate and pierce should be used; with right food, on the other hand, thin liquors and fat sauces.

4. Besides my former advice to take the first draught at supper warm, I recommend every one likewise, as a preparation for the stomach, to take half an hour before meals a good draught of whatever drink he is accustomed to, hot, and a little spiced to gratify the taste.

5. The preparation of meats, bread, and drinks, if it be well ordered and agreeable to this intention, is of very great import-ance. And although it be a thing mechanical and savouring of the kitchen and the cellar, yet it is worth more than the fables of gold, precious stones, and the like.

6. The moistening of the juices of the body by a moist preparation of aliment is a childish affair; it may be of use in the heat of illnesses, but is directly opposed to roscid ali-mentation. Boiled food therefore, for this intention, is far inferior to roast or baked, or the like.

7. Meat should be roasted before a quick fire, and done quickly; not before a slow fire and done slowly.

8. All solid meats should be used not entirely fresh, but somewhat salted. And simple salt should be taken sparingly, or not at all, at meals; for salt distributes itself much better when incorporated in the meat than when taken by itself.

9. Various and good modes of steeping and infusing flesh in proper liquors before roasting should be brought into use; as similar methods are sometimes employed before baking, and in the pickling of some fish.

10. The beating and striking of meat before it is dressed produces a great effect. It is acknowledged that pheasants and partridges killed in hawking, and bucks and stags that have been hunted (unless the course has been too long) are of better flavour. Some fish likewise are better for being scourged and beaten. Hard and rough pears and some other kinds of fruit become sweeter by squeezing and pressing them. It would be good also to introduce a custom of beating and bruising the harder kinds of flesh before they are put, to the fire. And this will be one of the best preparations.

11. Bread a little leavened and very little salted is the best. It should be baked in an oven well heated and not too slow.

12. The preparation of drinks suited to longevity may be comprised in one precept. Of water-drinkers there is no need to speak; for, as has been said elsewhere, such a diet may con-tinue life for a certain time, but can never prolong it to any great extent. But in other spirituous liquors (as wine, beer, mead, and the like) the one thing to be aimed at and observed as the sum of all is to make the parts of the liquor as fine and the spirit as mild as possible. And it will be difficult to effect this by age alone; for that makes indeed the parts somewhat more fine, but renders the

spirits much stronger and sharper; attd therefore I have already advised the infusion of some fat substance in casks, to restrain the acrimony of the spirits. There is also another way, without infusion or mixture; which is, to keep the liquor in perpetual agitation, either by water or land carriage, or by hanging the vessels on ropes and shaking them daily, or other similar processes. For it is certain that such local motion refines the parts, and in the mean time so fer-ments the spirits in them that they have no leisure to turn to acidity, which is a kind of putrefaction.

13. In extreme old age, food ought to be so prepared as to be almost half way to chyle. Distillations of meat are mere folly; for the best or nutritive part does not rise in vapours.

14. The incorporation of meat and drink before they meet in the stomach is a step towards chyle. Take chickens there-fore, partridges, pheasants, and the like; boil them in water with a little salt; let them be then cleaned and dried, and afterwards infused in new wine or beer that is still working, with a little sugar.

15. Extracts of meats and minces well seasoned are good fur old men; the more so, because they have mostly lost the use of their teeth for chewing, which is a principal prepara-tion.

16. Towards the supply of that defect, namely, of teeth for grinding food, there are three things which may help. The first is, to grow new ones, which is extremely difficult, and cannot .be done without a radical and powerful restoration of the body. The second is, so to harden the gums by the use of proper astringents that they may in some way perform the office of the teeth; and this does not appear impracticable. The third is, to prepare the food in such a way that it does not require mastication; and this is easy, and quickly attained.

17. With regard to the quantity of meat and drink, it oc-curs to me that a little excess is sometimes good for the irrigation of the body; %vhence immoderate feasting and deep potations are not to be entirely forbidden. And so' much for the opera-tion on aliments and the preparation thereof.

VIII.

THE OPERATION UPON THE LAST ACT OF ASSIMILATION.

Transition.

The advice concerning the last act of assimilation, whereat the three preceding operations principally aim, shall be short and simple; for the matter rather requires explanation than any variety of rules.

Comment.

1. It is certain that all bodies are endued with some desire of assimilating the things which lie neat to them. This- is per-formed freely and vigorously by thin and pneumatic bodies, such as flame, spirit, and air; but very languidly by thick and tangible bodies; because in them the desire of -assimilation is controlled by a stronger, desire for rest, and an aversion to motion.

2. It is certain likewise that this desire for assimilation, which in a gross body is bound up, as 'kv as said, and rendered ineffectual, is somewhat liberated and excited by heat or spirit in its neighbour, and in the end actttatod I)y it. And this is the only reason why inanimate bodies do not assimilate, and animate bodies do.

3. Again, it is certain that the harder the consistency of a body, the greater is the heat required as a spur to assimilation. And this turns out ill for old men, because in them the parts are more stubborn and the heat is weaker; and therefore either the hardness of the parts must be softened, or the heat must be increased. With regard to the softening of the parts, as I have already laid down many precepts which relate to the preven-tion or prohibition of this kind of hardness, I will speak of it hereafter. But, on increasing the simple heat, I will now give one precept; first however assuming this axiom.

4. The act of assimilation (which, as has been said, is excited by the surrounding heat) is an extremely accurate and subtle motion which affects even the smallest particles. But all motions of this kind are only in vigour when all the local motion which may disturb it is at rest. For the motion of separation into homogeneous parts, which in milk causes the cream to rise to the top and the whey to sink to the bottom, will never take place if the milk be at all stirred. Neither will any putrefaction take place in water or mixed bodies if they be in continuous local motion. From this assumption then I will draw, with reference to the present inquiry, this conclusion.

5. The act of assimilation is performed principally during sleep and rest, especially towards the morning, when the dis-tribution is finished. The only advice therefore which occurs to me, is that men keep themselves warm during sleep, and towards

morning use some ointment or anointed shirt to excite a moderate heat; and after that fall asleep again.. And so much for the inquiry concerning the last act of assimilation.

IX.

THE OPERATION UPON THE INTENERATION OF THE PARTS

WHICH HAVE BECOME DRY, OR THE SOFTENING OF THE BODY.

Transition.

Having already inquired of the internal inteneration of the body, which is performed by many tor;uous and circuitous methods both of alimentation and detention of the spirit, and therefore by slow degrees; I now come to the inteneration which takes places from without and at once, or the softening of the body.

The History.

1. In the fable of the restoration of Pelias to youth, Medea, when she pretended to set to work, proposed to accomplish it by cutting the body of the old man to pieces and boiling it up in a cauldron with certain drugs. Some boiling may perhaps be required there, but the cutting to pieces is unnecessary.

2. But yet the cutting to pieces (not indeed with a knife, but with the judgment) may in some sort be useful. For since the consistency of the bowels and the parts is very different, their inteneration cannot be performed by the same means; bait there must be a distinct cure for each part, besides the things which pertain to the inteneration of the whole mass of the body. Of this last however I will discourse first.

