There are, therefore, no pre-exiſting germs, or germs infinitely contained within each other. But there is an organic matter diffuſed through all animated nature, which is always active, always tending to form, to aſſimilate, and to produce beings ſimilar to thoſe which receive it. The ſpecies of animals and of vegetables, therefore, can never be exhauſted: As long as individuals ſubſiſt, the different ſpecies will be conſtantly new; they are the ſame now that they were three thouſand years ago: The whole will perpetually exiſt by their own powers, unleſs they be annihilated by the will of their Creator.

THE

NATURAL HISTORY

OF

M A N.

SECT. I.

Of the Nature of Man.

THOUGH man be much intereſted in obtaining a knowledge of himſelf, yet I ſuſpect that he is better acquainted with every other object. Endowed by Nature with organs deſtined ſolely for our own preſervation, we employ them for the reception of external impreſſions only. Anxious to expand our external exiſtence beyond the limits of our powers, and to multiply the functions of our ſenſes, we ſeldom employ that internal ſenſe which reduces us to our true dimenſions, and diſtinguiſhes us from every other being. If, however, we are

desirous of knowing ourselves, we must cultivate this sense, by which alone we are enabled to form a dispassionate judgment concerning our nature and condition. But how shall we give to this sense its full extent and activity? How shall we emancipate the soul, in which it resides, from all the illusions of fancy? We have lost the habit of employing this sense; its activity is repressed by the tumult of corporeal sensations, and parched with the heat of our passions; the heart, the imagination, the senses, all conspire to annihilate its exertions. Unchangeable, however, in its nature, and invulnerable by its essence, it continues always the same. Its splendour may be obscured, without losing its force; it may enlighten us less, but it guides us with certainty. Let us collect those rays which it still emits, and the darkness which surrounds us will diminish; and, though the path should not be equally illuminated from one end to the other, we shall at least have a torch to prevent us from wandering.

The first and most difficult step, in arriving at a proper knowledge of ourselves, is to acquire distinct ideas of the two substances of which we are composed. Simply to affirm, that the one is immaterial, unextended, and immortal, and that the other is material, extended, and mortal, is only denying those qualities to the one, which we know the other possesses. What real knowledge can be acquired from this mode of

negation?

negation? Such negative expressions can communicate no positive idea. But, to say that we are certain of the existence of the former, and less assured of that of the latter; that the substance of the one is simple, indivisible, and has no form, because it manifests itself only by a single modification, which is that of thought; that the other is less a substance, than a subject capable of receiving species of forms relative to our senses, which are all as uncertain and as variable as the organs themselves, is advancing one step towards a distinct idea of the nature of the two substances: It is ascribing to both different and peculiar properties; it assigns to them positive qualities, and enables us to institute a comparison between them.

All our knowledge is ultimately derived from comparison. What is absolutely incomparable, must be incomprehensible. Of this God is the only example: He cannot be comprehended, because he can be compared with no other being. But every thing which is susceptible of being compared, and of being relatively viewed in different lights, becomes a source of human knowledge. The more subjects of comparison which any object affords, the means of forming a proper knowledge concerning it are proportionally increased and facilitated.

The existence of the soul is self-evident: To be, and to think, are, with regard to us, the same thing. This truth is more than intuitive: It is

independent of the ſenſes, of the imagination, of the memory, and of all our other relative faculties. But the exiſtence of our bodies, and of external objects, is doubtful to every unprejudiced reaſoner; for that extenſion in length, breadth, and thickneſs, which we call our bodies, and which ſeem to be ſo intimately connected with us, is nothing more than a relation of our ſenſes; and the organs of ſenſation themſelves are only certain affinities with the objects which affect them. Has the internal ſenſe, the mind, any thing common or ſimilar to theſe organs? Have the ſenſations produced by light or ſound any reſemblance to that ſubtile fluid which excites the idea of light, or to the vibration of the air which conveys to us the notion of ſound? Theſe effects reſult ſolely from the neceſſary and intimate relation that ſubſiſts between the eyes and ears and the different matters which act upon them. But, as we have demonſtrated, that there is no reſemblance between ſenſations and the objects which produce them, is not this a ſufficient proof that the nature of the ſoul is different from that of matter?

We may, therefore, conſider it as an eſtabliſhed point, that internal ſenſation is totally different from its cauſe; and we have already ſhown, that, if external objects exiſt, they muſt be very different from the ideas we form of them; becauſe ſenſation has not the moſt diſtant reſemblance to the objects by which it is excited.

May

May we not hence conclude, that the cauſes of our ſenſations neceſſarily differ from our notions concerning them? That extenſion which we perceive by the eye, that impenetrability of which we acquire the idea by touching, and all the other conſtituent properties of matter, may have no exiſtence; ſince our internal ſenſations of extenſion, impenetrability, &c. are neither extended nor impenetrable, and poſſeſs nothing in common with theſe qualities.

As the mind, during ſleep, is affected with ſenſations which are often different from thoſe excited by the actual preſence of the objects, is it not natural to think, that the preſence of objects is not neceſſary to the exiſtence of our ſenſations, and, conſequently, that both mind and body may exiſt independent of theſe objects? For, during ſleep and after death, the body has the ſame exiſtence as before, though the mind recogniſes not its exiſtence, and, with regard to us, the body entirely loſes its being. Now I aſk, if any object that can exiſt, and afterwards be no more, which affects us in a manner totally different from what it is, and from what it has been, can be ſo real as to leave no doubt of its exiſtence?

We may ſtill, however, believe, though we are uncertain, that ſomething exiſts without us; but we cannot heſitate concerning the real exiſtence of every thing within us. The exiſtence of the ſoul, therefore, is certain, and that of the

body ſeems to be doubtful. The mind has one mode of perception when we ſleep, and another when we are awake; after death, ſhe will perceive in a manner ſtill more different; and the objects of ſenſation, or matter in general, may then have no more exiſtence with regard to her, than our bodies, with which we have no farther connection.

But, though we admit the exiſtence of matter, and that it exiſts in the very manner we perceive it; yet, in comparing it with the mind, we ſhall find the latter endowed with qualities ſo oppoſite, that we cannot heſitate concerning the difference of its nature, and the ſuperiority of its rank.

It is impoſſible to recogniſe the mind under any other form than that of thinking, which is extremely general, ſimple, and uniform. This form is not diviſible, extended, impenetrable, nor poſſeſſes any other quality of matter. The mind, therefore, which is the ſubject of this form, muſt be indiviſible and immaterial. Our bodies, on the contrary, as well as all external objects, have many forms, each of which is compounded, diviſible, and deſtructible; and the whole are only relative to the different organs by which we perceive them. Our bodies, and matter in general, therefore, poſſeſs no conſtant, real, or univerſal properties, which can enable us to acquire a certainty of their exiſtence. A blind man has no idea of the images of bodies preſented

preſented to us by means of light. A leper, whoſe ſkin was inſenſible, could have none of thoſe ideas which originate from the ſenſe of feeling. A deaf man knows nothing of ſound. Suppoſing a perſon to be ſucceſſively deprived of theſe three inſtruments of ſenſation, the mind would ſtill exiſt, and manifeſt itſelf by its own internal power of thinking. But, if you abſtract colour, extenſion, ſolidity, and all the other qualities of matter which have a relation to our ſenſes, matter, in this caſe, would be entirely annihilated: The mind, therefore, is indeſtructible; but matter may, and muſt, periſh.

The ſame reaſoning applies to the other faculties of the mind, when compared with the moſt eſſential properties of matter. The mind wills and commands; the body obeys as far as it is able: The mind can unite itſelf, in an inſtant, to the moſt diſtant or moſt elevated objects; and nothing can prevent this union, when ſhe commands it to be effected. But the body is incapable of uniting with any object; it is wounded by every thing that makes too cloſe an approach. Every thing reſiſts and becomes an obſtacle to its motions, which are naturally ſlow. Is this will, then, nothing more than a corporeal movement; and is contemplation only a ſimple contact? How could this contact be effected with remote objects, or abſtract ſubjects? Or how could this motion be inſtantaneouſly accompliſhed? Without ſpace and time,

the idea of motion is inconceivable. The will, therefore, if it be a motion, is not a material motion; and, if the union of the mind with its object be a contact, it muſt be a contact, or rather an intimate penetration, at a diſtance! qualities which are the reverſe of thoſe of matter, and which, of courſe, can belong only to an immaterial being.

But I am apprehenſive of having dwelt too long upon a ſubject, which, by ſome, may be regarded as foreign to the nature of this work. What connection, it may be ſaid, have metaphyſical remarks on the mind with natural hiſtory? If I were conſcious of abilities ſufficient for the diſcuſſion of a topic ſo elevated and extenſive, this reflection, I acknowledge, would not give me any uneaſineſs; and I have abridged my obſervations, ſolely becauſe I deſpaired of being able to comprehend a ſubject ſo immenſe, and ſo important in its nature. Why ſhould the nobleſt part of man be rejected from his hiſtory? Why thus prepoſterouſly debaſe him, by conſidering him merely as an animal, while his nature is ſo different, and ſo ſuperior to that of the brutes, that nothing but the moſt brutal ignorance could ever dream of confounding them?

Man, it is true, reſembles the other animals in the material part of his being; and, in the enumeration of natural exiſtences, we are obliged to rank him in the claſs of animals. But, in nature, there are neither claſſes nor genera; all are

are mere independent individuals. Claſſes and genera are only the arbitrary operations of our own fancy: And, though we place man in one of theſe claſſes, we change not his nature; we derogate not from his dignity; we alter not his real condition; we only aſſign him the firſt rank among beings which reſemble him ſolely in the material part of his exiſtence.

When we compare man with the animal creation, we find in both a material organized body, ſenſes, fleſh and blood, motion, and many other ſtriking reſemblances. But all theſe analogies are external, and authoriſe us not to pronounce, that the nature of man is ſimilar to that of the brute. In order to acquire a diſtinct idea concerning the nature of each, it is neceſſary that we ſhould have as complete a knowledge of the internal qualities of animals as we have of our own. But, as it is impoſſible to know what paſſes within animals, or how to rank or eſtimate their ſenſations, in relation to thoſe of man, we can only judge by comparing the effects which reſult from the natural operations of both.

Let us, therefore, conſider theſe effects; and, while we acknowledge all the particular reſemblances, we ſhall only examine ſome of the moſt general diſtinctions. The moſt ſtupid man, it will be admitted, is able to manage the moſt alert and ſagacious animal: He governs it, and makes it ſubſervient to his purpoſes. This he effects

defective, not in the mechaniſm of their organs, but in their intellectual powers.

Language implies a train of thinking; and it is for this reaſon that brute animals are incapable of ſpeech: For, though we ſhould allow them to poſſeſs ſomething ſimilar to our firſt apprehenſions, and to our moſt groſs and mechanical ſenſations, it is certain that they are unable to form that aſſociation of ideas in which alone the eſſence of reflection and of thought conſiſts. They can neither think nor ſpeak, becauſe they can neither join nor ſeparate ideas; and, for the ſame reaſon, they neither invent nor bring any thing to perfection. If they were endowed with the power of reflecting, even in the ſlighteſt degree, they would be capable of making ſome progreſs, and acquire more induſtry; the preſent race of beavers would build their houſes with more art and ſolidity than their progenitors; and the bee would daily improve the cell which ſhe inhabits: For, by ſuppoſing that this cell has all the perfection of which it is capable, we aſcribe to this inſect a genius and underſtanding ſuperior to the human, by which it is enabled, at one glance, to perceive the utmoſt point of perfection to which its work can be carried. But man never can attain a clear view of this point: Much time, reflection, and practice are neceſſary, before the meaneſt of our arts can be brought to maturity.

Whence proceeds this uniformity in all the operations of animals? Why does every ſpecies perform the ſame work in the very ſame manner? And why is the execution of different individuals neither better nor worſe than that of every other? Can there be a ſtronger proof that their operations are only the reſults of pure mechanical impulſe? If they poſſeſſed a ſingle ſpark of that inward light which illuminates mankind, we ſhould find variety, at leaſt, if not perfection, in their works; every individual would exhibit ſome difference in his mode of execution. But ſuch differences never appear: They all work upon the ſame plan; their mode of acting runs through the whole ſpecies, and is not peculiar to any individual. If, therefore, we aſcribe to animals a mind or ſoul, we muſt allow but one to every ſpecies, of which each individual has an equal ſhare: This ſoul would, of courſe, be diviſible, and, conſequently, material, and very different from ours.

Why, on the contrary, is ſo much variety exhibited in the operations of men? Why does ſervile imitation coſt us more labour than original deſign? Becauſe our ſouls are proper to us, and independent of any other; and becauſe we poſſeſs nothing common to the ſpecies, but the matter which conſtitutes our bodies, and by which alone we have any reſemblance to the brute creation.

If internal ſenſation depended on corporeal organs, ſhould not as great a variety appear in the operations of the ſame ſpecies of animals, as in thoſe of men? Would not thoſe endowed with finer organs build their neſts, and their cells, in a manner more ſolid, elegant, and commodious? If any individual had more genius than another, would it not be rendered conſpicuous by its mode of acting? But nothing of this kind is ever exhibited: The greater or leſſer perfection of corporeal organs, therefore, has no influence upon the nature of internal ſenſation. From this circumſtance, we may ſafely conclude, that animals poſſeſs no ſenſations of this kind; that they neither belong to matter, nor depend, as to their nature, upon the texture of corporeal organs; and of courſe that there is in man a ſubſtance totally diſtinct from matter, which is the ſubject and the cauſe that produce theſe ſenſations.

But theſe proofs of the immateriality of the human mind may be extended ſtill farther. We have often remarked, that Nature proceeds in her operations by imperceptible degrees. This truth, which otherwiſe admits of no exception, is here totally reverſed. Between the faculties of man and thoſe of the moſt minute animal, the diſtance is infinite. This is a clear proof, that the nature of man is different from that of the brute creation; that he himſelf conſtitutes a ſeparate claſs from which there are numberleſs

degrees

degrees of deſcent, before we arrive at the ſtate of the mere animal; for, if man were of the ſame rank with the animals, there would be in nature a certain number of beings leſs perfect than man, and ſuperior to any animal we are acquainted with; and thoſe intermediate beings would deſcend imperceptibly from man to the monkey tribes. But no ſuch beings exiſt. The paſſage is ſudden from a thinking being to a material one, from intellectual faculties to mechanical powers, from order and deſign to blind impulſe, from reflection and choice to ungovernable appetite.

This is a ſtrong indication of the excellence of our nature, and of the immenſe diſtance fixed by the bounty of the Creator between men and animals. Man is a reaſoning being; the animal is totally deprived of that noble faculty: And as there is no intermediate point between a poſitive and a negative, between a rational and an irrational animal, it is evident that man's nature is entirely different from that of the animal; that the latter only reſembles the former in the external or material part; and that, to form a judgment from this material reſemblance alone, is ſhutting our eyes voluntarily againſt that light which enables us to diſtinguiſh truth from falſehood.

Having conſidered the internal nature of man, and demonſtrated the immateriality of his ſoul, we ſhall next examine his external part, and

give

give the hiſtory of his body. In the preceding chapters, we have explained his formation and expanſion, and traced him to the very moment of his birth: Let us now run over the different ages of his life; and, after conducting him to that period when he is ſeparated from his body, we ſhall leave it to moulder in the common maſs of matter to which it originally belonged.

SECT. II.

Of Infancy.

NOTHING exhibits ſuch a ſtriking picture of weakneſs, of pain, and of miſery, as the condition of an infant immediately after birth. Incapable of employing its organs or its ſenſes, the infant requires every kind of ſuccour and aſſiſtance: It is more helpleſs than the young of any other animal: Its uncertain life ſeems every moment to vibrate on the borders of death. It can neither move nor ſupport its body: It has hardly force enough to exiſt, and to announce, by groans, the pain which it ſuffers; as if Nature intended to appriſe the little innocent, that it is born to miſery, and that it is to be ranked among human creatures only to partake of their infirmities and of their afflictions.

Let us not diſdain to conſider that ſtate in which our exiſtence commenced: Let us view human nature in the cradle; and, leaving the diſguſt that might ariſe from a detail of the cares which infancy demands, let us inquire by what degrees this delicate and hardly exiſting machine acquires motion, conſiſtency, and ſtrength.

An infant, at birth, paſſes from one element into another. When it eſcapes from the waters which ſurrounded it in the womb of the mother, it is expoſed to the air, and inſtantly feels the impreſſions of that active fluid. The air acts upon the olfactory nerves, and upon the organs of reſpiration. This action produces a ſhock, a kind of ſneezing, which expands the cheſt, and gives the air a free paſſage into the lungs, the veſicles of which it dilates. After the air remains for ſome time, it is heated and rarified to a certain degree, and the ſtimulus or ſpring ariſing from the dilatation of the fibres re-acts upon this rarified fluid, and expells it from the lungs. We will not here attempt to explain the cauſes of the alternate motion of reſpiration, but ſhall confine ourſelves to its effects.