3. This operation (if it be possible) may probably be satis-fied by baths, anointings, and the Eke; with respect to which the following observations are to be noted.

4. We must not be too sanguine of accomplishing this object, because we see things done in the infusing and steepin; of inanimate bodies whereby they become tender; whereof I have brought forward some instances before. For this kind of operation is easier upon inanimate bodies, because they attract and suck in the liquors; but upon animate bodies it is more difficult, because in them the motion proceeds more to-wards the circumference.

5. The emollient baths therefore that are in use do more harm than good; for they rather draw out than press in, and rather loosen than consolidate the framework of the body.

6. The baths and anointings suitable to the present opera-tion of softening the body well and perfectly ought to have three properties.

7. The first and the principal one is, that they should con-sist of things which in their whole substance are like the flesh and body of man, and which at the same time feed and nourish from without.

8. The second is, that they be mixed with things of subtlety enough to make an entrance, and to insinuate and convey their nutritive power into the body.

9. The third is, that they receive some mixture (though far inferior to the former) with things that are astringent, not harsh or tart, but unctuous and comforting; that thus, while the two former are at work, the exhalation from the body, which de-stroys the virtue of the emollients, may be as far as possible stopped; and the motion to the inward parts on the other hand may, by the astriction of the skin and closing of the pores, be promoted and assisted.

10. Warm blood, either of man or animals, is most akin to the substance of the human body. But the conceit of Ficinus' to renew the strength of old men by sucking the blood out of the arm of a healthy young man is very foolish. For that which nourishes from within ought not to be equal or perfectly homogeneous to the body nourished, but in some degree in-ferior and subordinate, that it may be converted; but in ex-ternal applications the more similar the substance the better the consent.

11. It is an old tradition that a bath made of infant's blood cures the leprosy, and restores the putrid flesh; and some kings have incurred popular dislike on this very ground.'

12. It is told of Heraclitus that, being afflicted with the dropsy, he covered himself up in the warm belly of a newly slain ox.

13. The warm blood of kittens is used for erysipelas, and to restore the flesh and skin.

14. In amputations or great hemorrhages of any limb it is good to thrust the bleeding part into the belly of an animal which has been just cut up. For this has a great effect in stanching the blood; as the blood of the amputated member by consent sucks and forcibly draws to itself the fresh blood of the animal, whereby it is itself stopped and turned back.

15. It is a common practice in extreme and desperate diseases to cut pigeons in two, and apply them one after another to the soles of the feet of the sick man. This sometimes gives wonderful relief, which is commonly imputed to their ex-tracting the malignity of the disease. But in some way or other this treatment affects the head and comforts the animal spirits.

16. But since these bloody baths and anointings appear to us dirty and loathsome, we must look out for others which may be less disgusting and yet equally useful.

17. Nest therefore to fresh blood, the things like in sub-stance to the human body are nutritives ; namely, fat flesh, as beef, pork, and venison; oysters, milk, butter, yolks of eggs, fine wheat meal, wine sweetened with sugar or honey.

18. For mixtures to make impression, salts, especially bay-salt, will serve for all. Wine also (being full of spirit) is a useful vehicle of impression.

19. Astringents of the kind described, namely, unctuous and comforting, are saffron, mastich, myrrh, and myrtle-berry.

20. Of these, as far as I can judge, such a bath as we require may be successfully made. Physicians and posterity will dis-cover better components.

21. The operation will become far more powerful if the pro-posed bath (which I hold to be the principal thing) be attended by a course and order of four operations.

22. First, before bathing, rub the body and anoint it with oil mixed with some thickening substance, that the power and moistening heat of the bath, rather than the watery part, may enter the body. Next, get into the bath, and remain there about two hours. After the bath cover the body with a plaster of masticb, myrrh, gum-dragon, diapalma, and saffron, to keel) in the perspiration as much as possible, till the soft matter has by degrees become solid, and keep it on for twenty-four hours or more. Lastly, after taking off the plaster, anoint the body with a mixture of oil. saffron, and salt. Renew the bath with the plaster and unction as before every fifth day, and let the process of softening the body continue for a month.

23. While this softening process is going on, I hold it to be useful, proper, and. agreeable to this intention, to nourish the body well, to keep it from cold air, and to drink nothing that is not warm.

24. .But this is one of the things (as I gave notice at first) which I have not proved by trial, but only set down.with a view to the end aimed at. For having set up the goal I hand on the lamp to others.

25. Warm and cherishing applications from living bodies are not to be neglected. Ficinus' says, and that not in joke, that the laying of the young maid in David's bosom would have done him good, but that it came too late. He ought how-ever to have added that the maid, like the Persian virgins, should have been anointed with myrrh and the like, not for the pleasure of it, but to increase the cherishing virtue from the living body.

26. Barbarossa in his last days, by the advice of a Jewish physician, continually applied young boys to his stomach, to warm and cherish it. Some old men likewise apply puppies, which are animals of the hottest kind, to their stomachs at night.

27. There is an account tolerably certain, and with the authority of many names, that some men with deformed noses, tired of being laughed at, have cut off the eacrescences and shoots, and having made an incision in their arms sewed them up therein for a time, and thence obtained more comely noses. If this is true it plainly shows the consent of flesh to flesh, especially in live flesh.

28. With regard to the particular inteneration of the prin-cipal viscera, namely, the stomach, lungs, liver, heart, brain, spinal marrow, reins, gall, entrails, veins, arteries, nerves, cartilages, and bones, it would take too long to inquire and give rules concerning them, seeing I am not now prescribing a course of practice, but only certain indications thereto.

x.

THE OPERATION TO PURGE AWAY THE OLD JUICE AND TO

SUPPLY NEW, OF PERIODICAL RENOVATION.

History.

Although the things I shall here set down have been mostly touched on before, yet seeing that this is one of the principal operations, I will handle them again a little more fully.

1. It is certain that worn out draught oxen being turned into new and fresh pastures recover young and tender flesh. This is proved by the eating; and therefore it is evident that inteneration of the flesh is not difficult; and it is probable also that this inteneration of the flesh, if often repeated, will likewise reach the bones, membranes, and the like.

2. It is certain that the diets now in use, especially of guaiacum, sarsaparilla, China-root and sassafras, if continued for a long time, and according to strict rules, first attenuate all the juice of the body, and then consume and absorb it. And this is shown very clearly in venereal diseases, which when they have even got so far as to produce gummosities, and have devoured and corrupted the inner juices of the body, may still be cured by these diets. Again, it is equally manifest that men who have grown thin, pale, and cadaverous by these diets, soon after gain fatness and colour, and are evidently renewed. Wherefore in old age, diets of this kind, used every two years, would I think be useful to my intention, like the casting of the skin in serpents.

3. Let me not be accounted one of the heretics called Cdthari, if I affirm confidently that purgings often repeated, and made familiar to the body, do more to lengthen life than exercises and perapirations. But this must needs be so, if my previous position be admitted, that anointings of the body, filling up the pores externally, exclusions of the air, and detentions of the spirit in the mass of the body, contribute greatly to longevity. For it is most certain that by outward sweats and perapirations, not only the humours and ezcre-mentitious vapours are exhaled and consumed, but with them also the juices and good spirits, which are not so easily re-stored; but this is not the case in purgings (unless they be very violent), since they act principally upon the humours. The best purgings for this intention are those which are taken a little before meals, because they dry the body less; and there-fore they should consist of such purgatives as least disorder the stomach.

The intentions of these proposed operations are, I think, most true; and the remedies faithful to the intentions. And although many of them may appear very common, yet it would be scarce believed with how much care and choice they have been examined; that they might be (the object of the intention always secured) both safe and effectual. Experience however will both prove and advance this matter. But such in all things are the works of the more prudent kind of counsel; admirable in effect, excellent in order, common-place in the means employed.

THE PORCHES OF DEATH.

In connection I now come to the inquiry concerning the porches with the 15th enicie or in- of death; that is, of the things which happen to men quirt'.

Transition. both a little before and a little after the point of death; that seeing that there are many paths which lead to death, we may know what are the common issues of them all, especially in deaths caused rather by a destitution of nature than by violence; though of these likewise some notice must be inserted, by reason of their connection with the subject.

The History.

1. The living spirit seems to require three things for its subsistence; namely, suitable motion, moderate coolness, and proper aliment. Flame appears to require only two of these; namely, motion and aliment; because flame is a simple and spirit a compound substance, insomuch that if it approach too near to the nature of flame it destroys itself.

2. Flame likewise, as Aristotle' well observed, is extinguished and overpowered by a greater and more powerful flame; much more the spirit.

3. Flame, if it be too much compressed, is extinguished; as may be seen by putting a glass over a candle; for the air expanded by the heat compresses the flame, and thereby lessens and extinguishes it. Neither will the flame catch in grates where the fuel is pressed close together without leaving any space between the parts.

4. Ignited bodies are also extinguished by compression; for if you press a burning coal hard with the tongs or with your foot the flame is immediately put out.

5. But to pass on to the spirit. Blood or phlegm entering into the ventricles of the brain causes instantaneous death, since the spirit has not space to move.

6. A violent contusion of the head likewise causes sudden death, the spirits being straitened in the ventricles of the brain.

7. Opium and other strong narcotics congeal the spirit and deprive it of motion.

8. A poisonous vapour that is directly hostile to the spirits causes sudden death; as in deadly poisons which operate by what is called a specific malignity; for it strikes the spirit with such aversion that it will no longer move nor rise against so deadly an enemy.

9. Extreme drunkenness or surfeiting likewise sometimes cause sudden death, the spirit being crushed not so much. by the density or malignity of the vapour (as in opium and malignant poisons) as by the quantity of it.

10. Extreme grief and fear, especially if sudden (as the news of unexpected misfortune), sometimes produce sudden death.

11. Too great an expansion as well as too close a compression of the spirits is likewise fatal.

12. Many have died from great and sudden joys.

13. Great discharges, as the flow of water in cuttings for the dropsy, and much more, great and sudden hemorrhages, are often followed by sudden death. And this takes place from the mere horror of vacuum in the body; all the parts, and the spirit among them, rushing at once to fill the empty spaces. With respect to the slower fluxes of blood; the matter is referred to the want of aliment, not to the rushing back of the spirit. And so much for the motion of the spirit when either by over-compression or over-discharge it produces death.

14.1 come now to the want of coolness. Prevention of respiration causes sudden death, as in all suffocation or stran-gulation; yet this should not be attributed so much to the stoppage of motion as to the stoppage of refrigeration, because air when too hot, though it be freely drawn in, is no less suffo-cating than if respiration were stopped; as we see in persons who have sometimes been suffocated by burning coals or charcoal, or walls newly whitewashed, in close rooms where a fire has been lighted; a kind of death which the emperor dovinian is said to have died. The same happens likewise from the overheating of dry baths; as was practised in the death of Fausta, wife of Constantine the Great.'

15. The intervals at which nature repeats the act of inspira-tion, and desires to expel the foul air received into the lungs and to take in fresh, are very short, - scarce the third part of a minute.

16. Again, the pulsation of the arteries and the contraction and dilatation of the heart is a motion three times more rapid than respiration; so that if it were possible without hindering respiration to stop this motion of the heart, death would ensue quicker than by strangulation.

17. Use and custom have however some control over this natural action of respiration, as appears in the Delian divers and pearl-fishers, who by continual practice can hold their breath at least ten times longer than other men.

18. Some animals even among those who have lungs can hold their breath longer than others, according as they require a greater or less degree of refrigeration.

19. Fish require less refrigeration than land animals; yet they require some, and receive it through their gills. And as land animals cannot bear a too hot or close air, so likewise fish are suffocated in water if it be totally and long frozen.

20. If the spirit is assaulted by another heat far stronger than its own, it is dissipated and destroyed. For if it can-not bear its own heat without receiving refrigeration, much less can it endure a strange heat that is more intense. This is visible in burning fevers, when the heat of the putrefied humours exceeds the natural heat so much as to quench or dissipate it.

21. The wont and use of sleep is likewise referred to re-friaeration. For as motion attenuates and rarefies the spirit and stimulates and intensifies the heat thereof, so on the other hand sleep pacifies and subdues its motion and discursive action. For although sleep strengthens and furthers the actions of the parts and the non-vital spirits and all motion towards the circum-ference of the body, yet it greatly calms and lulls the proper motion of the living spirit. Now human nature requires sleep regularly once in the twenty-four hours, and that for five or six hours at least; though in this respect also there are some-times miracles of nature; as Mmcenas is said not to have slept for a long time before his death.' And so much for the want of refrigeration for the preservation of the spirit.

22. With regard to the third want, namely, that of aliment, it seems to belong more to the parts than to the living spirit;for a man may easily believe that the living spirit subsists in identity, and not by succession or renovation. As for the rational soul in man, it is most certain that it is not propagated, nor subject either to repair or death. Men talk also of the natural spirit of animals and even of vegetables, which dif-fers from the other soul both in essence and in form. For from the confusion between them has sprung the doctrine of metempsychosis and innumerable conceits of heathens and heretics.(Pliny, vil. 52.)

23. The human body requires renovation by aliment regu-larly once a day. Men in good health can scarce bear three days' fasting; but training and custom even here have no little effect. To men out of health fasting is less injurious. And as exercise demands more nourishment, so likewise sleep to a certain extent supplies it. There are some few instances of men who, by some miracle of nature, have been found to live a considerable time without meat and drink.

24. Dead bodies, if not prevented by putrefaction, last a long time without much decay; but live bodies, as has been said, cannot, unless they receive alimentation, last more than three days. This shows that this rapid consumption is the work of the living spirit, which either repairs itself, or makes it neces-sary for the parts to repair themselves, or both. This is borne out also by that which was noted before, namely, that animals can go somewhat longer without aliment, if they sleep. Now sleep is nothing else than the retirement of the living spirit into itself.