This function is eſſentially neceſſary to the exiſtence of man and of many other animals. If reſpiration ceaſes, the animal muſt periſh; when once commenced, it never ſtops till death; and, after the fœtus begins to reſpire, it continues this action without interruption. It is probable, however, that the foramen ovale of the heart does not cloſe immediately after birth, and, conſequently, that part of the blood muſt paſs through that aperture. The whole blood, therefore, enters not, at firſt, into the lungs; and a new-born child may perhaps be deprived of air for a conſiderable time without ſuffocation. This conjecture

jecture ſeems to be confirmed by ſome experiments I lately made upon young dogs. I procured a pregnant bitch, of the large gray-hound kind, and, when juſt about to litter, I fixed her ſo in a bucket full of warm water, that her hinder parts were entirely covered. In this ſituation ſhe brought forth three puppies, which, after being diſengaged from their membranes, were immerſed in a fluid nearly of an equal temperature with that of the amnios. After aſſiſting the mother, and waſhing the puppies in this water, I ſuddenly removed them into a pail of warm milk, without allowing them time to reſpire. I put them into the milk, in preference to water, that they might have an opportunity of taking ſome food, if they found a deſire for nouriſhment. I kept them immerſed in the milk for more than half an hour; and, when taken out of it, all the three were alive. They began to breathe; and they diſcharged a quantity of fluid matter by the mouth. I allowed them to reſpire about half an hour, and again immerſed them in the warm milk, where they remained another half hour. I then took them out: Two of them were ſtill vigorous; but the third ſeemed to languiſh: I therefore ordered it to be carried to the mother, which, beſide the three brought forth in the water, had littered other ſix in the natural manner. The puppy which was born in the water, and had continued one half hour in warm milk, before it was allowed

to breathe, and another half hour after it had reſpired, ſeemed to be very little incommoded; for it ſoon recovered, and was as active and lively as thoſe which had received no injury. Of the ſix that were brought forth in the air, I threw away four; ſo that there remained only two with the mother, beſide the one that had been littered in the water. I continued my experiments upon the other two which had been twice immerſed in the milk: After allowing them to breathe about half an hour, I plunged them a third time into the milk, where they remained another half hour. Whether they ſwallowed any of the milk, I could not determine; but, when removed, they appeared to be nearly as vigorous as before their immerſion. Having carried them to the mother, however, one of them died that ſame day; but I know not whether its death was owing to ſome accident, or to the injury it received from being plunged into the milk, and deprived of air. The other lived as well as the firſt; and both grew up, and were equally vigorous as thoſe which had not been ſubjected to the experiment. I puſhed theſe trials no farther: But I learned enough to convince me, that reſpiration is not ſo indiſpenſibly neceſſary to the exiſtence of a new-born animal, as to an adult; and that, by employing certain precautions, it is, perhaps, poſſible to keep the foramen ovale open, and, by this means, produce excellent divers, or a ſpecies of amphibious animals, which

which would be able to live equally in air or in water.

The air, on its firſt entrance into the lungs, generally meets with ſome obſtacle, occaſioned by the fluid ſubſtance collected in the wind-pipe. This obſtacle is greater or leſs, in proportion to the viſcidneſs of the liquor. But the infant, at birth, raiſes its head, which formerly reclined on its breaſt; and, by this operation, the canal of the wind-pipe is lengthened; the air, of courſe, ruſhes in, forces this fluid into the cells of the lungs, which it dilates; and, in this manner, the mucous ſubſtance, which oppoſed the free paſſage of the air, is diffuſed through the whole ſubſtance of the lungs. The perpetual admiſſion of freſh air ſoon dries up this ſuperfluous moiſture; or, if it ſhould ſtill incommode the infant, it excites a cough, and is thrown off by expectoration, which generally runs out of the mouth, becauſe the child has not yet ſtrength enough to ſpit.

We can remember nothing that paſſes at this early period of our exiſtenee. It is, therefore, impoſſible to diſcover the feelings produced in the child by the firſt impreſſions of the air. But the cries and groans it utters immediately after birth, are certain indications of the pain occaſioned by the action of the atmoſphere. Till the moment of birth, the infant is accuſtomed to the mild warmth of a tranquil fluid. It is, therefore, conſonant to reaſon, that the action of a fluid

unequal in its temperature, is too violent for the lax and delicate fibres of a new-born infant. It is equally ſenſible of heat as of cold: In every ſituation it utters complaints; and pain appears to be its firſt and only ſenſation.

Moſt animals are blind for ſome days after birth. Infants open their eyes the moment they come into the world; but their eyes are fixed and dull: They have not that luſtre and brilliancy they afterwards acquire; neither have they thoſe motions which accompany diſtinct viſion. But they ſeem to feel the impreſſion of light; for the pupil contracts or dilates, in proportion to the quantity of light. A new-born infant cannot diſtinguiſh objects; becauſe the organs of viſion are ſtill imperfect: The cornea is wrinkled; and perhaps the retina is too ſoft and lax for receiving the impreſſions of external bodies, and for producing the ſenſations peculiar to diſtinct viſion.

The ſame remark may be applied to the other ſenſes. They have not yet acquired that force and conſiſtency which the operation of the ſenſes demand: And, even when they arrive at this ſtate, it is long before the ſenſations of the infant can be juſt and complete. The ſenſes are inſtruments of which we muſt gradually learn the uſe. That of viſion is the moſt noble, and the moſt wonderful; but, at the ſame time, it is the moſt uncertain and eluſory. The ſenſations produced by it, if not rectified every moment

ment by the ſenſe of touching, would uniformly lead us into falſe concluſions. The ſenſe of touching is the criterion of all the other ſenſes: It alone is eſſential to animal exiſtence, and is univerſally diffuſed through every part of the body. But even this ſenſe is imperfect at birth: A new-born infant, indeed, diſcovers ſymptoms of pain by its cries and its groans; but it has no expreſſion that indicates pleaſure. It begins not to ſmile in leſs than 40 days: It is about this time, likewiſe, that it begins to weep; for its former cries were not accompanied with tears. There are no veſtiges of the paſſions in the countenance of a new-born child. The features of the face have not acquired that conſiſtence and elaſticity which are neceſſary for expreſſing the ſentiments of the mind. All the other parts of the infant's body are extremely feeble; and their motions are awkward and ill-directed. It is unable to ſtand erect; its thighs and legs are ſtill bended, from the habit contracted while in the womb of the mother; it has not ſtrength to ſtretch out its arms, or to lay hold of any thing with its hands; and, if abandoned in this condition, it would remain on its back, without being able to turn to one ſide or another.

From theſe remarks, it appears, that the pain felt by infants recently born, and which they expreſs by crying, is only a corporeal ſenſation, ſimilar to that of other animals, who likewiſe cry the moment they are brought forth; and

that mental ſenſation commences not ſooner than 40 days after birth; for ſmiles and tears are the effects of two internal ſenſations, which both depend upon the action of the mind. The former is an agreeable ſenſation, which originates from the ſight or remembrance of a known and deſirable object. The latter is a diſagreeable agitation, compounded of ſympathy and anxiety concerning our own welfare. Both theſe paſſions preſuppoſe a certain degree of knowledge, and a power of reflecting, and of comparing ideas. Smiles and tears are expreſſions of pleaſure and pain peculiar to the human ſpecies; for the cries, the motions, and the other marks of bodily pains and pleaſures, are common to man and moſt of the other animals.

But we muſt now return to the material organs and affections of the body. The ſize of an infant born at the full time is generally about 21 inches, though ſome exceed, and others fall much below this ſtandard. The breaſt of a child of 21 inches, meaſured by the length of the ſternum, is about three inches, and only two, when the infant exceeds not 14 inches in length. At nine months, a fœtus generally weighs from 12 to 14 pounds. The head is large in proportion to the body; but this diſproportion gradually wears off, as the infant increaſes in ſize. The ſkin of a new-born child is very fine, and of a reddiſh colour, its tranſparency

parency allowing a ſlight tint of the blood to ſhine through. It is even alledged, that the redder the ſkin of an infant is at birth, it will afterwards become the fairer and more beautiful.

The form of the body and members of infants, recently after birth, is by no means perfect. The parts are too much rounded; and, even when the child is in high health, they have a ſwollen appearance. A kind of jaundice generally comes on at the end of three days; and, at the ſame time, there is milk in the breaſts of infants, which is ſqueezed out by the fingers. As the growth of the child increaſes, the ſuperfluous juices and ſwelling of the parts gradually diminiſh.

In ſome infants, a palpitation may be ſeen in the fontanella, or opening of the head; and, in every child, the beating of the ſinuſes, or arteries of the brain, may be felt at this place. Above this opening, a ſpecies of ſcurf appears, which is often very thick, and muſt be rubbed off with a bruſh, when it becomes dry. This matter ſeems to have ſome analogy to the horns of quadrupeds, which likewiſe derive their origin from an opening in the ſkull, and from the ſubſtance of the brain. We ſhall afterwards ſhow, that the extremities of the nerves become ſolid when expoſed to the air; and that horns, nails, claws, &c. are genuine productions of this nervous ſubſtance.

The

The fluid contained in the amnios leaves upon the infant's body a viſcid whitiſh matter, which is ſometimes ſo adheſive, that it requires to be diluted with ſome mild liquid before it can be removed. In this country, we always waſh the infant with warm liquors; but there are whole nations, who inhabit climates much colder than ours, where the infants are plunged into cold water as ſoon as they are born, without receiving the ſmalleſt injury. The Laplanders are even ſaid to leave their new-born infants in the ſnow till their reſpiration is almoſt ſtopped with cold, and then throw them into a warm bath. This rough treatment is continued three times every day for the firſt year: And, after that period, the children are bathed thrice a week in cold water. The inhabitants of the northern regions are firmly perſuaded that cold bathing makes men more healthy and robuſt; and, therefore, they inure their children to this habit from their very birth. We are, indeed, totally ignorant how far our bodies may be rendered capable of ſuffering, of acquiring, or of loſing by the power of habit. The ſavages in the iſthmus of America, when covered with ſweat, plunge themſelves into cold water with impunity: The women throw their drunk huſbands into the rivers, in order the more ſpeedily to remove the effects of intoxication: The mothers bathe in cold water along with their infants the moment after they are delivered; and yet

yet much fewer of them die of child-bearing than in other countries, where a practice of this kind would be regarded as extremely dangerous.

Infants, a few minutes after birth, and generally after feeling the heat of a fire, diſcharge urine, and likewiſe the meconium or excrement which had been formed in the inteſtines during their abode in the womb. But this laſt evacuation does not always happen ſo ſoon; and, when it is retarded during the firſt day, the child is often affected with cholic pains; the diſcharge muſt, therefore, be promoted by proper remedies. The meconium is black, and, when entirely purged off, the ſtools are of a whitiſh colour. This change generally happens on the ſecond or third day. The odour of the excrement becomes then more offenſive than that of the meconium; which is a proof that the bile, and other bitter humours of the body, begin to be mixed with the fæces.

This obſervation ſeems to confirm what was formerly advanced concerning the growth and nouriſhment of the fœtus. We then remarked, that the fœtus was nouriſhed by abſorption, and that it received no food by the mouth. This change in the odour of the excrement is a proof that the ſtomach and inteſtines of the fœtus have no action, or, at leaſt, that they act not in the ſame manner, as after the motions communicated to them by reſpiration; ſince it is only after this period that digeſtion, and the mixture of the

the bile and pancreatic juice with the food, takes place in the ſtomach and inteſtines. Thus, though the bile and pancreatic juice are ſecreted in the fœtus, theſe liquors remain in their reſervoirs, and paſs not into the inteſtines; becauſe, like the ſtomach, theſe reſervoirs have yet no motion or action ſufficient ſo make them empty their contents into the receptacles of the food.

Before the child is allowed to ſuck, we allow it time to diſcharge the ſlime and meconium in its ſtomach and bowels. As theſe ſubſtances might ſour the milk, and produce bad effects, we firſt give the child a little wine and ſugar, in order to fortify its ſtomach, and to promote ſuch evacuations as are neceſſary to prepare it for receiving and digeſting its food. Ten or twelve hours, therefore, ought to elapſe, before the child be allowed to ſuck for the firſt time.

The infant has hardly eſcaped from the womb of its mother, and enjoyed the liberty of ſtretching its limbs, when it is again condemned to a more cruel and unnatural bondage. The head of the little innocent is fixed; its legs are fettered; its arms are bound down to its ſides; and it is laced with bandages ſo ſtrait, that it cannot move a ſingle joint. It is a fortunate circumſtance, when the ſwaddings are not drawn ſo tight as to ſtop reſpiration, or when the midwife has the ſenſe to lay the miſerable captive on its ſide, that the natural moiſture may ſpontaneouſly flow from its mouth; for it is denied

nied the liberty of turning its head to facilitate this neceſſary diſcharge. Is it not an inſtance of ſuperior wiſdom in thoſe nations, who ſimply clothe their infants, without tormenting them with ſwaddling-bands? The Siameſe, the Indians, the Japaneſe, the Negroes, the ſavages of Canada, of Virginia, of Braſil, and almoſt all the inhabitants of South America, lay their infants naked into hanging beds of cotton, or put them into cradles lined with fur. Theſe practices are both ſenſible and humane: The reſtraint of ſwaddling-bands muſt be painful. The efforts made by infants to diſentangle themſelves have a more direct tendency to diſtort their members, than any poſitions they could aſſume, if left in the full poſſeſſion of liberty. Swaddling-bands may be compared to the ſtays worn by young girls, which occaſion many more deformities and diſeaſes than they are intended to prevent.

If the efforts for liberty made by infants thus fettered be hurtful, the inactivity to which they are condemned is, perhaps, ſtill more noxious. The want of exerciſe retards the growth of their members, and diminiſhes the ſtrength of their bodies; and, of courſe, thoſe children who are allowed full freedom of motion will be the moſt vigorous and healthy. It was this motive that induced the Peruvians to leave the arms of their infants perfectly looſe, in a wide ſwathing-bag: Afterwards, when their children grew older, they

they put them up to the middle in a hole dug out of the earth, and lined with linen; their arms, by this contrivance, were at full liberty; and they could move their heads, and bend their bodies, without falling, or hurting themſelves. As ſoon as they were able to ſtep, the breaſt was preſented to them at a little diſtance, to entice them to walk. The children of Negroes are often expoſed to greater difficulties before they can approach the nipple; they cling round one of the mother's haunches with their knees and legs; they adhere ſo faſt, that they ſupport themſelves without the aſſiſtance of the mother; they lay hold of the breaſt with their hands; and they continue to ſuck without inconvenience or danger of falling, though the mother moves about or works at her ordinary labour. Theſe children begin to walk or rather to creep, on their hands and knees, at the end of the ſecond month; and, by exerciſe, they acquire the faculty of running, in this ſituation, with nearly equal quickneſs as they do upon their feet.

Infants, recently after birth, ſleep much; but their ſleep is often interrupted. As they likewiſe require frequent nouriſhment, they ought to have the breaſt once every two hours during the day, and, in the night, as often as they awake. At firſt, they ſleep almoſt continually; and they ſeem never to awake but when ſtimulated by hunger or pain: Their ſleep, therefore, generally terminates by a fit of crying. As, in the cradle,

cradle, they are obliged to lie in the ſame poſition, and are chained down by bandages, this ſituation ſoon becomes painful. They are beſides often wet and chilled by their excrements, the acrimony of which irritates their delicate and ſenſible ſkin. In this condition, the efforts of children are extremely feeble; and their calls for relief are expreſſed by cries and groans. This ſuccour ſhould always be ſpeedily adminiſtered; or rather the inconveniences they feel ſhould be prevented, by frequently changing part of their clothing. The ſavages are ſo attentive to this article, that, though they cannot change their furs ſo often as we do our linen-cloths, yet they ſupply this defect by employing other ſubſtances, of which they have no occaſion to be ſparing. In North America, they put wood duſt, which they obtain from trees that have been corroded by worms, into the bottom of the cradle, and renew it as often as neceſſary: The children are laid upon this powder and covered with ſkins. Though this powder, may, perhaps, be as ſoft as our down-beds; yet they uſe it not for the purpoſes of delicacy, but becauſe it quickly abſorbs moiſture of every kind. In Virginia, they place the child naked upon a board covered with cotton, and provided with a hole for the paſſage of the excrement. The cold in this country is unfavourable to ſuch a practice; but it is almoſt general in the eaſt of Europe, and particularly in Turkey. This pre-

caution has another advantage; it precludes all kind of care, and prevents the dreadful effects which too commonly reſult from the common negligence of nurſes. Nothing inferior to maternal affection can ſupport that perpetual vigilance and minute attention which the infantine ſtate requires. With what propriety, then, can ſuch exertions be expected from ignorant and mercenary nurſes?