25. Too continuous and copious an effusion of blood, such as sometimes takes place in hemorrhoids, sometimes in vomiting of blood from the opening or rupture of the inner veins, and sometimes in wounds, causes speedy death; for the blood of the veins supplies the blood of the arteries, which again sup-plies the spirit.

26. A man who feeds twice a day takes no small quantity of meat and drink into his body; much more indeed than he discharges by stool, urine, or sweat. No wonder, perhaps you will say, seeing the rest is turned into the juices and substance of the body. True; but reflect for a moment that this accession of food takes place twice a day, and yet the body is not. sur-charged. And similarly, though the spirit is repaired, yet it grows not immoderate in quantity.

27. It is of no use to have aliment at hand, if it be in a remote degree; but it should be of such a kind and so prepared and applied that the spirit can act upon it. The stick of a wax torch cannot continue the flame if wax be wanting, neither can men feed on herbs alone. And this it is which occasions atrophy in old age, namely, that although there be flesh and blood, yet the spirit has become so scanty and thin, and the juices and the blood are so exhausted and obstinate, that they are not equal to alimentation.

28. Let us now sum up the things required for life, accord-ing to the common and ordinary course of nature. The spirit requires room for its motion in the ventricles of the brain and the nerves perpetually; pulsation of the heart every third part of a moment; respiration every moment; food and sleep once in three days; power of alimentation after the age of about eighty years; and if any of these wants are not supplied death ensues. Therefore there appear plainly to be three porches of death; namely, destitution of the spirit, in the motion, refrigeration, and nourishment thereof.

Admonitions.

1. It would be an error to suppose that the living spirit, like flame, is perpetually generated and ex-tinguished, and is of no sensible duration. For even flame does this not of its own nature, but because it lives among things hostile to it, since flame within flame is durable. But the living spirit lives among things that are friendly and obsequious. Therefore, whereas flame is a momentary and air a fixed substance, the living spirit partakes of the nature of both.

2. The present inquiry, as was observed at first, does not relate to the extinction of the spirit by the destruction of the organs through disease and violence; although this also terminates in the same three porches. And so much for the form of death.

29. There are two great precursors of death, the one sent from the head, the other from the heart, namely, convulsions and extreme labour of the pulse; for that

deadly hiccough is it-self a kind of convulsion. But this labouring of the pulse has a remarkable quickness, because on the point of death the heart trembles so violently that contraction and dilatation are almost confounded. But together with this quickness there is a feebleness and lowness, and often a great intermission in the pulse, the motion of the heart failing, and being no longer able to recover itself stoutly and regularly.

30. The immediate signs which precede death are, great restlessness and tossing of the body, fumbling of the hands, hard clutching and grasping, teeth firmly set, a hollow voice, trembling of the lower lip, pallor of the face, a confused memory, loss of speech, cold sweats, elongation of the body, raising up the white of the eyes, alteration of the whole countenance (as the nose becoming sharp,- the eyes hollow, and the cheeks sinking in), contraction and rolling of the tongue, coldness of the extremities, in some a discharge of blood or seed, a shrill cry-, thick breathing, falling of the lower jaw, and the like.

31. Death is succeeded by deprivation of all sense and motion as well of the heart and arteries as of the nerves and limbs, by inability of the body to support itself upright, by stiffness of the nerves and parts, by loss of all warmth, and soon after by putrefaction and stench.

32. Eels, serpents, and insects move a good while in all their- parts after being cut in pieces; so that countrymen ima-gine that the different parts'are trying to unite again. Birds likewise flutter for a little after their heads are cut off; and the hearts of animals beat for a long time after being torn out. Indeed, I remember to have seen the heart of a man who had his bowels torn out (the punishment with us for high treason), which on being cast according to custom into the fire, leaped up at first about a foot and a half high, and then by degrees.to a less height, for the apace, as I remember, of seven or eight minutes. There is likewise an old and trustworthy tradition of an ox bellowing after his bowels were torn out. But there is a more certain report of a man, who having undergone this said punishment for high treason, when his heart had been torn out and was in the bands of the executioner, was heard to utter three or four words of prayer. This I say is more credi-ble than the story of the sacrificed ox; because the friends of such criminals usually give money to the executioner to do his office as quickly as possible, and so put them sooner out of pain; whereas in sacrifices I do not see why the priest should use any such despatch.

33. To recover persons from swoons and sudden fits (of whom many, without relief, would otherwise die), the follow-ing remedies are used; namely, giving them waters distilled from wine (which are called hot and cordial waters), bending the body forward, close stopping of the mouth and nostrils, bending and twisting the fingers, tearing out the hair of the beard or head, rubbing of the parts, especially the face and extremities, a sudden sprinkling of cold water on the face, sudden and shrill noises, holding rose-water and vinegar to the nose in fainting fits;

burning feathers or cloth in hysterics; but in apoplectic fits the best thing is a heated frying-pan. A close embrace of living bodies has likewise been of service to some.

34. There have been many instances of men who have been left for dead, laid out, and carried forth to burial; nay, of some who have been actually buried; that have yet come to life again. In the case of those who have been buried, this has been ascertained, on opening the grave, from the wounded and bruised state of the head, by reason of the body striving and tossing in the coffin. The most recent and memorable instance thereof was the subtle schoolman Duns Scotus, who having been buried in the absence of his servant (who appears to have known the symptoms of these fits), was by him afterwards disinterred and found in this state. And a similar thing hap-pened in our time to an actor buried at Cambridge. I remember to have heard of a gentleman who, being curious to know what the sensation of banging was, hung himself by mounting on a stool and then dropping himself off, thinking of course that he would be able to regain the stool as soon as he liked; but this he was unable to do, and he was only released by a friend who was present. On being asked what he had suffered, he said that he felt no pain, but that at first he saw round about him the appearance of fire burning, which was succeeded by an intense blackness or darkness, and then by a kind of pale blue or sea-green colour, such as is often seen also by fainting persons. A physician still alive told me that by the use of frictions and warm baths he had recovered a man who had hung himself and been suspended for half an hour, and be made no doubt of being able to restore to life any one who had been suspended for the same time, provided his neck had not been broken by the shock of the first drop.

THE DIFFERENCES BETWEEN YOUTH AND OLD AGE.

In connection 1. The scale or succession of stages in the human vatic the Itch

Article of the this conception, quickening in the womb, the Inquiry,.birth, nourishment at the breast, weaning, beginning to feed upon such food and drink as are given to infants,, cutting the first teeth about the second year, beginning to walk, beginning to speak, putting forth the second teeth about the seventh year, puberty about the twelfth or fourteenth year, power of generation and menstrual flux, growth of hair on the legs and arms, growth of beard, increase of stature all this time, and sometimes longer, fulness and perfection of strength and activity, grey hairs and baldness, cessation of the menstrua and of the generative power, tendency to decrepitude and a three- legged animal, death. In the mean time the mind also has its periods, though they cannot be described by years; as a -failing memory and the like, of which hereafter.

2. The differences between youth and old age are these: A young man's skin is even and smooth, an old man's dry and wrinkled, especially about the eyes and forehead; a young man's flesh is soft and tender, an old mans hard; youth has strength and activity, old age decay of strength and slowness of motion; youth has a strong, old age a weak digestion; a young man's bowels are soft and succulent, an old man's salt and parched; in youth the body is erect, in old age bent into a curve; a young man's limbs are firm, an old man's weak and, trembling; in youth the humours are bilious and the blood hot, in old age the humours are phlegmatic and melancholy, and the blood cold; a young man's sexual passions are quick, an old man's slow; in youth the juices of the body are more roscid, in old age more crude and watery; in youth the spirit is plenti-ful and effervescent, in old age poor and scanty; in youth the spirit is dense and fresh, in old age eager and rare; in youth the senses are quick and entire, in old age dull and im-paired; a young man's teeth are strong and perfect, an old man's weak, worn, and falling out; a young man's hair is coloured, an old man's (whatever colour it formerly was) white; youth has hair, old age baldness; in youth the pulse beats stronger and quicker, in old age weaker and slower; a young man's illnesses are more acute and curable, an old man's chronic and hard to cure; in youth wounds heal fast, in old age slowly; a young man's cheeks are fresh-coloured, an old man's pale or ru-bicund, and the bloo3 thick; youth is less troubled with rheums, age more so. Neither, as far as I know, does age bring any improvement to the body unless it be sometimes in fitness. The cause whereof is obvious; namely, that in old age the body nuither perspires nor assimilates well; and fatness is nothing else than exuberance of aliment over and above that which is discharged or perfectly assimilated. Some old men likewise have an increase of appetite by reason of the acidity of the humours, though the digestion becomes worse. But all these things that I have here mentioned the physicians will idly enough refer to the diminution of the natural heat and the radical moisture, things worthless for use. This much is certain, that in the coming on of years dryness precedes cold-ness, and that bodies in the highest state of heat decline to dryness, and coldness follows after.

3. Next in order comes the consideration of the affections of the mind. I remember when I was a young man at I'oictiers in France that I was very intimate with a young Frenchman of great wit, but somewhat talkative, who afterwards turned out a very eminent man. He used to inveigh against the manners of old men, and say that if their minds could be seen as well as their bodies, they would appear no less deformed; and further indulging his fancy, be argued that the defects of their minds had some parallel and correspondence with those of the body. To dryness of the skin he opposed impudence; to hardness of the bowels, hardness of the heart; to blear eyes, envy, and the evil eye; to sunken eyes and bowing of the body to the ground, atheism (for they no longer, he says, look up to heaven); to the trembling of the limbs, vacillation of purpose and inconstancy ; to the bending and clutching of the fingers, rapacity and avarice; to the tottering of the knees, timidity; to wrinkles, cunning and crooked ways; and other parallels which do not now occur to me. But to be serious; youth has modesty and a sense of shame, old age is

somewhat hardened; a young man has kindness and mercy, an old man has become pitiless and callous; youth has a praiseworthy emulation, old age an ill-natured envy; youth is inclined to religion and devotion by reason of its fervency and inexperience of evil, in old age piety cools through the lukewarmness of charity and long intercourse with evil, together with the difficulty of believing.; a young man's wishes are vehement; an old man's moderate; youth is fickle and unstable, old age more grave and constant; youth is liberal, generous, and philan-thropic, old age is covetous, wise for itself, and self-seeking; youth is confident and hopeful, old age diffident and distrustful; a young man. is easy and obliging, an old man churlish and peevish; youth is frank and sincere, old age cautious and re-served; youth desires great things, old age regards those that are necessary; a young man thinks well of the present, an old man prefers the past; a young man reverences his superiors, an old man finds out their faults; and there are many other distinctions which belong rather to manners thad the present inquiry. Nevertheless as old men in some respects improve in their bodies, so also in their minds, unless they are quite worn out. For instance, though less ready in invention, yet they are more powerful in judgment, and prefer a safe and sound to a specious course. They increase likewise in talka-tiveness and ostentation; for being less fit for action they look for fruit of speech; so it was not without reason that the poets represented Tithonus as transformed into a grasshopper.

PROVISIONAL RULES.

CONCERNING THE DURATION OF LIFE AND THE FORM OF DEATH.

RULE I.

There is no consumption, unless that which is lost by one body passes into another.

EXPLANATION.

In nature there is no annihilation; and therefore the thing which is consumed either passes into the air, or is received into some adjacent body. Whence we see spiders, flies, or ants, entombed and preserved for ever in amber, a more than royal tomb, although they are tender substances and easily disipate . But no air reaches them into which any of their parts can escape, and the substance of the aniber is so hete-rogeneous that it takes nothing from them. There would like-wise in my opinion be

a sim:lar effect if a stick, root, or the like were put into quicksilver. Wax, honey, and gum have an operation of the same kind, but only partial.

RULE II.

In every tangible body there is a spirit covered and enve-loped in the grosser body; and from this spirit consumption and dissolution take their origin.

EXPLANATION.

No known body in the upper parts of the earth is without a spirit, whether it proceed by attenuation and concoction from the heat of the heavenly bodies, o. by some other way. For the cavities of tangible things do not admit of a vacuum, but are filled either with air or the proper spirit of the thing. But thus spirit, whereof I am speaking, is not a virtue, nor an energy, nor an actuality, nor any such idle matter, but a body thin and invisible, and yet having place and dimension, and real. Neither again is this spirit air (no more than wine is water), but a rarefied body, akin to air, though greatly differing from it. Now the grosser parts of bodies, being of a sluggish and not very movable nature, would last for a long time, if this spirit did not disturb, agitate and undermine them, and prey upon the moisture, of the body, and whatever else it can turn into fresh spirit; after which both the pre-existing and the newly formed spirit gradually escape together. This is well exhibited by the diminution of weight in bodies dried by perspiration. For it must not be supposed that whatever is emitted either was spirit, when it had weight, or was other than spirit when it had flown.

RULE III.

The emission of the spirit produces dryness; the detention and working thereof within the body, either melts, or putrefies, or vivifies.

EXPLANATION.