Some nurſes deſert their children for ſeveral hours without feeling the ſmalleſt anxiety: Others are ſo callous as not to be affected with their cries. In this ſituation the unfortunate infants ſeem to deſpair; they exert all the force of which they are capable; and their cries only ceaſe when their ſtrength is exhauſted. This exceſſive crying either occaſions diſeaſes, or at leaſt throws them into a ſtate of laſſitude, which deranges their conſtitutions, and may have ſome influence on their tempers. Indolent nurſes are guilty of another abuſe: Inſtead of employing proper means for pleaſing the child, they rock it violently in the cradle. This agitation confuſes the brain, ſtops the crying, and, if long continued, ſtuns the child into ſleep. But this forced and unnatural ſleep is only a palliative; it removes not the original cauſe of complaint. Long and violent rocking, on the contrary, may diſorder the ſtomach and head, and lay the foundation of future diſorders.

Before children are put into the cradle we ought to be certain that they want nothing; and they ſhould never be rocked with ſuch violence as to confound or ſtun them. If they ſleep not ſufficiently, a gentle and equal motion may be employed. Neither ſhould they be often rocked; for, if they be once accuſtomed to this motion, they will not afterwards ſleep without it. Though children, when in health, ſhould ſleep long without the aſſiſtance of art; yet their conſtitution may be injured by too much ſleep. In this caſe, they ſhould be rouſed by gentle motion, by ſoft and agreeable ſounds, and by amuſing them with brilliant objects. This is the period when they receive the firſt impreſſions from the ſenſes, which are, perhaps, of more importance during life than is generally imagined.

Infants always direct their eyes to the lighteſt part of a room; and if, from the child's ſituation, one eye only can ſee the moſt luminous part, the other, for want of equal exerciſe, will not acquire equal ſtrength. To prevent this inconvenience, the foot of the cradle, whether the light proceeds from a window or a candle, ſhould be placed oppoſite to the light: In this poſition both eyes receive the light at the ſame time, and conſequently acquire, by exerciſe, an equal degree of ſtrength: If one eye acquires more ſtrength than the other, the child will ſquint; for I have elſewhere proved, that an inequality of ſtrength in the eyes is the cauſe of ſquinting *.

* See Mem. de l'Acad. des Sciences, année 1743.

For the firſt two months, the infant ſhould receive no other food than the milk of the mother or nurſe; and, if its conſtitution be delicate, this nouriſhment alone ſhould be continued during the third and fourth month. A child, however robuſt, may be injured, if any other food be adminiſtered before the end of the firſt month. In Holland, in Italy, in Turkey, and through the whole Levant, children are allowed no other food during the firſt year. The ſavages of Canada nurſe their children four or five, and ſometimes ſix or ſeven years. In our country, as moſt nurſes have not a ſufficient quantity of milk to ſatisfy the deſires of their children, in order to ſpare it, they give them, even from the beginning, a compoſition of boiled bread and milk. This nouriſhment appeaſes hunger; but, as the ſtomach and inteſtines are yet too weak to digeſt ſuch a groſs, viſcid ſubſtance, the children are greatly hurt by it, and often die of indigeſtion.

The milk of animals, in caſes of neceſſity, may ſupply that of the mother: But then the child ſhould be obliged to ſuck the animal's teat, that it may receive the milk in an equal and proper degree of heat, and that, by the action of the muſcles in ſucking, the milk may be mixed with ſaliva, which greatly promotes digeſtion. I have known ſeveral peaſants who had no other nurſes than ewes; and yet they were equally vigorous

vigorous as thoſe who had been nurſed by their mothers.

After two or three months, when the child has acquired ſome ſtrength, it may have food ſomewhat more ſolid, as flour baked with milk, a ſpecies of bread which gradually diſpoſes the ſtomach to receive common bread, and ſuch other nouriſhment as it muſt afterwards be accuſtomed to take.

The conſiſtence of liquid food is thus gradually increaſed, that the child's ſtomach may be prepared to receive what is ſtill more ſolid. Infants, during the firſt year, are incapable of maſtication. The rudiments of the teeth are ſtill covered with the gums, which are ſo ſoft, that they can have little effect upon hard ſubſtances. Some nurſes, eſpecially among the common people, firſt chew the food, and then give it to their children. Before reflecting on this practice, we muſt throw aſide every idea of diſguſt, of which children, at this age, have not the leaſt conception. They are equally diſpoſed to receive nouriſhment from the mouth of the nurſe, as from her breaſts. This cuſtom ſeems to have originated from ſome natural inſtinct; for we meet with it in many countries which are exceedingly remote from each other; as in Italy, in Turkey, in moſt parts of Aſia, in America, in the Antiles, in Canada, &c. As it is the only way by which the ſtomachs of children can be ſupplied with a proper quantity of ſaliva, I believe it is very uſe-

ful to them. If the nurſe chews a bit of bread, it is ſoaked in her ſaliva, which renders it fitter for nouriſhment than if it had been diluted in any other liquor. This practice, however, is unneceſſary after children are furniſhed with teeth, which enable them to chew their food, and to mix it with their own ſaliva.

The *inciſores*, or cutting teeth, are eight in number, four in each jaw, and they generally appear about the ſeventh month, though, in ſome caſes, not till the end of the firſt year. Theſe teeth are often premature; for ſome children have them at birth, and fœtuſes have been found with teeth completely formed long before the ordinary time of geſtation is finiſhed.

The rudiments of the teeth are lodged in ſockets, and covered with the gums: In the proceſs of their growth, they extend their roots to the bottom of the ſocket, and break through the gums. This proceſs obſerves not the ordinary laws of Nature, which act continually on the human body, without occaſioning any painful ſenſation. Here Nature makes a violent and painful effort, which is often attended with fatal conſequences. Children, when teething, loſe their uſual ſprightlineſs, and become peeviſh and fretful. The gums are at firſt red and ſwelled; and, when the circulation of the blood is nearly ſtopped by the preſſure of the teeth, they turn whitiſh. Children perpetually apply their fingers to the affected part, in order to remove

move the irritation: To procure ſtill farther relief, they are furniſhed with a piece of ivory, coral, or any other hard ſmooth ſubſtance, which they rub againſt the gums. This operation relaxes the parts, affords a momentary ceſſation of pain, renders the gums thinner, and facilitates their rupture. But, notwithſtanding every precaution, the rupture of the gums is always accompanied with pain and danger. When the gums are uncommonly ſtrong and rigid, they reſiſt the preſſure of the teeth for a conſiderable time, and occaſion a violent inflammation, which often proves fatal. The ſimple operation of cutting the gum removes the inflammation, and gives a free paſſage to the teeth.

The canine or dog-teeth, which are four in number, and ſituated next to the cutting-teeth, generally appear in the ninth or tenth month. About the end of the firſt, or during the courſe of the ſecond year, the ſixteen molares or grinders, four on each ſide of the canine-teeth, cut the gums. But theſe periods vary greatly in different children.

The cutting-teeth, the dog-teeth, and the firſt four grinders, are generally ſhed during the fifth, ſixth, or ſeventh year; and are commonly replaced in the ſeventh year, though ſometimes not before the age of puberty. The ſhedding of theſe ſixteen teeth is occaſioned by the expanſion of the rudiments of a ſecond ſet, which are ſituated at the bottom of the ſockets, and, by their

their growth, puſh out the firſt ſet. But there is no ſecond ſet below the other grinders; and, therefore, they never ſhed but by accident, and their loſs is ſeldom repaired.

There are ſtill other four teeth ſituated at the extremity of each jaw. In ſome perſons, theſe teeth are entirely wanting: They ſeldom appear before the age of puberty, and ſometimes not till a more advanced period. They are diſtinguiſhed by the name of *Wiſdom-teeth*, and either appear ſucceſſively, or two at a time. It is owing to this irregularity in the wiſdom-teeth, that the number of teeth is not uniformly the ſame, which varies from 28 to 32. Women, it has been alledged, have generally fewer teeth than men.

Some authors maintain, that the human teeth, like thoſe of certain animals, would continue to grow during life, if they were not conſtantly worn down by grinding the food. But this notion ſeems to be contradicted by experience; for people who live upon liquid food have not longer teeth than thoſe who eat the hardeſt kinds of aliment. Beſides, thoſe who hold this opinion probably miſtake the tuſks of certain animals for their teeth. The tuſks of the wild boar, and of the elephant, for example, continue to grow during life; but their increaſe, after they arrive at their natural ſize, is extremely doubtful. Tuſks have a greater analogy to horns than to teeth: But this is not a proper

place for ſuch diſcuſſions. We ſhall only remark, that, in children, the firſt ſet of teeth are leſs ſolid, and more looſely fixed in their ſockets, than the ſecond.

It has been often aſſerted, that the firſt hair of children is always brown; and that after it falls off, it is replaced by hair of different colours. I am unable to determine whether this remark be well founded; but the hair of moſt children is fair, and often entirely white. In ſome it is red, and in others black: But in all thoſe who are to have fair or brown complexions, the hair is more or leſs fair in early infancy. Thoſe who are to be fair have generally blue eyes; thoſe who are to be red have yellowiſh eyes; and thoſe who are to be brown have eyes of a dark yellowiſh colour: But theſe diſtinctions are imperfectly marked in children recently after birth; becauſe their eyes are then almoſt always blue.

When infants are allowed to cry long and violently, ruptures are frequently the conſequence of the efforts they make. Theſe are eaſily reduced by the application of bandages. But, if this remedy be too long neglected, the diſeaſe may continue during life. The limits to which I have preſcribed myſelf permit me not to mention all the diſeaſes incident to children. I ſhall only remark on this ſubject, that worms, with which they are often infeſted, are produced from the nature of their food. Milk is a

ſpecies of chyle, a purely nutritive ſubſtance, without any mixture: It, of courſe, conſiſts entirely of organic and prolific matter, which, when not properly digeſted by the ſtomach, and applied to the nouriſhment and growth of the body, aſſumes, by its natural activity, other forms, and produces animated beings, or worms, in ſuch profuſion, that the child is often in danger of being deſtroyed by them. The bad effects occaſioned by worms might perhaps be prevented, by allowing children to drink a little wine; becauſe fermented liquors have a tendency to prevent the generation of worms: Fermented liquors likewiſe contain few organic nutritive particles; and it is chiefly by acting on the ſolids, that wine communicates ſtrength to the body; for it contains little nouriſhment. Beſides, moſt children are fond of wine; or, at leaſt, they are eaſily accuſtomed to drink it.

Though the bodies of infants be extremely delicate, they are leſs ſenſible of cold than at any other period of life. Their internal heat, it would appear, is proportionally greater: The quickneſs of the pulſe in children ſeems to fortify this opinion. Small animals, for the ſame reaſon, have unqueſtionably more heat than large ones; for the action of the heart and arteries increaſes in proportion to the comparative ſmallneſs of animals, which takes place in the ſame, as well as in different ſpecies. The pulſe of an infant, or of a little man, is more frequent than that

that of an adult, or of a large man. The pulſe of an ox is ſlower than that of a man; a dog's pulſe is quicker than a man's; and the motion of the heart in very ſmall animals, as that of a ſparrow, is ſo rapid that the ſtrokes can hardly be numbered.

The life of a child, till it be three years of age, is extremely precarious. In the two or three ſucceeding years, however, its life becomes more certain; and, in the ſixth or ſeventh year, a child has a better chance of living than at any other period. By conſulting Simpſon's tables of the degrees of mortality at different ages *, it appears, that, of a certain number of children born at the ſame time, more than a fourth of them died in the firſt year, more than a third in two years, and at leaſt one half in the firſt three years. If this calculation be juſt, when a child is born, we might lay a bet, that it would not live above three years. This exhibits a melancholy view of the human ſpecies; for, though a man who dies at the age of 21 is generally lamented, as being prematurely deprived of life; yet, according to theſe tables, one half of mankind muſt die before the termination of three years; and, conſequently, every man who lives more than three years, inſtead of complaining of his fate, ought to conſider himſelf as peculiarly favoured by his Creator. But this mortality of children is not nearly ſo great in every

* See Simpſon's tables, publiſhed at London in 1742.

place

place as in London: M. Dupré de S. Maur has demonſtrated, by a number of experiments made in France, that one half of the children born at the ſame time are not extinct in leſs than ſeven or eight years; and, therefore, we might inſure the life of a new-born child for ſeven or eight years. When a child arrives at five, ſix, or ſeven years, it appears, from the ſame experiments, that its life is more certain than at any other age; for we may then inſure for 42 years more. But in proportion as it advances above five, ſix, or ſeven years, the number of years it will probably live conſtantly decreaſes. At 12, for inſtance, the chance is equal for 39 years only, at 20 for 33½, at 30 for 28, and ſo on, till the age of 85, when the chance is equal for three years more *.

In the growth of the human body, one thing is exceedingly remarkable. The growth of the fœtus increaſes more and more, in equal times, till it eſcapes from the womb. The growth of the child, on the contrary, gradually diminiſhes, in equal times, till the age of puberty, to which it makes a ſudden bound, and ſoon acquires its full ſtature. The fœtus, at the end of the firſt month, is an inch long; at the end of the ſecond it is two inches and a quarter; in three months it is three inches and a quarter; in four months it is more than five inches; in five

* See the tables at the end of this volume.

months,

months, it is ſix and a half, or ſeven inches; in ſix months, it is eight and a half, or nine inches; in ſeven months, it is more than 11 inches; in eight months, it is 14 inches; and in nine months, it is 18 inches. Though theſe meaſures vary in different ſubjects, yet the uniform reſult is, that the fœtus, in equal times, continues to have a proportionally greater increaſe. But, if a child at birth be 18 inches long, it will not acquire, for the next 12 months, above ſix or ſeven inches more; that is, at the end of the firſt year, it will be 24 or 25 inches; in two years it will only be 28 or 29 inches; in three years it will be no more than 30, or, at moſt, 32 inches; and afterwards, till the age of puberty, it will not acquire above one and a half, or two inches, every year. Thus the fœtus grows more in one month, when near the termination of its abode in the uterus, than the child does in one year, till it arrives at the age of puberty, when Nature ſeems to make a ſudden effort to bring her work to maturity.

For preſerving the health of children, virtuous and wholeſome nurſes are of the utmoſt importance. We have too many melancholy examples of certain diſeaſes being communicated from the nurſe to the child, and from the child to the nurſe. Whole villages have, in this manner, been infected with the venereal virus.

Children, it is probable, would be much more ſtrong and vigorous, if they were nurſed by

their

their mothers, whoſe milk muſt be more agreeable to them than that of any other woman; for the fœtus is nouriſhed in the womb with a liquor which has a great reſemblance to the milk in the breaſts. Thus the infant is, in ſome meaſure, accuſtomed to the milk of the mother, even before its birth. But the milk of another woman is not only new to the child, but is often of ſo different a nature, that it is difficult to reconcile the child to the uſe of a ſtranger's milk. We ſometimes ſee children, who cannot digeſt the milk of certain women, languiſh and turn diſeaſed; and, if they are not ſpeedily ſupplied with another nurſe, they ſoon periſh.

Nothing can be more deſtructive to children than the practice of crowding numbers of them into the ſame hoſpital. Moſt of them die of infectious diſeaſes, which they would certainly eſcape, if they were brought up in ſeparate houſes, and particularly at a diſtance from great towns. The ſame expence would be ſufficient to ſupport them; and numberleſs citizens, which conſtitute the riches of a ſtate, would, by this ſimple and natural mode of treatment, be ſaved to the public.

Children begin the difficult taſk of learning to ſpeak about the 12th or 15th month. They pronounce the vowel A with more facility, becauſe it requires only the opening of the mouth, and forcing out the air. E requires the tongue to

to be raiſed, at the ſame time that the lips are opened. In pronouncing I, the tongue is ſtill more elevated, and approaches the teeth of the upper jaw. O requires the tongue to be depreſſed, and the lips contracted; and, in the pronunciation of U, the lips muſt be ſtill more contracted, and ſomewhat extended. The firſt conſonants articulated by children are thoſe which require the leaſt motion of the organs. B, M, and P, are moſt eaſily pronounced. B and P require only the lips to be joined, and then opened with celerity; and for M, they muſt be firſt opened, and then quickly ſhut. The articulation of the other conſonants cannot be effected without more complicated movements. The pronunciation of C, D, G, L, N, Q, R, S, and T, depends upon particular motions of the tongue, which are not eaſily deſcribed. F requires a prolongation of ſound beyond any of the other conſonants. Thus, of the vowels, A is moſt eaſily pronounced; and of the conſonants, B, P, and M. It is for this reaſon that children, in all countries, firſt begin to articulate the words *Baba*, *Papa*, *Mama*. Theſe words are the moſt natural, only becauſe they are moſt eaſily pronounced; and the letters of which they are compoſed muſt exiſt in every language.