There are four processes of the spirit, namely arefaction, melting, putrefaction and generation of bodies. Arefaction is not properly the work of the spirit, but of the grosser parts after the emission of the spirit; for upon this they contract themselves, partly to avoid a vacuum and partly from the union of homogeneous things together; as is shown in all things dried by age, and in the drier kinds of bodies which have passed through the fire, as bricks, charcoal, and bread. Melting is the work of the spirits alone, and that only when they are excited by beat; for then the spirits expanding themselves and yet not going forth, insinuate and spread themselves among the grosser parts, and make them soft and molten, as appears in metals and wag; for metals and other tenacious bodies are apt to restrain the spirit, and prevent it from rushing forth when excited. Putrefaction is the combined work of the spirit and the grosser parts. For the spirit (which held to-gether and kept in

order the parts of the body) having partly escaped, and partly become feeble, all things are dissolved and return to their heterogeneities, or elements; whatever spirit there was in the body is gathered to itself (whence putrefied bodies begin to have a foul odour); the oily parts are gathered to themselves (and hence putrefied bodies have a certain smooth-ness and unetuosity); the watery parts likewise to themselves; and the dregs to themselves (and hence the confusion in putre-fied bodies). Generation or vivification is likewise the combined work of the spirit and the grosser parts, but in a very different manner. For the spirit is entirely detained, but swells and moves locally; and the grosser parts are not dissolved, but fol-low the motion of the spirit, which as it were inflates and thrusts them out into various figures; whence proceeds that same gene-ration and organization. Vivification therefore always takes place in a matter tenacious and viscous, but at the same time soft and yielding, that there may be at once both a detention of the spirit, and a gentle yielding of the parts, as the spirit moulds them. And this appears in the matter of all things, as well vegetable as animal, whether generated from putrefaction or from seed; for there is manifest in them all a matter hard to break through, but easy to yield.

RULE IV

In all animate bodies there are two kinds of spirits; lifeless spirits, such as are in bodies inanimate, and in addition to them a living spirit.

EXPLANATION.

I have already observed that to procure long life the human body should be considered first as a body inanimate and unsupported by aliment; and secondly as a body animate and nourished; for the first consideration gives laws touching con-sumption, the second laws touching repair. We should know therefore that there are diffused in the substance of every part of the human body, as the flesh, bones, membranes, or-gans and the like, during lifetime, spirits of the same kind as those which exist in the same things, flesh, bones, mem-branes and the rest, when separated and dead; such like-wise as remain in the corpse. But the living spirit, though it governs them and has some agreement with them, is very different from them, being integral and self-subsisting. But between the lifeless and vital spirits there are two special dif-ferences; the one, that the lifeless spirits are not continued in themselves, but are as it were cut off and surrounded by the grosser body which intercepts them; as air is mixed up in snow or froth. But all the vital spirit is continued in itself, by certain channels through which it passes, without being totally intercepted. And this spirit likewise is of two kinds; the one merely branched, and permeating through small thread-like chan-nels; the other having a cell likewise, so that it is not only con-tinued in itself, but also collected in a considerable quantity, according to the proportion of the body, in some hollow space; and in this cell is the fountain of the streamlets which diverge from thence. This cell is chiefly in the ventricles of the brain, which in the lower animals are

narrow,; so that the spirits seem rather to be diffused over the body than seated in cells; as may be seen in serpents, eels and flies, the different parts whereof continue to move long after they are cut in pieces. So likewise birds quiver for some tine after their heads are cut off, because they have small heads, with small cells; but the nobler animals, and men most of all, have larger ventricles. The other difference between the spirits is, that the vital spirit has in it a degree of inflammation, and is like a breath compounded of flame and air, as the juices of animals contain both oil and water. But this inflammation supplies peculiar motions and faculties; for in-flammable smoke even before it catches fire is hot, rare, and movable, and yet it is a different thing after it has become flame. But the inflammation of the vital spirits is gentler by many degrees than the softest flame, whether of spirit of wine or other; and besides, it is largely mixed with an aerial substance, so as to be a mysterious combination of a flammeous and aerial nature.

RULE V

The natural actions are proper to the several parts, but they are excited and sharpened by the vital spirit.

EXPLANATION.

The actions or functions of the individual members follow the nature of the members themselves; as attraction, retention, digestion, assimilation, separation, excretion, perspiration; and even the sense itself, depend upon the properties of-the several organs, as the stomach, liver, heart; spleen, gall, brain, eye, ear, and the rest. But yet none of these actions would ever be set in motion without the vigour, presence, and heat of the vital spirit; as iron could not attract iron, unless it were excited by the magnet; and an egg could not be productive, unless the substance of the hen had been actuated by the treading of the cock.

RULE VI

The lifeless spirits are nearly of the same substance as the air; the vital spirits more akin to the substance of flame. -

EXPLANATION.

The explanation of the foregoing 4th rule is also a declaration of this; but further, it is the reason why all fat and oily sub-stances continue to exist long in their natural state; for neither does the air prey much upon them, nor have they much-desire to unite with the air. But the idea -that flame is lighted air is a vain conceit, seeing that flame and air are no less heteroge-neous than oil and water. When therefore this rule declares that the vital spirits approach nearer to the substance of flame, it must only be understood that they do this more than the lifeless spirits, and not that they pertain more to the nature of flame than of air.

RULE VII.

The spirit has two desires; one of multiplying itself, the other of going forth and congregating with its connaturals.

EXPLANATION.

This rule is understood of the lifeless spirits. For with regard to the second desire, the vital spirit has a special abhor-rence of leaving the body, seeing it has no connaturals near at hand. It may, perhaps, rush to the extremities of the body, to meet something that it loves, but, as I said before, it is loth to go forth. But the lifeless spirits, on the other hand, are possessed by both these desires. For as to the former, every spirit seated amongst the grosser parts dwells unhappily; and being in such solitude, where it finds nothing like itself, it the more strives to make and create something similar; and to increase its quantity, it works hard to multiply itself, and prey upon the volatile part of the grosser bodies. With regard to the second desire, namely, that of escaping and resolving itself into air, it is certain that all thin bodies (which are always movable move willingly to their likes when near at hand. One drop of water moves towards another, and flame to flame; but much more does this appear in the escape of the spirit into the external air, because it is not carried to a particle like itself, but to a very world of connaturals. In the meantime, it should be noted that the going forth and escape of the spirit into the air is a double action, arising partly from the appetite of the spirit, and partly from the appetite of the air ; for the common air is a needy thing, and seizes everything with avidity, as spirits, odours, rays, sounds, and the like.

RULE VIII.

Spirit detained, if it have no means of generating other spirit, softens likewise the grosser parts.

EXPLANATION.

Generation of new spirit does not take place except upon things which are in a degree near to spirit, as moist bodies are. If therefore the grosser parts wherein the spirit works are in a degree remote, the spirit, though it cannot convert them, yet does all it can to weaken, soften, and disperse them; so that though it cannot increase its quantity, it may nevertheless live more freely, and amidst things that are better disposed to it. But this aphorism is very useful to our end, because it tends to the inteneration of the hard and stubborn parts of the body by the detention of the spirit.

RULE IX.

The inteneration of the harder parts proceeds well when the spirit neither escapes nor generates.

EXPLANATION.

This rule solves the knot and difficulty in the operation of softening the body by the detention of the spirit. For if the spirit when detained in the body preys upon all things within, nothing is gained towards the inteneration of the parts in their substance, but they are rather wasted and corrupted. The spirits therefore besides being detained should be cooled and confined, that they be not too active.