It is worthy of remark, however, that, as the ſounds of ſeveral conſonants are very ſimilar, as thoſe of B and P, of C and S, of K and Q, of D and

D and T, of F and V, of G and J, of G and K, and of L and R, there may be many languages in which theſe different conſonants are not employed. But, in every language, a B or a P, a C or an S, a K or a Q, a D or a T, an F or a V, a G or a J, an L or an R, are indiſpenſible; and, in the moſt contracted alphabets, there muſt be at leaſt ſix or ſeven conſonants; becauſe the articulation of them is not complicated, and the ſounds by which they are uttered are all diſtinct and different from each other. Children who cannot eaſily pronounce R, ſubſtitute L in place of it, and T in place of D; becauſe the former are more difficult to articulate than the latter: And the ſoftneſs or harſhneſs of a language depends on the choice of conſonants which are more or leſs difficult to pronounce. But it is needleſs to enlarge upon this ſubject.

Some children, at two years of age, articulate diſtinctly, and repeat whatever is ſaid to them; but moſt children require a long time. It has been remarked, that thoſe who are long before they learn to ſpeak, never articulate with the ſame facility as thoſe who acquire that faculty more early. The latter may be taught to read before they are three years of age; and I have known children read amazingly at four. But, after all, it is difficult to determine whether any advantages are to be derived from ſuch premature inſtruction. We have had ſo many examples of prodigies

prodigies of learning at four, at eight, at twelve, and at ſixteen years, who turned out to be either fools, or men of very little ability, at twenty-five, that I am inclined to think, that the common mode of education, by which Nature is not prematurely forced, and which is diſcreetly proportioned to the ſtrength and capacity of children, is ſtill the beſt.

SECT. III.

Of Puberty.

PUBERTY commences where childhood ends, and accompanies us through the after periods of life. Before puberty, Nature ſeems to have had nothing in view but the growth and preſervation of her work. The proviſion ſhe has made for the infant extends no farther than the nouriſhment and expanſion of its members. It lives, or rather enjoys a kind of vegetable exiſtence, which is confined to itſelf, and which it cannot communicate. But the principles of life ſoon multiply: We are ſoon poſſeſſed of a ſtock, ſufficient not only for our own being, but for enabling us to beſtow exiſtence upon others. This redundancy of life, the ſource of health and vigour, can no longer be confined, but is ſtrongly impelled to expand and diffuſe itſelf. The age of puberty is accompanied with ſeveral external and internal marks. It is the ſpring of life; the ſeaſon of pleaſure. May we be enabled to write the hiſtory of this critical period, without exciting any ideas but what are ſtrictly philoſophical!

In

In the hiſtory of man, puberty, circumciſion, caſtration, virginity, impotence, and many other circumſtances, are articles too eſſential to be omitted. We ſhall, therefore, endeavour to deſcribe them with that delicacy of ſtyle, that philoſophical apathy, which annihilate every looſe deſire, and beſtow on words nothing more than their ſimple and primitive ſignification.

Circumciſion is a cuſtom of great antiquity, and is ſtill practiſed over the greateſt part of Aſia. Among the Hebrews, the operation was performed eight days after birth. In Turkey it is delayed to the ſeventh or eighth year, and ſometimes to the eleventh or twelfth. The children in Perſia are circumciſed at the age of five or ſix; the wound is healed with cauſtic or aſtringent powders; and burnt paper is very generally uſed, which according to Chardin is the beſt remedy. This author tells, that the operation, when performed on grown perſons, is attended with conſiderable pain: That they are obliged to be confined to the houſe three or four weeks; and that death is ſometimes the conſequence.

In the Maldivia iſlands, children are circumciſed at the age of ſeven years. To render the ſkin ſoft, the children are bathed in the ſea ſix or ſeven hours before the operation. The Iſraelites made uſe of a ſharp ſtone: The Jews obſerve the ſame mode in moſt of their ſynagogues. But the Mahometans employ a knife or a razor.

An operation ſimilar to circumciſion is neceſſary in certain diſeaſes. It is a common opinion, that the prepuces of the Turks, and of other nations where circumciſion is practiſed, would naturally grow too long, if they were not curtailed in childhood. Boulaye ſays, that he has ſeen, in the deſerts of Arabia and Meſopotamia, on the banks of the Tigris and Euphrates, numbers of Arabian boys whoſe prepuces were ſo long as to render them incapable of generation, without the aid of circumciſion.

The people of the eaſt have likewiſe longer eye-lids than the inhabitants of other nations. The ſkin of the eye-lids reſembles that of the prepuce. But what relation can take place between the growth of thoſe diſtant parts?

Girls as well as boys are circumciſed, upon the borders of the Perſic Gulph and the Red Sea. But theſe people never perform the operation till the girls have paſſed the age of puberty; becauſe there is no redundance before that period. In other climates, the exceſs of growth in the nymphæ appears more early; and is ſo general among certain people, as thoſe upon the river Benin, that they circumciſe both girls and boys eight or ten days after birth. The circumciſion of females was an ancient cuſtom, even in Africa. Herodotus mentions it among the uſages of the Æthiopians.

Circumciſion may, therefore, be founded on neceſſity; it has, at leaſt, propriety for its object.

But *infibulation** and caſtration muſt have ariſen from jealouſy alone. Theſe ridiculous and cruel operations have been invented by gloomy and fanatical tyrants, who, actuated by a mean envy, and a deſire of monopolizing natural pleaſures, enacted and enforced thoſe barbarous and bloody laws, which make privation a virtue, and mutilation meritorious.

Boys are infibulated by drawing the prepuce forward, piercing it, and putting a ſmall cord through the holes, which remains till the cicatrice of the oppoſite ſides be formed: The cord is then removed, and a ring ſubſtituted in its place, which is made of ſufficient ſtrength to laſt as long as the perſon who ordered the operation pleaſes; and ſometimes it remains for life. The eaſtern monks, who take on the vow of chaſtity, employ a large ring, which renders a breach of their oath impoſſible. We ſhall afterwards mention the method of infibulating females. It is impoſſible to imagine any thing too ridiculous upon this ſubject, which has not been practiſed by ſome men, either from motives of paſſion or of ſuperſtition.

During infancy, there is ſometimes but one teſticle in the ſcrotum, and ſometimes none. We muſt not, however, conclude that children in this ſituation are totally deſtitute of theſe parts. It often happens, that the teſticles remain in the

* This word ſignifies the operation of tying or ſewing parts together.

abdomen, or are entangled in the rings of the muſcles. But time generally removes theſe obſtacles; and the teſtes deſcend into their proper receptacle at the age of eight or ten, and ſometimes not till the ſeaſon of puberty. Parents, therefore, have no reaſon to be anxious about ſuch of their children as ſeemingly have no teſtes, or but one. The teſticles of adults are ſeldom concealed; becauſe nature, at the age of puberty, makes ſtrong efforts to bring them to light. The ſame effect is ſometimes produced by diſeaſe, or violent motion, ſuch as a leap, a fall, &c. Even when the teſticles never make their appearance, the purpoſes of generation are not fruſtrated. Men of this kind are often endowed with uncommon vigour.

There are men who have but one teſticle. This defect, however, is inoffenſive; for it is always uncommonly large. Some men have three, and are, on that account, ſaid to poſſeſs more vigour and bodily ſtrength. We learn, from the animal creation, how greatly theſe parts contribute to ſtrength and courage. How different is an ox from a bull, a wedder from a ram, and a capon from a cock?

The practice of caſtration among mankind is very extenſive, and of great antiquity. It was the puniſhment of adultery among the Ægyptians. In the Roman dominions, the number of eunuchs was conſiderable: At this day, theſe mutilated males are employed through all Aſia and

and part of Africa, as guards upon the chaſtity of the ladies. In Italy, this infamous, this cruel operation, has nothing for its object but the improvement of the voice. The Hottentots cut off one teſticle, becauſe they imagine that this operation renders them more ſwift in the chaſe. In other countries, the poor people mutilate their children, to make them incapable of procreation, and to prevent them from feeling thoſe excruciating pangs which they themſelves ſuffer, when they want bread to ſupport their offſpring.

The ſpecies of caſtration vary according to the object in view. When the improvement of the voice is intended, the two teſticles are only cut out. But men, whoſe minds are inflamed with jealouſy, would not believe their females to be ſafe in the cuſtody of ſuch eunuchs: They employ none but ſuch as have been deprived of the whole external parts of generation.

But amputation is not the only means of accompliſhing this end. Formerly, the growth of the teſticles was prevented, and their ſtructure deſtroyed, without any inciſion: They bathed the infants in warm water and decoctions of plants, and then preſſed and rubbed the teſticles for a long time, in order to deſtroy their texture. Others compreſſed them with an inſtrument: Some pretend, that this ſpecies of caſtration does not endanger life.

The amputation of the teſticles is not very dangerous: It may be done at any age; the

time of infancy, however, is always preferable. But the amputation of the whole external parts of generation is often fatal, eſpecially if performed after the age of fifteen years. Even in the moſt favourable time, which is from ſeven to ten years of age, there is always great danger. The difficulty of preſerving eunuchs of this kind renders them exceedingly precious. Tavernier informs us, that, in Turkey and Perſia, they bring five or ſix times the price of the other kind. Chardin obſerves, that the total amputation is accompanied with the moſt exquiſite pain; that it is performed pretty ſafely upon young children; and is exceedingly dangerous after the age of fifteen; that hardly a fourth part eſcape with life; and that the wound is never cured in leſs than ſix weeks. On the other hand, Pietro della Valle aſſerts, that thoſe who ſuffer this puniſhment in Perſia for rapes, and other crimes of that nature, heal eaſily, though advanced in years; and that they apply nothing but aſhes to the wound. I know not whether thoſe who underwent the ſame puniſhment in Egypt, as Diodorus Siculus relates, eſcaped with equal eaſe. According to Thevenot, vaſt numbers of negroes, who are forced by the Turks to ſubmit to this operation, periſh, even when it is performed on children of eight or ten years of age.

Beſide negro eunuchs, there are others at Conſtantinople, throughout all Turkey, Perſia, &c. who, for the moſt part, are brought from the

the kingdom of Golconda, the peninſula on this ſide the Ganges, the kingdoms of Aſſan, Aracan, Pegu, and Malabar, where their colour is gray; and from the Gulf of Bengal, where they are of an olive colour: There are ſome white eunuchs from Georgia and Circaſſia; but their number is ſmall. Tavernier ſays, that, when he was in the kingdom of Golconda, in the year 1657, 22000 males were caſtrated. The black eunuchs come from Africa, and eſpecially from Æthiopia. In proportion to the uglineſs and horror of their appearance, they are the more eſteemed, and bring a higher price. A very flat noſe, a frightful aſpect, large thick lips, and, above all, black teeth placed at a great diſtance from each other, are admired qualities in a eunuch. Theſe people have commonly fine white teeth: But ſuch teeth would be a capital defect in a eunuch, who ought to be a hideous monſter.

Eunuchs, who are only deprived of their teſticles, have a lively ſenſe of titulation in what remains: They have even the external ſign more frequently than other men. The part which remains, however, is generally ſmall; for it continues nearly in the ſame ſtate in which it was before the operation. A eunuch caſtrated at ſeven years of age, when arrived at twenty, is no better, with regard to this matter, than a child of ſeven. Thoſe, on the other hand, who have not undergone the operation till the age of puberty,

berty, or later, have parts nearly equal to thoſe of ſound men.

Peculiar relations ſubſiſt between the throat and the parts of generation, though we are totally ignorant of their cauſes. Eunuchs have no beard; their voice, though ſtrong and piercing, can never reach a low or deep tone. Secret diſeaſes often appear in the throat. The remarkable ſympathy which ſome parts of the body have with others, though at a diſtance, and of a different nature, is a ſubject too much neglected: We are apt to deſpiſe effects, when we cannot eaſily diſcover their cauſes. Hence it is, that we never think of examining theſe relations or ſympathies, although they are the proper ſpring of the animal conſtitution. In females, there is a remarkable ſympathy between the uterus, breaſts, and head. How many curious and uſeful facts of this nature might be diſcovered, if phyſicians paid more attention to this intereſting ſubject! It would produce more enlightened views, and a more extenſive utility, than can ever be expected from a mere regiſter of anatomical names. It is impoſſible to diſcover the principles of animal motion: The ſprings which give life to organization are not to be found in the muſcles, veins, arteries, and nerves, deſcribed with ſuch minuteneſs by anatomiſts. Organized bodies are poſſeſſed of internal powers, upon which the groſs laws of mechaniſm have no influence. Inſtead of attempting to diſcover theſe

theſe powers, by attending to their effects, they have been treated as ideal exiſtences; they have ceaſed to be the objects of philoſophical reſearch. They have at laſt reaſſumed their native importance in the laws of gravitation, in elective attractions, in the phænomena of electricity, &c. But, notwithſtanding the evidence and univerſality of their exiſtence, as their action is internal, as they are ſolely objects of reaſon, and have little connection with the ſenſes, they are in danger of eſcaping our obſervation, and we admit them with difficulty; for judgment is generally occupied and directed by external objects. We never imagine that the internal conſtitution of animated beings ought to be a principal object of enquiry. We conceive that the human genius is limited to external objects; and, therefore, we overlook every thing that might lead to a more refined and ſpiritual philoſophy.

The ancients, leſs limited in genius, and poſſeſſed of a more comprehenſive philoſophy, were not aſtoniſhed to meet with facts which were inexplicable: They viewed Nature through a more tranſparent medium. A peculiar correſpondence or ſympathy, was to them only a phænomenon; but, to us, becauſe not reducible to ſome fanciful laws of motion, it is a paradox. They knew that Nature produced her principal effects by laws concealed from human eyes: They knew, that, to trace her various laws and modes

modes of operation, exceeded the powers of our circumſcribed faculties. A certain number of uniform and related effects, therefore, was to them ſufficient to conſtitute a cauſe, or law of nature. Whether, according to the ancients, this ſympathy ſhall be called a peculiar correſpondence between different parts of the body, or, according to the moderns, it ſhall be conſidered as an unknown relation in the action of nerves, its exiſtence in the animal œconomy is univerſal; its effects, therefore, are of the utmoſt importance to the theory of medicine, and cannot be too diligenly ſcrutinized. But this is not the place for a full inveſtigation of ſuch an important ſubject. I ſhall only obſerve, that the relation between the voice and the generative organs takes place not only in eunuchs, but in other men: It is even diſcoverable in females. In men, the voice changes at the age of puberty; and in women, who have a ſtrong rough voice, the paſſion of love is ſuſpected to be violent.

The firſt ſymptom of puberty is a ſenſe of fulneſs and ſtiffneſs in the groins, which is moſt perceptible when walking, or when the body is bent forward. This ſtiffneſs is often accompanied with pretty ſmart pain in the different joints of the limbs: It is likewiſe accompanied with a new and peculiar ſenſation in thoſe parts which diſtinguiſh the ſexes. Small whitiſh tubercles alſo begin to appear in theſe parts, which are the germs of their natural veil. The voice, for a conſiderable time, is rough and unequal; after which

which it becomes more full, articulate, and ſtrong. This change is very conſpicuous in boys; but it is leſs diſtinguiſhable in girls, becauſe their voices are naturally more ſharp.

Theſe marks of puberty are common to both ſexes: But each ſex has marks peculiar to itſelf; as the eruption of the menſes, and the expanſion of the breaſts in women; the beard and faculty of procreating in men. Theſe marks, indeed, are not always uniform. The beard, for example, does not always appear preciſely at the age of puberty: There are even whole nations who have hardly any beard. On the contrary, there is no country where the age of puberty in women is not diſtinguiſhed by the enlargement of the breaſts.

Among every race of mankind, the females arrive at puberty ſooner than the males. But the age of puberty is very different in different countries. It ſeems to depend upon the temperature of the climate and the quality of the food. The children of citizens and of opulent parents, who are generally fed with rich and nouriſhing victuals, arrive ſooner at this ſtate. But children brought up in the country, or whoſe parents are poor, require two or three years longer; becauſe their food is not only bad, but given too ſparingly. In the ſouthern parts of Europe, and in cities, girls arrive at puberty about the age of 12, and boys about 14. But, in northern climates, and in the country, girls hardly come

to

to maturity till they are fourteen, and boys not before ſixteen.

It may be aſked, Why are the females, in all climates, capable of procreating ſooner than the males? The anſwer is eaſy: The bodies of men are larger and ſtronger; their bones are harder, and their muſcles more compact; a longer time is therefore neceſſary for their growth. Beſides, as the growth of the body muſt be nearly complete before a ſuperfluous quantity of organic juices can be accumulated in the parts deſtined for generation, women, of courſe, muſt arrive at maturity ſooner than men.