RULE X

The heat of the spirit, to keep the body fresh, should be robust, but not eager.

EXPLANATION.

This rule likewise relates to the solution of the above-men-tioned difficulty, but it extends much further, for it describes what should be the temper of heat in the body to dispose it for longevity. And this is useful, whether the spirits are detained or not; for in any case the heat of the spirits should be such as rather to act upon the hard parts than prey upon the soft; for the former intenerates and the latter dries up. Besides, the same thing is good to perfect alimentation; for such a heat best excites the faculty of assimilation, and at the same time best prepares the matter to be assimilated. The properties of this kind of heat should be these: First, it should be slow, not sudden; secondly, it should not be very intense, but moderate; thirdly, it should be regular and not variable, that is, not alternately increasing and decreasing; fourthly, if it meets with any resistance it should not be easily stifled or depressed. This operation is very subtle, but as it is one of the most useful it should not be neglected; and in the remedies proposed to invest the spirit with a robust heat, or that which I call operative, not predatory, I have in some :measure answered this purpose.

RULE XI.

The condensation of the spirits in their substance tends to longevity.

EXPLANATION

This rule is subordinate to the preceding; for the spirit when condensed receives all the four properties of heat there mentioned. But the methods of condensation are to be found in the first of the ten operations.

RULE XII.

The spirit is more eager to escape and more predatory in large quantities than in small.

EXPLANATION.

This rule is self-evident, seeing quantity of itself regularly increases power; as may be seen in flames, that the bigger the flame the stronger it breaks out and the quicker it con-sumes. And therefore too great an abundance or exuberance of the spirits is very injurious to longevity; and such a supply only is needed as will suffice for the offices of life and the fur-nishing of proper reparation.

RULE XIII.

The spirit if equally diffused is less eager to go forth, and less predatory, than if it is distributed irregularly.

EXPLANATION.

Not only is a large quantity of spirits in proportian to the whole injurious to the duration of things, but also the same quantity if less distributed is in like manner injurious. There-fore the more the spirit is broken up and dispersed the less predatory it is; for dissolution begins wherever the spirit is most loose. And hence it is that exercise and frictions con-tribute much to longevity; for agitation is the best means of breaking up and intermingling things together in their smallest particles.

RULE XIV.

An irregular and subsultory motion of the spirits does more to hasten their emission and is more predatory than a constant and equal one.

EXPLANATION.

In inanimate bodies this rule is certain, for inequality is the mother of dissolution; but in animate bodies (where repair as well as consumption is regarded, and repair proceeds by-the. appetite of things, which again is sharpened by variety) it holds less strictly; yet here also it may be received with this qualifi-cation, that the variety be rather an alternation than a con-fusion, and as it were constant in inconstancy.

RULE XV.

The spirit in a body of firm texture is detained, though against its will.

EXPLANATION:

All things abhor a solution of their continuity, but in a degree proportioned to their density and rarity. For the more rarefied bodies are, the- smaller and. narrower are the passages into which they suffer themselves to be compressed; and therefore water will find a way where dust will not, air where water will not, and flame and spirit where air will not. But yet there is a limit to this; for the spirit is not so possessed with a desire of emission as to suffer itself to be too much discontinued, or to be driven into too .narrow pores or passages; and there-fore if the spirit be - enclosed in .a hard or an unctuous and tenacious body (which is not easily divided), it is completely bound, and as it were imprisoned, and gives up its desire- to issue forth. And hence we see that metals and stones require a long-time for their spirit to go forth, unless either the spirit be excited by fire, or the grosser parts be disunited by strong and corrosive waters. The like reason holds good of tenacious bodies, as gums, except that they are dissolved by a gentler heat. Accordingly hard juices of the body, a tight skin, and the like (which are procured by dryness of aliment, exercise, and coldness of the air) are good. for longevity, because they closely confine the spirit and prevent its emission.

RULE XVI.

In oily and fat things, though they be not tenacious, the spirit is detained willingly.

EXPLANATION.

The spirit, if it be neither irritated by antipathy to the body that encloses it, nor fed by too great a similitude of that body, nor solicited or excited by an external body, makes no great effort to go out. And oily bodies are without all these properties; for they are neither so hostile to the spirit as bard bodies, nor so similar as watery bodies, nor in good agreement with the air ambient.

RULE XVII.

A rapid escape of the watery humour preserves the oily longer in its existence.

EXPLANATION.

I have already observed that the watery, humours, as being of alike substance to the air, escape sooner; the oily, as having less agreement with the air, later. But since both humours are present in most bodies, it happens that the water does as it were betray the oily; for stealing off gradually it carries that off along with it. Therefore there is nothing better for the preservation of bodies than a gentle drying of them, such as may cause the watery humour to exhale without exciting the oily; for then the oily enjoys its proper nature. And this relates not to the prevention of putrefaction (though that likewise is a consequence), but to the preservation of freshness. And hence it is that gentle frictions and moderate exercises that promote perspiration rather than sweating are very conducive to longevity.

RULE XVIII.

Exclusion of the air contributes to longevity, if you guard against other inconveniences.

EXPLANATION.

I just before observed that the escape of the spirit is a double action, from the appetite of the spirit and of the air. If there-fore one of these is removed there is not a little gained; and this is chiefly to be expected from anointings. Notwithstand-ing it is attended by various inconveniences, the remedies whereof have been noted in the second of our ten operations.

RULE XIX

Youthful spirits introduced into an old body may shortly turn back the course of nature.

EXPLANATION.

The nature of the spirits is as it were the master-wheel which turns the other wheels in the body of man; and there-fore in the intention of longevity it ought to stand first. Moreover there is an easier and more expeditious way of altering the spirits than the other parts. For the operation upon the spirits is two-fold; the one by aliment, which is slow and as it were circuitous; the other (itself likewise two-fold) which is sudden, and goes at once to the spirits,-namely, by vapours or by the affections.

RULE XX.

Juices of the body somewhat hard and roscid conduce to longevity.

EXPLANATION.

The reason hereof is plain, seeing I before laid down that bard and oily or roscid bodies are dissipated with difficulty. There is however this difference (as was likewise noted in the tenth operation), that though a hard juice is less easily dis-sipated, yet it is at the same time less reparable. Here there-fore we have a convenience, coupled with an inconvenience, so that no great matter can be achieved thereby. But a roscid juice satisfies both operations; to this therefore we should more diligently apply ourselves.

RULE XXI.

Whatever penetrates by its rarity, and yet corrodes not by its acrimony, generates roscid juices.

EXPLANATION.

This rule is more difficult to practise than to understand.

For it is evident that whatever penetrates well, but yet with a sting or tooth (as all acrid and acid things do), leaves behind it wherever it passes some trace of dryness and separation, so that it indurates the juices and dislocates the parts. But contrariwise, things which penetrate from their rarity alone, as it were by stealth and insinuation, without violence, bedew and irrigate the parts in their passage. And of these not a few have been set down in the fourth and seventh operations.