In the warmeſt climates of Aſia, Africa, and America, the age of puberty commences in girls at ten, and ſometimes at nine. The periodic diſcharge, though leſs abundant in warm climates, appears much ſooner. The interval is nearly the ſame in all nations. With regard to time, a greater diverſity takes place between individuals than between nations. In the ſame climate and nation, ſome females ſuffer this evacuation every 15 days; others have an interval of ſix weeks: But a month, or a few days more or leſs, is the moſt uſual period.

The quantity evacuated ſeems to depend upon the quantity of nouriſhment and of inſenſible perſpiration. The diſcharge is greateſt in females who eat largely and take little exerciſe: It is leaſt in warm countries, where the perſpiration is more copious. The quantity of this

diſcharge

diſcharge has been variouſly eſtimated. It is, indeed, difficult to make an accurate meaſure. In different ſubjects, and different circumſtances, it varies from one or two ounces to a pound, and even more. It generally continus to flow three, four, or five days; but ſometimes it remains for ſix, ſeven, and even eight days. The cauſe of this diſcharge is generally aſcribed to a ſuperfluity of bloody and nutritious juices. The ſymptoms which precede it are certain indications of a plethora, as heat, tenſion, ſwelling, and the pains felt not only in the parts themſelves, and their environs, but in the mammæ, which alſo ſwell, and diſcover a ſuperabundance of blood by the colour of the areolæ becoming then more deep: The eyes likewiſe are heavy, and the ſkin below the orbits takes on a faint blue or a violet colour: The cheeks glow; the head is heavy and affected with pain; and, in a word, the whole body is oppreſſed with a ſurcharge of blood.

The growth of the body, in length, generally terminates at the age of puberty. Before this period, young people commonly ſhoot up ſeveral inches in a very ſhort time. But the quickneſs of growth is moſt remarkable in the parts of generation of both ſexes. In males, this growth is only an augmentation in ſize: But, in females, it often produces a ſhrinking of ſome of the parts, which has received different appellations

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from thoſe who have treated of the ſigns of virginity.

Men, jealous of pre-eminence of every kind, have always diſcovered a remarkable attachment to prior and excluſive poſſeſſions. This ſpecies of folly has beſtowed a phyſical exiſtence upon female virginity. Virginity, which is a moral being, a virtue exiſting ſolely in purity of heart, has been metamorphoſed into a phyſical object, in which moſt men think themſelves deeply intereſted. This notion, accordingly, has given riſe to many abſurd opinions, cuſtoms, ceremonies, and ſuperſtitions; it has even given authority to pains and puniſhments, to the moſt illicit abuſes, and to practices which ſhock humanity. Young women have been obliged to ſubmit to the examinations of ignorant matrons, and to expoſe the ſecrets of nature to the eyes of prejudiced phyſicians. They did not reflect, that every indecency of this kind is a violent attack againſt chaſtity; that every ſituation which produces an internal bluſh, is a real proſtitution.

I have little hope of being able to eradicate the ridiculous prejudices which have been formed on this ſubject. Mankind always believe what they wiſh to be true, however vain and unreaſonable the foundations of their faith. But, as it is the province of hiſtory to relate not only the ſucceſſion of events, and the circumſtances of facts, but likewiſe the origin of popular opinions and errors, I think it a neceſſary article in the

the hiſtory of man, to examine this favourite idol which he adores, to conſider the reaſonableneſs of his worſhip, and to inquire whether Virginity be a real or a fabulous divinity.

Fallopius, Veſalius, Diemerbroek, Riolan, Bartholin, Heiſter, Ruyſch, and ſome other anatomiſts, maintain, that the membrane of the hymen has a real exiſtence, and that it ought to be reckoned among the parts of generation peculiar to females. They aſſert, that it is a fleſhy membrane, very thin in infants, but thicker in adults; that it is ſituated under the orifice of the urethra, and nearly ſhuts up the entrance of the vagina; that it is perforated by a round or oval hole, ſo ſmall as hardly to admit a pea during infancy, or a large bean at the age of puberty. The hymen, according to Winſlow, is a membranous fold, ſometimes circular, and ſometimes ſemilunar, with an aperture of a ſmaller or greater ſize in different ſubjects, &c. On the other hand, Ambroſe Paré, Dulaurent, De Graaff, Pineus, Dionis, Mauriceau, Palfyn, and other anatomiſts of equal authority with thoſe formerly mentioned, inſiſt, that the membrane of the hymen is a mere chimera; that it is not natural to young girls; and expreſs their aſtoniſhment that any man ſhould talk of it as a thing which has a real and uniform exiſtence. They produce a multitude of experiments and obſervations made upon ſubjects of different ages, in which they could never diſcover any appearance

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of this membrane. They acknowledge, that they have ſometimes, but very ſeldom, ſeen thoſe fleſhy protuberances called carunculæ myrtiformes connected by a membrane; but they maintain, that this membrane was preternatural. Anatomiſts are not leſs divided with regard to the number and qualities of theſe carunculæ. Are they only rugoſities of the vagina? Are they diſtinct and ſeparate parts? Are they the remains of the hymen? Is their number uniform? Does only one, or many, accompany the ſtate of virginity? All theſe queſtions have been ſtated, and each has received a different ſolution.

This oppoſition of ſentiment, in a matter which depends on inſpection, is an inconteſtible proof, that mankind have often an ardent deſire to diſcover things in Nature which exiſt in their own imaginations only. Many anatomiſts of reputation have never been able to diſcover either the hymen or carunculæ, even before the age of puberty. Thoſe who ſupport the contrary opinion, at the ſame time acknowledge, that theſe parts are not always the ſame; that their form, ſize, and texture, vary in different ſubjects; that, in place of the hymen, ſometimes there is but one caruncula, at other times there are two or more united by a membrane; that the ſhape of the aperture is not uniform, &c. What is the conſequence? We muſt conclude, that the cauſes of this mark of virginity are equivocal and inconſtant; and that, even when

when they have exiſtence, they produce only an effect of a tranſient and variable nature. Anatomy determines nothing with regard to the exiſtence of the hymen and carunculæ; it allows us to reject theſe ſymptoms of virginity, becauſe they are not only uncertain, but imaginary.

The effuſion of blood, though a more common ſymptom, is not leſs equivocal. It has, in all ages, been regarded as an infallible proof of virginity. But it amounts to nothing, in all thoſe caſes where the entrance of the vagina is naturally relaxed or dilated. Beſides, the effuſion of blood is not peculiar to virgins. Women who have no pretenſions to virginity frequently experience this diſcharge. Some diſcharge copiouſly and often; others a ſmall quantity, and only once; and ſome have no ſuch effuſion. This phænomenon depends upon age, health, ſtructure of parts, and a number of circumſtances. Of theſe we ſhall enumerate only a few, and endeavour, at the ſame time, to inveſtigate the true cauſes of the various phyſical marks which have been held forth as infallible characteriſtics of female virginity.

At the time of puberty, the parts of both ſexes undergo a conſiderable change: Thoſe of the male have then a growth ſo quick, that they arrive in a year or two at full maturity. Thoſe of women increaſe likewiſe at this period. The nymphæ, in particular, which, though formerly almoſt imperceptible, now become full and conſpicuous.

ſpicuous. The menſtrual diſcharge appears at the ſame period. By an unuſual accumulation of blood, all the parts ſwell, and approach towards each other. The orifice of the vagina contracts, though the dimenſions of the vagina itſelf be enlarged. The appearances produced by this contraction are different in different ſubjects; for we are informed by anatomiſts, that there are ſometimes four, and ſometimes only three, or two, *caruncul*æ; and that a circular or ſemilunar ring, or rather a ſeries of folds, is a common phænomenon. But anatomiſts have neglected to tell us, that, whatever form this contraction aſſumes, it never appears before the age of puberty. In young girls whom I have had occaſion to diſſect, nothing of this kind could be diſcerned; and, having collected many facts concerning this ſubject, I can with confidence aſſert, that when young women, before puberty, have commerce with men, no effuſion of blood ever happens, unleſs the parts be greatly diſproportioned, or ſome violence is committed. On the other hand, at the time of puberty, eſpecially when the females are regular, and in good health, theſe effuſions are common, and produced by the ſlighteſt cauſes. But thoſe who are meagre, and ſubject to the fluor albus, generally want this mark of virginity. The frequent repetition of this flux of blood, and even at conſiderable intervals of time, is an evident demonſtration that it is only a deceitful appearance.

ance. It is a certain fact, that young women, who at firſt had a copious effuſion, have repeated this pretended ſymptom of virginity after a few months abſtinence. This phænomenon may, by proper management, be frequently exhibited, eſpecially before the body has acquired its full growth. It is equally certain, that young women, who have not been faithful to the marriage bed, have, notwithſtanding, by the ſimple expedient of abſtinence, given freſh proofs of innocence to their deluded huſbands. Some women, in the courſe of two or three years, have exhibited this fictitious mark of purity five times. But this ſymptom is limited to a certain time; for it ſeldom appears after the age of eighteen years. When the growth of the body is compleated, its parts become fixed and unalterable, and cannot aſſume differences but by the employment of ſuch artifices as it would be both unneceſſary and improper to relate. Beſides, many women, particularly thoſe who are irregular in their menſes, and ſubject to the fluor albus, never have any freſh marks of virginity.

Nothing, therefore, can be more chimerical than the prejudices of men with regard to virginity, and nothing can be more fallacious than its pretended ſigns. A young woman may have commerce with a man before the age of puberty, and yet exhibit no marks of virginity. But the ſame woman, after ſhe arrives at puberty, may have very copious effuſions of blood.

Others, who are actual virgins, diſcover no ſuch appearances. Men, therefore, ſhould be perfectly eaſy as to this matter, and not indulge, as is too often the caſe, unjuſt and ridiculous ſuſpicions.

If we wiſh to obtain an evident and infallible mark of virginity, we muſt ſearch for it among thoſe barbarous people, who are incapable of inſtilling by education the ſentiments of virtue and honour into their children, but ſecure the chaſtity of their daughters by an expedient which could only be ſuggeſted by the rudeneſs of their manners. In Æthiopia, and other parts of Africa, in Pegu, Arabia Petrea, and other nations of Aſia, the inhabitants, immediately after the birth of females, ſew up thoſe parts which Nature has ſeparated, leaving only a ſpace ſufficient for the natural evacuations. As the child grows, the parts gradually adhere, and, when the time of marriage arrives, they are again diſunited by inciſion. Inſtead of thread, the fibres of the aſbeſtos are ſaid to be employed, which is a ſubſtance not liable to ſudden corruption. Some tribes content themſelves with putting a ring through the parts. To this operation wives as well as girls are ſubjected, with this difference, that the ring allotted to the latter cannot be removed, but, in that allotted to the former, there is a lock, of which the huſband alone poſſeſſes the key. But why ſhould we mention barbarous nations, when we have ſimilar examples at

no great diſtance? That abſurd delicacy of a neighbouring nation, with regard to the chaſtity of their wives, is the offspring of a brutal and criminal jealouſy.

How oppoſite are the taſtes, the diſpoſitions, the opinions, and the manners of different nations? After what has been related concerning the high eſtimation of virginity among the bulk of mankind, and the numberleſs precautions and ignominious methods employed to ſecure it, is it poſſible to believe that there are other people who deſpiſe virginity, and conſider the trouble of removing it to be a mean and ſervile office?

Superſtition has induced the inhabitants of certain countries to reſign the firſt fruits of virginity to their idolatrous prieſts, and ſometimes to the idols themſelves. This privilege is enjoyed by the prieſts of Cochin and of Calicut; and, in Goa, the virgins are proſtituted by their parents, either voluntarily or from choice, to an idol of iron. Groſs ſuperſtition induces theſe people to commit ſuch abominable outrages from religious motives. But views more ſervile and intereſted have induced men of other countries to devote their daughters to their chiefs. The inhabitants of the Canary iſles, and of the kingdom of Congo, proſtitute, in this manner, their daughters, without any injury to their reputation. Nearly the ſame cuſtom takes place in Turkey, Perſia, and ſeveral other countries both of Aſia and Africa. Their moſt eminent nobles

think themſelves highly honoured to receive from their ſovereign, women with whom he himſelf is already diſguſted.

In the kingdom of Arracan, and in the Philippine iſlands, a man would eſteem it to be diſgraceful to marry a young woman who had not been previouſly deflowered; and nothing but the force of money can prevail on any perſon to precede the huſband. In the province of Thibet, mothers anxiouſly ſearch for ſtrangers, and earneſtly ſolicit them to put their daughters in a proper ſtate for obtaining huſbands. The Laplanders likewiſe prefer girls who have had commerce with ſtrangers. They fancy them to poſſeſs uncommon merit, becauſe they have been able to pleaſe men who are better judges of beauty and female accompliſhments than themſelves. In Madagaſcar, and ſeveral other countries, the moſt diſſolute and debauched women are ſooneſt married. Many other examples might be given of this ſtrange taſte, which nothing but the groſſeſt and moſt depraved manners could produce.

After puberty, marriage is the natural ſtate of man. A man ought to have but one wife, and a woman but one huſband. This is the law of nature; for the number of females is nearly equal to that of males. Such laws as have been enacted in oppoſition to this natural principle, have originated ſolely from tyranny and ignorance. Reaſon, humanity, and juſtice revolt

revolt againſt thoſe odious ſeraglios, in which the liberty and the affections of many women are ſacrificed to the brutal paſſion of a ſingle man. Does this unnatural pre-eminence render theſe tyrants of the human race more happy? No! Surrounded with eunuchs, and with women uſeleſs to themſelves and to other men, they are tormented with the conſtant appearance of that accumulated load of miſery they have created.

Marriage, therefore, as it is eſtabliſhed among us, and other nations who are directed by the lights of reaſon and revelation, is a ſtate moſt conſonant to the nature of man, and in which it is his duty to employ thoſe new faculties he acquires from puberty. By obſtinately perſiſting in celibacy, theſe powers become troubleſome, and ſometimes fatal. In either ſex, too long continency may give riſe to diſeaſes, or create irritations ſo violent, that neither reaſon nor religion may be able to counteract the impetuoſity of thoſe paſſions they excite: And thus man may be reduced to a level with the brutes, which, under the influence of ſuch ſenſations, become perfectly furious and ungovernable.

In women, the furor uterinus is the moſt violent effect of this irritation. This diſeaſe is a ſpecies of madneſs, which deranges their ideas, and deprives them of all ſenſe of ſhame. Both the nature and the ſeat of this melancholy diſ-

temper are indicated by the moſt laſcivious expreſſions, and the moſt indelicate actions. I have ſeen, with aſtoniſhment, a girl at the age of twelve years, who had a brown, but lively and florid complexion, and, though low in ſtature, was ſtrong and plump, commit the moſt indecent actions upon the very appearance of a man, from which ſhe could not be deterred, either by the preſence or chaſtiſement of her mother. She did not, however, loſe her reaſon; and the paroxyſms of the diſeaſe ceaſed, the moment ſhe was left with her own ſex. Ariſtotle alledges, that, at this age, the irritation is ſtrongeſt, and that girls ought then to be carefully watched. The remark may be applicable to the climate in which he lived; but, in colder countries, the ardor of the female conſtitution does not appear ſo early.

When the furor uterinus increaſes to a certain degree, marriage will not remove it; and there have been inſtances of its proving fatal. Happily the force of nature is ſeldom the only cauſe of a paſſion ſo deteſtable, even when there is a prediſpoſition to it in the habit of body. Before it arrives at this extremity, the imagination muſt be inflamed by licentious converſation, by obſcene repreſentations, or other cauſes. Among women, the oppoſite temperament is infinitely more common; for, with regard to this paſſion, moſt of them are either cool or indifferent. There are alſo many men to whom chaſtity is an

an eaſy virtue. I have known ſome men who, at the age of twenty-five or thirty, enjoyed good health, without having ever felt this paſſion ſo ſtrong as to render any gratification neceſſary.

Continency, however, is leſs to be dreaded than exceſs. The number of immoderate men is too great to require particular examples. By exceſs, ſome have loſt their memory; ſome have been deprived of ſight; ſome have become bald; and many have periſhed by pure debility. Young perſons can never be ſufficiently warned of the irreparable injury to their health, which the indulgence of the venereal appetite never fails to produce. How many ceaſe to be men, or, at leaſt, ceaſe to enjoy the powers of manhood, before the age of thirty? and how many, at fifteen or eighteen, receive the ſeeds of a diſeaſe, diſgraceful in itſelf, and which it is often impoſſible to eradicate?

It has already been remarked, that, at the age of puberty, the growth uſually ſtops. It frequently happens, however, that, even after puberty, a tedious illneſs makes the body increaſe in length more than it would have done in a ſtate of perfect health. This extraordinary increaſe is probably occaſioned by the inactivity of the external organs of generation during the courſe of the diſeaſe. The organic particles do not reach theſe parts, becauſe they are not determined thither by irritation; and this defect of irritation is owing to a laſſitude and imbecil-

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lity of the parts, which prevent the ſecretion of the ſeminal fluid. Theſe organic particles, therefore, remain in the maſs of blood, and neceſſarily extend the extremities of the bones nearly in the ſame manner as happens to eunuchs. Thus young people, after recovering from a long ſickneſs, are often taller, but worſe ſhaped, than formerly. Some, for inſtance, become hunch-backed, and others crook-legged; becauſe the ſtill ductile extremities of the bones have been unneceſſarily extended by a ſuperfluity of organic particles, which, in a ſtate of health, would have been exhauſted in the formation of ſeminal fluid.

The production of children is the chief intention of marriage. But this intention is ſometimes fruſtrated. Of the different cauſes of ſterility, ſome are common to both ſexes. But, as theſe cauſes are more apparent in men than in women, they are, therefore, more commonly aſcribed to the former. In both ſexes, ſterility is occaſioned either by a defect in the original conformation, or by accidental injuries done to the organs themſelves. In men, the moſt pernicious defects of conformation are thoſe which affect the teſticles, or the muſcles called *erectores penis*. A wrong direction of the urethra, which is ſometimes not only oblique, but improperly perforated, is another obſtacle to generation. The adheſion of the prepuce to the frænum is another obſtacle; but it is not inſurmountable.

In women, the conformation of the uterus may likewiſe occaſion ſterility. If the orifice of the uterus be always open, or always ſhut, conception will be equally prevented. But the moſt frequent cauſe of barrenneſs, both in men and women, ariſes from ſome depravity in their ſeminal fluids. I formerly quoted a remark of Valiſnieri, that a corruption of the fluid in the teſticles of women rendered them entirely barren. It is the ſame with men. If the ſecretion by which ſemen is formed be vitiated, the fluid is unfit for impregnation. The cauſes of ſterility are not diſcoverable by any external appearances.

In caſes of ſterility, different means have been employed to diſcover whether the defect proceeded from the man or the woman. Inſpection is the firſt reſource; and, if the barrenneſs be occaſioned by a fault in the external conformation, it is ſufficient. But, if the defect lie in the internal organs, it is hardly poſſible either to diſcover or remove it. Some men, though they appear to be perfectly formed, want the genuine ſign of a proper conformation. Others have this ſign ſo imperfectly, or ſo ſeldom, that it is only a very equivocal mark of virility.

Every body knows that the action of this part is not under the command of the mind. It is the moſt animal part of the human body; for it acts by a kind of inſtinct, the cauſes of which are unknown. How many young perſons, educated

educated in perfect purity, and totally ignorant of pleaſure, have felt the moſt lively impreſſions, without being able to recogniſe either their cauſe or their object? How many, on the contrary, remain cold and languid, notwithſtanding all the efforts of ſenſe and imagination?

This part of our bodies, therefore, belongs leſs to us than any other of our members. It acts or is languid without our participation. Its functions commence or terminate at certain periods. All this happens without our command, and often contrary to our inclination.

Where, then, is the foundation for thoſe laws, which are ſo unjuſt in their principle, and ſo diſgraceful in their execution? The rules and decrees of the Congreſs * are an affront to human reaſon. Its members ſhould have known, that the very means they employed to inveſtigate truth, were not only indelicate, but infallibly prevented its diſcovery.

When there is no defect in the external conformation, barrenneſs proceeds oftener from the woman than the man; for independent of the pernicious effects of the fluor albus, there

* The name of an infamous court in France, where trials for impotency, with a view to diſſolve marriages, were held. Proofs by inſpection were taken before the judge, who was aſſiſted by ſurgeons and midwives. This court was aboliſhed by an arret of the parliament of Paris, dated 18th February 1677. It is ſurpriſing that the Count de Buffon, who expreſſes the utmoſt deteſtation againſt this court, ſhould have mentioned nothing of its diſſolution.

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ſeems to be another cauſe which has never excited attention.

From my experiments, related in the ſixth chapter, it appears that the teſticles of females give birth to a kind of natural protuberances, which I have called *glandulous bodies*. They grow in a gradual manner, and ſerve for ſecreting and maturating the ſeminal fluid. They are in a continual fluctuating ſtate. They begin to grow under the membrane of the teſticle, which they ſoon perforate; they then ſwell, and their extremities ſpontaneouſly open, and diſtil a ſeminal fluid for ſome time; after which they gradually decay, leaving only a ſmall reddiſh cicatrice on the place from whence they ſprung. Theſe glandulous bodies no ſooner diſappear than they are replaced by others; ſo that the teſticles are continually labouring, and undergoing conſiderable changes. Hence any derangement in theſe organs, either by an unuſual thickneſs of the fluid, or weakneſs of the veſſels, prevents the proper exerciſe of their functions, renders them unable to ſecrete, or rather vitiates and corrupts the ſeminal fluid, which neceſſarily gives riſe to ſterility.

Conception ſometimes precedes puberty. Many women have become mothers before the appearance of the menſes; and ſome who never had any ſymptoms of this evacuation, are in the habit of bearing children. Inſtances of this kind happen in our climate, without travelling

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for them to Brazil, where whole nations are ſaid to be perpetuated, though not a ſingle woman be ſubject to the menſtrual diſcharge; an evident proof that it is not the menſtrual blood, but the ſeminal fluid of the male and female, which are eſſentially neceſſary to generation. It is likewiſe known, that the ceſſation of the menſes, which generally happens about the age of forty or fifty years, does not diſqualify every woman for conception; for ſome women have become pregnant at ſixty or ſeventy, and even at an age ſtill more advanced. Theſe examples, though pretty frequent, may be regarded as exceptions to the general rule; but they are ſufficient to demonſtrate that the menſtrual blood is by no means eſſential to generation.

In the ordinary courſe of Nature, women conceive not before the menſes appear, nor after they have ceaſed. The age at which men firſt acquire the faculty of generating is not ſo diſtinctly marked. His body muſt attain a certain growth before ſemen is ſecreted; and, before this fluid be fully maturated, the degree of growth muſt be ſtill greater. This generally happens between the twelfth and eighteenth years. But the period when man loſes the generative faculty, Nature ſeems to have left undetermined. At ſixty or ſeventy, when old age begins to enervate the body, the ſemen is leſs abundant, and often unprolific. In the collections of public ſocieties, however, there are many

many inſtances of men who have continued to procreate at the age of eighty or ninety.

There are likewiſe examples of boys who have procreated at eight, nine, and ten years, and of girls who have conceived at ſeven, eight, and nine years. But ſuch facts are exceedingly rare, and ought to be regarded as ſingular phænomena. The ſign of virility appears in infancy: But that is not ſufficient; the production of ſemen muſt be added; and this happens not till the growth of the body is nearly compleated. At firſt the quantity is ſmall and generally ſterile.

Two marks of conception have been mentioned by authors. The firſt is a kind of tremor, or ſhivering, which is ſaid to begin at the moment of conception, and continues for ſome days. The ſecond is derived from the orifice of the uterus, which, it is aſſerted, cloſes entirely after conception. But theſe ſigns appear to be very equivocal, if not altogether imaginary.

This tremor is mentioned by Hippocrates in the following terms: 'Liquido conſtat harum 'rerum peritis, quod mulier, ubi concepit, ſta-'tim inhorreſcit ac dentibus ſtridet, et auricu-'lam reliquumque corpus convulſio prehendit.' Galen, on the authority of ſome women, imputes this ſymptom to the contraction of the uterus. Others expreſs it by a vague ſenſation of cold over the whole body, and employ the words *horror* and *horripilatio*. Theſe, and other authors,

thors, endeavour, like Galen, to eſtabliſh the fact upon the teſtimony of women. Hippocrates ſays, 'quæ in utero gerunt, harum os uteri 'clauſum eſt;' or, according to another tranſlator, 'quæcunque ſunt gravidæ, illis os uteri 'connivet.' Opinions, however, are various as to the changes which the uterus undergoes after conception. Some maintain, that the edges of the *os tincæ* are drawn ſo cloſe together, that no vacuity is left between them; and others affirm, that theſe edges are not exactly cloſe till after the two firſt months of pregnancy. They agree, however, that, immediately after conception, the orifice is ſhut up by a glutinous humour; that the os tincæ, which, previous to conception, might admit a ſubſtance of the ſize of a pea, has no perceptible aperture; and that this difference is ſo evident, as to be diſtinguiſhable by a ſkilful midwife. If theſe aſſertions were founded in truth, the ſtate of pregnancy might be known a few days after conception.

It is urged, on the other hand, that if, after conception, the orifice of the uterus were cloſed, ſuperfœtation would be impoſſible. To this it may be replied, that the ſeminal liquor may perhaps penetrate through the membranes of the uterus; that the uterus itſelf may open to receive the materials neceſſary for ſuperfœtation; and that, at any rate, ſuperfœtations ſo ſeldom happen, that they make a very trifling exception to the general rule. Other authors maintain

maintain, that this change in the uterus can never appear but in women who have formerly conceived and brought forth children. In firſt conceptions, indeed, the difference muſt be leſs perceptible; but, though ever ſo conſpicuous, we have not ſufficient evidence to conclude, that it is a certain, a uniform, and a poſitive ſign. The ſtudy of anatomy, aided by experience, affords, on this ſubject, general notions only, which vaniſh upon a cloſer examination. The ſame obſervation may be applied to the ſhivering, or convulſive cold, which ſome women are ſaid to feel at the time of conception. As moſt women experience not this ſenſation; as others, on the contrary, aſſure us, that they have felt a burning heat; and as others ſtill confeſs that they are utter ſtrangers to all ſuch feelings; the natural concluſion is, that all theſe marks are highly equivocal, and that, when they do happen, they ought to be conſidered, not as the effects of conception, but of other cauſes.

On this ſubject I ſhall add one fact from Mr. Parſons's lectures on muſcular motion, p. 79. which proves, that the orifice of the uterus does not cloſe, immediately after conception, or, if it does cloſe, that the ſemen may find a paſſage into the uterus, by penetrating its ſubſtance. In the year 1714, a woman of Charleſtown in South Carolina, was delivered of two children, the one immediately after the other.

To the aſtoniſhment of the aſſiſtants, the one child was black and the other white. This evident teſtimony of the woman's infidelity to her huſband, obliged her to acknowledge, that, one morning, her huſband having juſt left her bed, a negro entered her chamber, and, by threats of immediate death, compelled her to gratify his deſires. This fact ſhows, that the conception of two or more children does not always happen at one time, and ſupports my opinion, that the ſemen penetrates through the texture of the uterus.

There are many other equivocal ſigns of pregnancy, by which it is ſaid to be early diſtinguiſhable; as a ſlight pain in the region of the uterus and loins; a numbneſs over the whole body; a continual drowſineſs; a melancholy and capricious diſpoſition; the toothach, headach; and a vertigo, which obſcures the ſight; yellowiſh, blood-ſhot eyes, with contracted pupils and depreſſed eye-lids; a pale and ſpotted countenance; a depraved appetite, accompanied with vomiting and ſpitting; hyſteric ſymptoms; the fluor albus; the ſtoppage of the menſtrual diſcharge, or, inſtead of it, an hæmorrhage; the ſecretion of milk in the breaſts, &c. Many other marks ſuppoſed to be peculiar to pregnancy might be added; but they are frequently nothing more than the effects of particular diſeaſes. But we ſhall leave the diſcuſſion of theſe to phyſicians. Details of this kind, to be uſeful,

uſeful, would require a long ſeries of profound inveſtigation. This ſubject, like many others in phyſiology, in the animal œconomy, and in different branches of the medical art, has ſeldom been treated with any degree of philoſophical accuracy.

SECT. III.

Of Manhood.

AT the age of puberty, or a few years after it, the human body attains its full ſtature. The growth of ſome perſons ſtops at the fourteenth or fifteenth year; and, in others, it continues till they arrive at twenty-two or twenty-three years. During this period, moſt men are of a ſlender make: Their thighs and legs are ſmall, and the muſcular parts are not properly filled up. But, by degrees, the muſcles ſwell, the limbs and different parts of the body aſſume their proper figure and proportions, and, before the age of thirty, the body, in men, acquires its moſt perfect ſymmetry.

But, in women, the body ſooner attains this ſymmetry. As their ſize is ſmaller, and their muſcles, and other parts, leſs ſtrong, compact, and ſolid, than thoſe of men, they arrive more early at a ſtate of maturity. A woman at twenty years is as perfectly formed as a man at thirty.

The body of a well-ſhaped man ought to be ſquare, the muſcles boldly marked, and the features of the face diſtinctly defined. In women, the parts are rounder and ſofter, and their features

are more delicate. Man is adorned with ſtrength and majeſty; grace and ſoftneſs are the peculiar embelliſhments of woman.

Even the external figure of the human ſpecies declares them to be the ſovereigns of the earth. The body of man is erect; his attitude is that of command; and his countenance, which is turned towards the heavens, is impreſſed with the ſignatures of ſuperior dignity. The image of his ſoul is painted in his face; the excellence of his nature penetrates through his material form, and animates his features with a divine illumination. His majeſtic deportment, and the firmneſs of his movements, announce the ſuperiority of his rank. He touches the earth with his extremity only: He views it at a diſtance, and ſeems to deſpiſe it. His arms are not pillars to ſupport his body: His hands tread not the earth, and loſe not, by friction and preſſure, that delicacy of feeling for which they were originally deſtined. His arms and hands are formed for purpoſes more noble; namely, for executing the commands of his intellect, for laying hold of diſtant objects, for removing obſtacles, for defending him from injuries, and for ſeizing and retaining objects at pleaſure.

When the mind is at eaſe, all the features of the countenance are in a ſtate of profound tranquillity. Their proportion, their harmony, their union, point out ſerenity of ſentiment, and accord with the calm that ſubſiſts within. When

the ſoul, however, is agitated, the human viſage becomes a living canvas, upon which paſſions are repreſented with equal energy and delicacy; where every emotion is expreſſed by a correſpondent feature; where every impreſſion anticipates the will, and reveals, by obvious and pathetic characters, thoſe intentions and feelings which we are ſolicitous to conceal.

It is in the eyes that the paſſions are moſt ſtrongly marked, and moſt readily diſcovered. The eye belongs to the ſoul more than any other bodily organ. It participates of every mental emotion, the ſofteſt and moſt tender, as well as the moſt violent and tumultuous. It exhibits theſe emotions in all their force and purity, and infuſes into the ſoul of the ſpectator the fire and the agitation of that mind in which they originate. In fine, the eye reflects the light of thought, and the glow of ſentiment; it is the ſenſe of the underſtanding, and the language of intelligence.

Men who ſquint, or are ſhort-ſighted, have leſs of this external ſoul, (as it may be termed,) whoſe chief reſidence is in the eye. Theſe defects hurt the phyſiognomy, and give to the fineſt countenance a diſagreeable, and often a ſtupid air. As nothing but ſtrong and violent paſſions are diſcoverable in viſages of this kind, and as they exhibit no marks of delicacy or vivacity of ſentiment, we are apt to form unfavourable impreſſions of ſuch perſons, which, however ill-

ill-founded, it is difficult for us to efface. We are ſo accuſtomed to be influenced by external appearances, that, if no ſymptoms of thought and reflection appear in a man's countenance, we inſtantly decide him to be void of ability. We even draw concluſions from the cut of the clothes, or the curls of the periwig; neither are theſe concluſions always falſe. Men ought, therefore, to pay ſome attention to theſe minute articles; becauſe, in the eye of ſtrangers, they make a part of ourſelves, and contribute not a little to the judgments they form of our underſtanding and breeding.

A vivacious or a languid motion of the eye has a prodigious effect on the character of the countenance. Eyes are of different colours, dark hazel, light hazel, green, blue, gray, and whitiſh gray. The iris has a ſmooth velvet-like appearance, and conſiſts of many ſmall filaments, regularly diſpoſed, and directed towards the centre of the pupil. The moſt uſual colours of the eye are the hazel and the blue; and both theſe colours are ſometimes to be found in the ſame eye. The eyes commonly called black, when narrowly inſpected, are only of a dark hazel colour. They appear black in conſequence of their being contraſted with the white of the eye. Thoſe of a leſs deep hazel are likewiſe reckoned black, but are not equally beautiful. Shades of orange, hazel, gray, and blue, are frequently to be met with in the ſame eye;

but, wherever there is a blue tint, it becomes the prevailing colour, and outſhines all the reſt. The black and the blue are the moſt beautiful colours, and give moſt fire and vivacity of expreſſion to the eye. In black eyes there is more force and impetuoſity; but the blue excel in ſweetneſs and delicacy. The former dart forth a perpetual and uniform flame, becauſe their colour appears always the ſame, and reflects the ſame rays: But the modifications of light are diſtinguiſhable in the blue; becauſe different rays are reflected by the various tints of which they are compoſed.