RULE XXII.

Assimilation is best performed when all local motion is at rest.

EXPLANATION.

This rule has been sufficiently explained in the commentary on the eighth operation.

RULE XXIII.

Alimentation from without, at least otherwise than by the stomach, is very beneficial to longevity, if it can be effected;

EXPLANATION.

We see that all thins which are performed by nutrition take long circuits, but those done by embracing like substances (as is the case in infusions) require no long time. Therefore external alimentation would be very useful, and the more so, because in old age the digestive faculties fail; so that if there could be some auxiliary nutritions, by bathings, anointings, or even by clysters, these things conjoined might do much, which single are of less service.

RULE XXIV.

Where the digestion is weak to send forth the aliment, there the outward parts should be comforted, so as to attract it.

EXPLANATION.

This is not the same as was propounded in the preceding rule; for it is one thing to attract the external aliment inwards, and another to attract the internal aliment outwards. But they concur in this, that they both assist the weakness of the internal digestions, though by different ways.

RULE XXV.

All sudden renovation of the body is effected either by the spirits or by emollients.

EXPLANATION.

There are two things in the body, namely, spirits and parts; to both of which the way by nutrition is long; but the way to the spirits by vapours or the affections, and to the parts by emollients, is short. But it is to be carefully observed, that I do not at all confound external alimentation with mollifying; for it is not the intention of emollients to nourish the parts, but only to make them more ready to be nourished.

RULE XXVI

Softening of the body is performed by things of a like sub-stance, by things that insinuate themselves, and things that close the pores.

EXPLANATION.

The reason hereof is evident; for like substances properly soften, things which insinuate themselves conduct, and things which close the pores restrain, and keep in the perspiration, which is a motion opposed to softening. Therefore (as was described in the ninth operation) this softening cannot be well performed at once, but it must be by a course and order. First, by covering the body with some thick coating, so as to exclude the liquor; for an extraneous and gross infusion does not well consolidate the body, and that which enters it should be subtle and a kind of vapour. Secondly, by inteneration, through the consent of similar substances; for bodies when touched by things which agree well with them open them-selves and relax their pores. Thirdly, these insinuating things are conductors, which help to convey. similar substances into the body, and a mixture of gentle astringents meanwhile some-what checks perspiration. But, fourthly, comes that great astringency or closing of the pores by a thick .plaster, and after-wards in a gradual process by anointing; till the soft becomes solid, as was mentioned in its proper place.

RULE XXVII.

Frequent renovation of the reparable parts refreshes likewise those that are less reparable.

EXPLANATION.

In the introduction to this history, the way of death was said to be this, that the more reparable parts perish in the embrace of the less reparable; so that all our efforts are to be exerted to repair these less reparable parts. Admonished therefore by Aristotle's observation touching plants, namely, that putting out new branches

refreshes the trunk in the pas-sage of the juice, I conceive that there might be the same result if the flesh and blood of the human body were often renewed; that thence the bones themselves, the membranes, and other parts of a less reparable nature, might partly by the brisk passage of juices, and partly by the new covering of fresh flesh and blood, be watered and renewed.

RULE XXVIII.

Refrigeration which passes not through the stomach is useful to long life.

EXPLANATION.

The reason hereof is obvious; for as refrigeration, not tem-perate but powerful (especially of the blood), is very necessary to longevity, this can by no means be performed from within to the desired extent, without destroying the stomach and bowels.

RULE XXIX

The complication arising from the fact that consumption and repair are both the works of heat, is the greatest obstacle to longevity.

EXPLANATION.

Almost all great works are destroyed by a complication of natures, that which is beneficial in one respect being hurtful in another; so that herein there is need of an accurate judg-ment and a discreet practice. And this I have done, as far as the matter allows and I can at present devise, by separating kindly heats from hurtful, and the things which tend to both.

RULE XXX.

The cure of diseases requires temporary medicines; but longevity is to be procured by diets.

EXPLANATION.

Things which come by accident cease as soon as the causes are removed; but the continuous course of nature, like a flow-ing river, requires likewise a continual rowing or sailing against the stream; therefore we must work regularly by means of diets. Diets are of two kinds; set diets, which are to be used at certain times, and the common diet for daily life. And of these the former kind, that is, courses of medicine to be used for a time, are the more potent; for things that have power enough to turn back the course of nature are mostly too strong, and produce alterations too sudden to be safely taken into common use. Now, in the remedies proposed in confor-mity with these intentions, you will find only three set diets;

namely, an opiate diet, an emollient diet, and a diet ema-ciating and renewing. But amongst the things which I have prescribed for common diet and daily life the most efficacious are these, which likewise have nearly the same force as set diets, namely, nitre and its subordinates; government of the affections, choice of pursuits; refrige~rations which do not pass by the stomach; drinks that engender roscid juices; impregnation of the blood with some firmer substance, as pearls and woods; proper anointings to keep out the air and detain the spirit; applications of heat from without during the time of assimilation after sleep; caution with respect to such things as inflame the spirit and give it a predatory heat, as wines and spices; and a mode-rate and seasonable use of things which give a robust heat to the spirits, as saffron, cress, garlic, elecampane, and compound opiates.

RULE XXXI

The living spirit perishes immediately, when it is deprived either of motion, or of refrigeration, or of aliment.

EXPLANATION.

These are the three things which before I called the porches of death, and they are the proper and immediate passions of the spirit. For all the organs of the principal parts serve to perform these three offices; and again all destruction of the organs which causes death brings it to this, that one or more of these fail. Therefore all the rest are but different ways to death that end in these three. But the fabric of the parts is the organ of the spirit, as the spirit is the organ of the reasonable soul, which is incorporeal and divine.

RULE XXXII.

Flame is a momentary, air a permanent substance; the living spirits of animals are of a middle nature between the two.

EXPLANATION.

This matter requires a deeper investigation and a longer explanation than pertains to the present inquiry. In the mean-time it should be known that flame is being continually generated and extinguished, so that it is only continued by succession. But air is a permanent body that is not dissolved; for though new air be created out of watery moisture, yet the old air still remains; whence comes that surcharge of the air mentioned in the title concerning the Winds. But the spirit partakes of both natures, both of flame and air; as likewise its nourishers are oil, which is homogeneous to flame, and air, which is homogeneous to water. For the spirit is not nourished by the oily part alone, nor by the watery part alone, but by both together; and though air does not sort well with flame nor oil with water, yet in a mixed body they agree well enougb. Likewise the spirit gets from air its easy and

delicate impres-sions and receptions, but from flame its noble and powerful motions and activity. In like manner also the duration of the spirit is a compound thing, not so momentary as flame, nor yet so permanent as air. And it differs the more from the condi-tions of flame because flame itself is extinguished by accident, namely, by contraries and the hostile bodies that surround it, a condition and necessity whereto the spirit is not subject; and the spirit is repaired from the fresh and lively blood of the small arteries which are inserted into the brain, but this repair takes place according to its own manner, whereof I am not now speaking.