Theſe, and other varieties in the colours of the eyes, are peculiar to man, the horſe, &c. In moſt other animals, the colours of individuals vary not. The eyes of the ox are brown; thoſe of the ſheep are of a watery colour; thoſe of the goat are gray, &c. Ariſtotle alledges, that, among men, gray eyes are the ſtrongeſt; that the blue are weaker; that prominent eyes are ſhort-ſighted; and that brown eyes ſee not ſo well as others in a faint light.

Though the eye, in moving, ſeems to be drawn towards either ſide, yet it only moves round its own centre, which gives the pupil the appearance of approaching or receding from the angles of the orbit, and of being elevated or depreſſed. In man the eyes are nearer each other than in any other animal. In ſome ſpecies, the eyes are ſo remotely ſituated, that it is impoſſible

poſſible for both eyes to ſee the ſame object at the ſame time.

Next to the eyes, the parts which give moſt character to the countenance are the eye-brows. Being totally different from every other feature, their effect is augmented by the contraſt: They form a deep ſhade in the canvas, and give relief to the other colours and features. The laſhes of the eye-lid have alſo their effect; when long and buſhy, they beſtow beauty on the eye, and give a mild and pleaſant aſpect to the face. Laſhes on both eye-lids are peculiar to man and the ape. Other animals have hair on the upper lid only; and even in man, the laſh of the under lid is leſs than that of the upper. The eye-brows have only two movements; one by which they are elevated; and the other by which they are depreſſed and contracted.

The eye-lids guard the ball of the eye from duſt, inſects, &c. and keep the cornea moiſt. The upper eye-lid moves up and down; but the under lid has little or no motion. Although the motion of the eye-lids be ſubject to the will, yet, by ſleep, fatigue, or ſurpriſe, we loſe the command of them. They are ſometimes alſo affected with convulſive motions, which we are unable to reſtrain. In birds and amphibious quadrupeds, the under eye-lid alone moves; and fiſhes and inſects have no eye-lids either above or below.

The

The forehead occupies a large part of the face, and contributes greatly to its beauty. It ſhould be well proportioned, neither too flat nor too prominent; neither too narrow nor too ſhort; and it ſhould be regularly adorned with hair both above and on each ſide. The hair gives great expreſſion to the countenance; baldneſs is therefore a capital defect; and the practice of employing ſuperficial hair, which is now ſo general, ought to be confined to ſuch as are naturally bald; for borrowed locks often change the true character of the face. If every man wore his own hair, and allowed it to float freely, it would be more eaſy to diſtinguiſh characters by the general aſpect of the countenance. The crown of the head, and immediately above the temples, are the parts which firſt become bald; but the hair below the temples, and on the under part of the back of the head, ſeldom falls off. Baldneſs is peculiar to man: Women, in the moſt advanced age, though their hair becomes white, are ſeldom affected with baldneſs: Children and eunuchs are not more ſubject to it than women; and the hair is ſtronger and more abundant in youth than at any other period. The longeſt hair becomes dry, and gradually waſtes and falls off as we advance in life. The whiteneſs commences at the points; and, when the hair is totally white, it loſes its ſtrength, and at laſt falls off altogether. There have been examples of young people whoſe hair

was rendered white by diſeaſe, and which recovered its natural colour after their health was reſtored. It is alledged by Ariſtotle, that no man becomes bald before having intercourſe with women, except ſuch as have been bald from their birth. The ancient writers upbraid the inhabitants of the iſlands of the Archipelago with the epithet *bald-heads;* and aſſert, that theſe iſlanders are all brought into the world with this defect *.

The noſe is the moſt prominent feature in the face. But, as it has very little motion, even in the moſt violent paſſions, it contributes more to the beauty than to the expreſſion of the countenance; and unleſs it be deformed, or greatly diſproportioned, it is leſs attended to than thoſe features which are capable of motion, as the mouth and the eyes. The form of the noſe, and its remarkable prominency, are peculiar to the human ſpecies. Moſt animals have noſtrils ſeparated by a partition; but none of them have an elevated and advanced noſe. Even the apes may be ſaid to have noſtrils only; the noſe of an ape has the ſame poſition as that of a man; but it is ſo ſhort and flat, that it can hardly be regarded as ſimilar. By this organ, men, and moſt animals, breathe, and ſmell odoriferous bodies. Birds have no cartilaginous noſtrils; they have only two holes or pipes for the purpoſes of reſpiration and ſmelling.

* See Dapper's Voyage, p. 354. and Plin. edit. Hardouin, p. 541.

Next to the eyes, the mouth and lips have both the greateſt motion and expreſſion. Theſe motions are excited by the paſſions, and the various forms of the mouth mark their different characters and modifications. The organs of ſpeech give the mouth an animation ſuperior to every other part of the face. The vermilion of the lips, and the whiteneſs of the teeth, ſo much excel the other colours of the face, that they attract our chief regard. We fix our eyes on the mouth of the ſpeaker; every word, every articulation, produces different motions on the lips; and, however rapid, it is eaſy to diſtinguiſh them from each other. The deaf learn to diſtinguiſh theſe motions ſo accurately, that they often know the ſentiments of the ſpeaker merely by attending to the motions of his lips.

In man, and in all other animals, the under-jaw is alone endowed with the power of motion. The crocodile, the opinion of Ariſtotle and many other naturaliſts notwithſtanding, is not an exception: I have examined many ſkeletons of that animal, and have found, by the nature of the articulation, that the under-jaw alone was moveable. In the human fœtus, and in monkeys, the under-jaw is greatly advanced before the upper. The deformity, in adults, is equal, whether the under-jaw be too prominent, or too much depreſſed: It ought to be nearly on a level with the upper. Strong paſſions, as well as languor, often produce an involuntary motion

motion in the under-jaw: Pain and pleaſure, as well as languor, give riſe to yawning; but, in the former, the motion is more briſk and lively.

When the mind is ſuddenly affected with ardent deſire, or keen regret, we feel a ſort of ſtarting, or internal oppreſſion; this motion of the diaphragm elevates the lungs, and produces that ſudden inſpiration which forms a ſigh: And, when the mind conſiders the cauſe of its emotion, and perceives no method of accompliſhing its deſire, or of baniſhing its regret, the ſighs are repeated, and ſorrow, or mental pain, ſucceeds. If this pain of mind be great and unexpected, it produces tears; the air ruſhes quickly into the lungs, and gives riſe to many inſpirations, which are accompanied with involuntary ſhocks: Each inſpiration makes a noiſe ſtronger than that of ſighing, and is diſtinguiſhed by the name of ſobbing; theſe ſobs ſucceed each other more rapidly than ſighs; and, in the former, the ſound of the voice is more apparent. The accent of the voice is ſtill more diſtinguiſhable in groaning, which is a ſpecies of ſob long continued; and its ſlow ſound is heard both in expiration and inſpiration: Its expreſſion conſiſts in the continuation of a plaintive tone formed by inarticulate ſounds. Groans are ſhorter or longer according to the degree of ſorrow or dejection; but they are generally repeated ſeveral times. The time of inſpiration forms the interval that takes place between each groan; and

and the intervals are nearly equal both in their duration and their diſtance. The plaintive ſhriek is a groan expreſſed with force, and with a high tone of voice. The ſhriek, when very ſharp, generally continues on the ſame tone through its whole extent; but when moderate, it commonly ends in a lower tone.

Laughter is an interrupted ſound, often repeated, and accompanied with a kind of convulſive motion of the belly, which is alternately elevated and depreſſed. To facilitate this motion, the breaſt and head are ſometimes thrown forward; the cheſt remains immoveable; the angles of the mouth recede from each other; and the cheeks ſwell: Every time that the belly is depreſſed, the air burſts from the mouth, and occaſions a noiſe, which, during the fit, is often repeated, ſometimes on the ſame tone, and ſometimes the tones gradually diminiſh.

The lips, in immoderate laughter, and in moſt violent paſſions, open wide; but, in the more tranquil emotions, the angles of the mouth recede, without any opening of the lips, the cheeks ſwell, and, in ſome perſons, dimples are formed in them near the corners of the mouth: This charm belongs to the graces, and is commonly attended with an agreeable ſmile, which is a mark of benevolence, and of internal ſatisfaction: A ſmile is alſo a mode of expreſſing contempt and ridicule; but, in theſe malignant ſmiles, we preſs the lips cloſe to each other.

The

The cheeks are uniform features, and have little motion or expreſſion, except from that involuntary redneſs or paleneſs with which they are covered in different paſſions; they unite the features, and give a contour to the face; they contribute more to beauty than to expreſſion; and the ſame obſervation may be applied to the chin, the ears, and the temples.

Shame, anger, pride, joy, equally give riſe to bluſhing; while fear, terror, and ſorrow, produce a paleneſs in the face. This change of colour is involuntary; it exhibits the ſtate of the mind without its conſent. It is an effect of ſentiment over which the will has no command. We can eaſily diſguiſe the other marks of paſſion; for a moment's reflection enables us to ſtop the action of the muſcles of the face which characterize particular paſſions, and even to change their direction; but to ſtop or alter the redneſs or paleneſs of the countenance, is beyond our power; becauſe theſe depend on a peculiar motion of the blood, occaſioned by the action of the diaphragm, which is the chief internal organ of ſenſation.

In different paſſions, the whole head is affected with different motions and poſitions: It hangs forward during ſhame, humility, and ſorrow; it inclines to one ſide in languor and compaſſion; it is elevated in pride, erect and fixed in obſtinacy and ſelf conceit; it is thrown backward in aſtoniſhment or ſurpriſe; and rolls from

ſide

ſide to ſide in contempt, ridicule, and indignation.

Grief, joy, love, ſhame, and compaſſion, make the eyes ſwell, and cauſe the tears to flow. The effuſion of tears is always accompanied with a contraction of the muſcles of the face, which opens the mouth; the tears flow through the lachrymal ducts into the noſe, and increaſe the fluid with which it is naturally moiſtened: The flowing of the tears is not conſtant; they ſeem to burſt out at irregular intervals.

In grief, the corners of the mouth are depreſſed, the under-lip riſes, the eye-lids fall down, the pupil is elevated, and half concealed under the eye-lid: The other muſcles of the face are relaxed, which enlarges the ſpace between the mouth and the eyes; and, of courſe, the countenance appears to be ſtretched out beyond its ordinary length. (See plate X. fig. 1.)

In conſternation and terror, the brow is wrinkled, the eye-brows are elevated, the upper eye-lid opens ſo wide that it riſes above the pupil, and uncovers a part of the white above the pupil, which laſt falls down, and is partly concealed by the under-lid. The mouth, at the ſame time, opens wide, the lips recede from each other, and expoſe the teeth both above and below. (See plate X. fig. 2.)

In

In contempt and deriſion, one corner of the upper-lip riſes, and leaves the teeth bare; the other corner moves a little, and has the appearance of a malignant ſmile; the noſtril next the elevated ſide of the lip ſhrivels up, and the angle of the mouth falls down. The eye on the ſame ſide is almoſt ſhut, while the other remains open; and both pupils are depreſſed in the ſame manner as when a perſon looks down from a height. (See plate X. fig. 3.)

In jealouſy, envy, and malice, the eye-brows fall down and are wrinkled; the eye-lids riſe, and the pupils fall down; the upper-lip is elevated on both ſides; the angles of the mouth ſink a little, and the middle of the under-lip riſes and joins the middle of the upper one. (See plate X. fig. 4.)

In laughing, the angles of the mouth are drawn back, and ſomewhat elevated; the upper part of the cheeks riſes; the eyes are more or leſs ſhut; the upper lip riſes and the under one ſinks; the mouth opens; and, when the laughter is immoderate, the ſkin of the noſe wrinkles. (See plate X. fig. 5.)

Beſide theſe marks, the arms, the hands, and the whole body, contribute to the expreſſion of the paſſions. Geſture alſo concurs with the action of the features in expreſſing the different emotions of the ſoul. In joy, for example, the eyes, the head, the arms, and whole body, are agitated with quick and various movements. In

languor and grief, the eyes are ſunk, the head reclines, the arms hang down, and the whole body remains fixed and immoveable. In admiration, ſurpriſe, and aſtoniſhment, every motion is ſuſpended, and the perſon remains in the ſame uniform attitude. Theſe expreſſions of the paſſions are involuntary: But there is another ſpecies of expreſſion, which conſiſts in an agitation of the eyes, head, arms, and body; and theſe motions ſeem, at the ſame time, to be the effect of reflection, and to depend on the will. They appear to be efforts of the mind to defend the body, and may be regarded as ſecondary ſymptoms, by which particular paſſions may be diſtinguiſhed. In love, hope, and keen deſire, we elevate the head, and turn towards heaven, as if imploring poſſeſſion; we ſtretch forward the head to make a nearer approach; and we extend the arms and open the hands, in order to ſeize and embrace the beloved object. On the other hand, in fear, hatred, and horror, we puſh the arms forward with precipitation, to repel the object of our averſion; we turn back the head and the eyes; we recoil, and at laſt fly, in order to avoid it. Theſe motions are ſo ſudden, that they appear to be involuntary: But this deception is the effect of habit; for theſe motions are produced by reflection, and, by their alacrity, diſcover the perfection of thoſe qualities of the body which enable it to obey, with ſuch amazing promptitude, the commands of the mind.

As

Plate X.

As the paſſions are agitations or movements of the mind, for the moſt part connected with impreſſions of ſenſation, they may be expreſſed by motions of the body, and particularly by thoſe of the countenance. We can, therefore, form a judgment of the affections of the mind by the motions of the body, and can diſcover the real ſituation of the ſoul by examining the changes in the features of the face. But, as the mind has no figure which can have any relation to that of matter, we can form no judgment of the general diſpoſition of any mind by the features of the countenance, or by the figure of the body with which it is connected. A deformed body may contain an amiable mind; neither ſhould we pronounce concerning the natural diſpoſition of any perſon, merely becauſe the features of his countenance are not agreeable; for there is no analogy between features and the nature of the ſoul, upon which any reaſonable conjectures can be founded.

The ancients, however, were much addicted to this falſe notion; and there have not been wanting in every age, men who wiſhed to ſupport a ſcientific divination derived by a pretended ſkill in phyſiognomy. But nothing is more evident, than that this ſpecies of divination can be extended no farther than to the affections of the mind, when expreſſed by the motion of the eyes, viſage, and other parts of the body: The form of the noſe, of the mouth,

and of other features, has no more connection with the natural diſpoſition of any perſon, than the ſtature, or ſize of the limbs, with the faculty of thinking. Has a man more genius in proportion as his noſe is well made? Is the ability of another more circumſcribed, becauſe his eyes are ſmall and his mouth large? It muſt, therefore, be acknowledged, that the divination of phyſiognomiſts is altogether chimerical, and deſtitute of any foundation in nature.

The ears, of all the parts of the head, contribute leaſt to the expreſſion of the face. They are placed at a ſide, and commonly concealed under the hair. But, in quadrupeds, the ears are more apparent; and by them we can diſcover whether the creatures be in a ſtate of vigour or of imbecility; their motions denote ſentiment, and correſpond to the internal feelings of the animal. The human ears, though furniſhed with muſcles, have hardly any motion, either voluntary or involuntary. Small ears are ſaid to be moſt beautiful; but large ones are better calculated for hearing. Some nations greatly enlarge the lobes of their ears, by piercing them, and placing in them pieces of wood or metal, which they change ſucceſſively for others of greater dimenſions, till the holes become enormous; and the lobes uniformly increaſe in proportion to the ſize of the holes. I have ſeen theſe round pieces of wood, which had been brought from India or South America, of more than an inch and

and a half in diameter. It is difficult to inveſtigate the origin of this ſingular cuſtom: but it is equally difficult to trace the origin of piercing the ears, (a practice almoſt general,) and ſometimes the noſtrils, in order to adorn them with rings, &c. unleſs we attribute it to thoſe naked ſavages, who contrived to carry, in the leaſt incommodious manner, ſuch things as appeared to them to be moſt precious.

But the whimſical varieties in the cuſtoms of different nations are ſtill more apparent in the manner of dreſſing and wearing their beards. The Turks ſhave their heads; but allow their beards to grow. Moſt Europeans, on the contrary, ſhave their beards, and wear their own or borrowed hair. The ſavages of America pull out the hairs of their beards, but carefully preſerve thoſe of the head. The negroes ſhave their heads in different figures; ſometimes they cut their hair in the ſhape of little ſtars, ſometimes in the manner of a friar, but moſt commonly in alternate ſtripes. The Talapoins of Siam ſhave the heads and eye-brows of thoſe children whoſe education is entruſted to them. In this article every nation has different uſages. Some prefer the hair on the upper lip to that of the chin; others eſteem hair on the cheek; ſome curl it, and others wear it ſtraight. It is not long ſince we wore our hair behind looſe and floating; we now incloſe it in a bag. Our dreſs is different from that of our fathers. The differences in

dreſs are as various as the different nations of the globe: And, what is ſingular, we have adopted that dreſs which is moſt incommodious, waſtes moſt time in adjuſting, and is leaſt agreeable to Nature.

Though faſhions ſeem to be founded on caprice and fancy; yet, when generally adopted, they merit examination. Men have always given a value to thoſe things which excite attention, and which convey flattering ideas of riches, power, and grandeur. The value of diamonds, and other precious ſtones, ariſes from their ſcarceneſs and brilliancy. The ſame obſervation applies to thoſe ſhining metals, the weight of which we regard ſo little, that, for the ſake of finery, we ſpread them over our garments. Ornaments of this kind are intended to excite the attention of ſpectators, to give them an idea of ſplendour and wealth, and to dazzle their fancies: How few have the capacity of diſtinguiſhing the perſon from the dreſs, or of eſtimating the man in any other manner than by the metal on his clothes!

Every thing that is rare and brilliant will, therefore, always be faſhionable, while men derive more eminence from riches than virtue, and while the means of acquiring reſpect continue ſo widely different from real merit. Strangers receive their firſt impreſſions of us from our dreſs, which is varied according to the points of view in which we wiſh to be conſidered. The modeſt

modeſt man, or he who wiſhes to aſſume that character, dreſſes with a ſimplicity correſponding to the nature of that virtue. The vain-glorious, on the contrary, neglect nothing that can ſupport their pride or flatter their vanity; and they diſtinguiſh themſelves by ſplendour or fineneſs in their external appearance.

Another very general object of dreſs is to increaſe the ſize of our figure, and to occupy more room in the world than Nature has allotted to us. We wiſh to enlarge our dimenſions by high-heeled ſhoes and blown up garments; but however bulky our dreſs, it is exceeded by that vanity which it endeavours to cover. Why is the doctor's head loaded with an enormous quantity of borrowed hair, while that of the beau is ſo thinly covered? The former wiſhes to have the extent of his learning meaſured by the apparent dimenſions of his head; and the latter deſires to diminiſh his head, that he may exhibit the gaiety and ſprightlineſs of his genius.

Other faſhions appear to have a more rational object, namely, to conceal the defects of Nature, or to render them leſs diſagreeable. Taking mankind in general, there is a greater number of deformed bodies, and diſagreeable faces, than of handſome figures, and beautiful countenances. Faſhions are always regulated by the practice of the majority; and, as the greateſt part of mankind have defects to conceal, it is their intereſt to invent and ſupport thoſe modes

which tend to render their deformities leſs conſpicous. Women never think of paint, till the natural bloom of their cheeks is faded. Painting, however, is a very general cuſtom. The mode of whitening the hair * with powder, and curling it, is not ſo univerſal; but it ſeems to have been intended for the ſame purpoſe, to make the colours and features of the countenance appear with greater advantage.

But, leaving external ornaments, and the drapery of the picture, let us return to the figure itſelf. The head of man is differently conſtructed, both internally and externally, from that of any other animal. The head of the monkey makes the neareſt approach; its brain, however, is proportionally leſs; and there are other differences, to be afterwards pointed out. The bodies of almoſt all quadrupeds are entirely covered with hair. In man, the head alone has this ornament before the age of puberty, and it is more amply furniſhed with hair than the head of any other animal. The monkey reſembles man very much in his ears, noſe, and teeth.

Among animals, there is a great diverſity in the ſize, poſition, and number of their teeth. Some are furniſhed with teeth in both jaws; others have them in the under-jaw only; in ſome they are widely ſeparated from each other;

* The ſavages of New Guinea powder their heads and beards with chalk. See Receuil des Voyages, &c. tom. iv. p. 637.

and

and are cloſe and united in others. The palate of ſome fiſhes is a hard bony plate, ſtuck full of ſharp points, which perform the office of teeth.

The mouths of moſt animals are armed with ſome ſolid ſubſtance, which enables them to apprehend or grind their food. The teeth of men, quadrupeds, and fiſhes, the beaks of birds, the pinchers, ſaws, &c. of inſects, are all hard inſtruments, and, like the nails, horns, and hoofs, derive their origin from the nerves. We formerly remarked, that nerves, when expoſed to the air, acquire a ſurpriſing hardneſs. As the mouth gives a free acceſs to the air, it is therefore natural to think that the nerves which terminate there ſhould harden, and produce the teeth, the bony plate, the beak, the pinchers, and all the other ſolid parts of animals.

The neck ſupports the head, and unites it to the body. It is larger and ſtronger in moſt quadrupeds than in man. Fiſhes, and other animals which are not furniſhed with lungs ſimilar to ours, have no neck. Birds, in general, have longer necks than other animals. Thoſe birds which have ſhort claws have likewiſe ſhort necks, and *vice verſa*. Ariſtotle ſays, that birds of prey which have pounces are all ſhort necked.

The human breaſt is proportionally larger than that of other animals; and none but man and the monkey have collar-bones. The breaſts of women are larger and more promi-

nent

nent than thoſe of men: But their conſiſtence and ſtructure are nearly the ſame; for the breaſts of men can ſecrete milk. There are many examples of this fact; and it commonly happens at the age of puberty. I have ſeen a young man of fifteen years ſqueeze more than a ſpoonful of milk out of one breaſt. Among animals there is a great variety in the number and ſituation of their paps. Some, as the monkey and elephant, have only two placed on the fore part of the breaſt; others have four, as the bear; others, as the ſheep, have only two ſituated between the hinder legs; others have them in great numbers upon the belly, as the bitch and the ſow. Birds, and all the oviparous animals, have no paps. Viviparous fiſhes, as the whale, the dolphin, &c. have breaſts, and ſuckle their young. The form of the breaſts varies in different animals, and even in the ſame animal at different ages. It is alledged, that women, whoſe breaſts are ſhaped like a pear, make the beſt nurſes, becauſe the mouth of the child comprehends not only the nipple, but part of the breaſt itſelf.

Below the breaſt is the belly, in which the navel makes a conſpicuous figure. In other animals it is hardly perceptible; and even the monkey has nothing in place of it but a kind of calloſity.

The arms of man have little reſemblance to the fore feet of quadrupeds, and ſtill leſs to the

the wings of birds. The monkey tribe are the only animals which have arms and hands; but their ſtructure is more rude, and their proportion leſs exact than thoſe of man; his ſhoulders are likewiſe larger, and differently conſtructed from thoſe of any other animal; and it is on the top of the ſhoulders that he can bear the heavieſt burdens.

The form of the back differs not much from that of ſome quadrupeds; the region of the reins is indeed more muſcular and ſtrong. But the buttocks are peculiar to the human body; the thighs of quadrupeds are often miſtaken for the buttocks, though they be totally different. Man being the only animal who can ſupport himſelf perfectly erect, the ſwelling, or cuſhion on the top of his thighs, is neceſſary to ſuſtain him in that poſture.

The human foot is very different from that of all other animals, the monkey not excepted. The foot of the ape is rather a kind of hand; its toes are long, and ſituated like fingers, the middle one being by much the longeſt; and it has no heel. The ſole of the foot is likewiſe larger in man, and his toes are better adapted for preſerving the equilibrium of the body in walking, running, dancing, and other movements.

The human nails are leſs than thoſe of other animals. If they protruded much beyond the points of the fingers, they would obſtruct the dexterity of the hand. Thoſe ſavages who allow

low them to grow to an unnatural length, uſe them for flaying and tearing animals. But, although their nails be ſtronger and longer than ours, they can by no means be compared to the hoofs or the claws of other animals.

With regard to the proportions of the human body, we have no exact knowledge. The ſame parts have not the ſame proportions in any two individuals; and, even in the ſame perſon, the correſponding parts are not perfectly ſimilar. For example, the right arm or leg have ſeldom the ſame dimenſions with the left. Repeated obſervations alone can aſcertain a ſtandard by which we may be enabled to form a perfect idea of the natural and beſt proportions of the human figure. It is not by comparing men, or taking their dimenſions, that we are to expect any light upon this ſubject: We have more to hope from the art of deſigning, and the efforts which have been made in imitating Nature. Taſte and ſentiment have exceeded the limits of mechanical operations. The ſquare and compaſs are laid aſide, and we truſt more to the impreſſions made on the ſenſes. Every poſſible form has been realized in bronze or in marble. We recogniſe the ſtandard of Nature more by imitating her, than by her own productions; and we judge better concerning the perfection of a ſtatue by viewing it, than by taking its different dimenſions. It is by long practice in the art of deſigning, and by delicacy

cacy of ſentiment, that eminent ſtatuaries have been enabled to make men feel the juſtneſs of proportion in the works of Nature. The ancients made ſtatues ſo exquiſitely fine, that they have uniformly been regarded as exact repreſentations of the moſt perfect human figures. Theſe ſtatues, which were only copies of the human form, are now conſidered as originals; becauſe they were not imitated from an individual, but from the whole ſpecies, ſo attentively compared and diligently obſerved, that it is impoſſible to find an equal degree of ſymmetry and proportion in any one man that ever exiſted. We ſhall, therefore, relate the dimenſions of the different parts which theſe artiſts have fixed as ſtandards of perfection. They commonly divide the height of the body into ten times the length of the face; they likewiſe divide each *face*, or tenth of the body, into three equal parts; the firſt commences at the ſpringing of the hair on the forehead, and terminates at the root of the noſe; the noſe is the ſecond diviſion; and the third extends from the noſe to the end of the chin. In meaſuring the reſt of the body, they uſe the term *noſe*, or length of the noſe, to denote the third of a face, or the thirtieth part of the body. The firſt face begins at the root of the hair above the forehead, and extends to the end of the chin; but, from the top of the forehead to the crown, there is ſtill a third of a face, or a noſe, in height. Thus, from

from the top of the head to the end of the chin, there is a face and a third; from the chin to the juncture of the clavicles, two thirds of a face; and, therefore, from the top of the breaſt to the crown of the head, is twice the length of the face, or the fifth of the body; from the joining of the clavicles to the under part of the paps they reckon one face; from this to the navel is a fourth face; and the fifth extends from the navel to the diviſion of the inferior extremities, which ſhould complete half the length of the body. Two faces are exhauſted between the thigh and knee, to the laſt of which they allow half a face, being the firſt half of the eighth face; two faces are aſſigned between the knee and top of the foot, and from that to the ſole half a face, which completes the ten faces, or length of the body. This diviſion has been made from men of ordinary ſize; but, in thoſe of a higher ſtature, they allow about half a face additional between the paps and the commencement of the thighs, which, in tall men, is not the middle of the body. When the arms are fully ſtretched in a horizontal line, the ſpace between the tops of the middle fingers is equal to the length of the body. From the joining of the collar-bone to the articulation of the ſhoulder-bone with that of the arm, is one face. When the arm hangs down, or is bended forward, it is four faces in length; two between the joint of the ſhoulder and the elbow, and two

two between the elbow and the root of the little finger, in all five faces, and an equal number for the other arm, which is preciſely the length of the body; about half a face remains for the length of the fingers; but it muſt be remarked, that half a face is loſt in the joints of the elbows and ſhoulders, when the arms are extended. The hand is about a face in length, the thumb a third of a face, or a noſe, and the longeſt toe is of the ſame length with the thumb. The under part of the foot is equal in length to the ſixth part of the height of the body. For the reaſons already mentioned, if an experiment be made of theſe dimenſions upon any individual, they will appear to be extremely imperfect. It is ſtill more difficult to fix the proportional thickneſs of the different parts of the body. The changes are ſo great when the ſame man is meagre or in good caſe, and the action of the muſcles in different poſitions, creates ſo much variety in the dimenſions of the parts, that it is almoſt impoſſible to give any determined rules upon this ſubject.

The ſuperior parts of the body, in infancy, are larger than the inferior; the thighs and legs are not nearly equal to half the length of the whole body; as the child advances in years, the inferior parts grow more in proportion than the ſuperior; and, when the growth is complete, the thighs and legs are very nearly one half the length of the body.

The

The anterior part of the cheſt, in women, is more elevated, and its diameter larger, than in men; but the cheſts of the latter are proportionally broader. The haunches of women are likewiſe larger than thoſe of men; becauſe the haunch-bones of women, and thoſe which join them and compoſe the pelvis, are proportionally larger. Theſe differences in the ſtructure of the cheſt and pelvis are ſo perceptible, that it is eaſy, by this criterion, to diſtinguiſh the ſkeleton of a woman from that of a man.

There are great varieties in the length of men. Thoſe are ſaid to be tall who are from five feet eight inches to ſix feet high. The middle ſtature is from five feet five to five feet eight; and thoſe who fall below theſe dimenſions are ſaid to be of ſmall ſtature. Women, in general, are two or three inches below the ſtandard of men. Of giants and dwarfs, notice ſhall be taken in another place.

Though the human body be externally more delicate, it is, however, very nervous, and perhaps ſtronger, for its ſize, than the moſt robuſt quadruped. In comparing the force of a lion to that of a man, it ought to be conſidered, that the lion is armed with teeth and talons; and that theſe dreadful weapons convey a falſe idea of real ſtrength. The arms which man has received from Nature are not offenſive; and happy had it been if art had never put into his hands

hands weapons more deſtructive than the claws of the lion.

But there is a juſter method of inſtituting a compariſon between the ſtrength of a man and that of the other animals, namely, by the weight they are able to carry. It is affirmed, that the porters of Conſtantinople can carry burdens of nine hundred pounds weight; and Deſaguliers tells us, that, by means of a certain harneſs, by which every part of a man's body was proportionably loaded, the perſon he employed in this experiment was able to ſupport, in an erect poſture, a weight not leſs than 2000 pounds. A horſe, which is about ſix times the ſize of an ordinary man, ought, therefore, when managed in the ſame manner, to bear 12,000 or 14,000 pounds; an enormous weight, in compariſon of what that animal can ſupport, even when it is diſtributed with every poſſible advantage.

The ſtrength of animals may likewiſe be eſtimated by agility and perſeverance in labour. Men, when accuſtomed to running, outſtrip horſes, or at leaſt continue their ſpeed much longer; and a man will accompliſh a long journey ſooner, and be leſs fatigued, than even the beſt road horſes. The royal meſſengers of Iſpahan, who are trained to running, go 36 leagues in 14 or 15 hours. We are aſſured by travellers, that the Hottentots outrun lions in the chace; and that thoſe ſavages who live upon hunting, purſue and even catch deer, and other animals of

equal ſwiftneſs. Many other ſtories are told of the amazing nimbleneſs of ſavages, of the long journeys they accompliſh on foot, over the moſt craggy mountains, where there is no path to direct, and every obſtacle to obſtruct their progreſs. Theſe people are ſaid to travel 1000 leagues in ſix weeks, or at moſt two months. If we except birds, whoſe muſcles are proportionally ſtronger than thoſe of any other animal, no other creature could ſupport ſuch long continued fatigue. The civilized man is ignorant of his own ſtrength; nor is he ſenſible how much he is weakened by effeminacy, nor to what extent he might recover his native force by an habitual and vigorous exerciſe of his powers.

Men of extraordinary ſtrength ſometimes appear *. But this gift of nature, which would be highly valuable in the ſavage ſtate, is of little uſe among poliſhed nations, where more depends on mental than corporeal powers, and where manual labour is confined to the inferior orders of men.

Men are much ſtronger than women; and they have often employed this ſuperiority in exerciſing a cruel and tyrannical dominion over the weaker ſex, who were entitled to ſhare with them both the pleaſures and the pains of life. Savage nations condemn the women to perpetual

* Nos quoque vidimus Athanatum nomine prodigioſæ oſtentationis quingenario thorace plumbeo indutum, cothurniſque quingentorum pondo calcatum, per ſcenam ingredi. Plin. lib. 7.

tual labour. They cultivate the ground, and perform every office of drudgery, while the men indolently recline in their hammocks, from which they never think of ſtirring, unleſs when they go a hunting or fiſhing; and, ſo averſe are they to motion, that they have often been known to ſtand in the ſame poſition for ſeveral hours. A ſavage has no idea of walking for amuſement; and nothing aſtoniſhes him more than to ſee Europeans walking backwards and forwards in queſt of nothing. All men are naturally indolent; but the ſavages of warm countries are not only the moſt lazy of human beings, but the moſt tyrannical to their women, whom they treat with a cruel barbarity. In nations more civilized, men dictate laws to the women. Theſe laws are always more ſevere in proportion to the groſſneſs of the national manners; and it is only among people highly poliſhed that women have obtained that equality of condition which is due to them, and which contributes ſo powerfully to the happineſs of ſociety. This politeneſs of manners is the genuine offspring of the ſofter ſex; they have oppoſed it to the arms of the victor, while their modeſty has taught us to acknowledge the empire of beauty, a natural advantage greatly ſuperior to mere ſtrength. But, to give it full force and value, requires the aſſiſtance of art; for the ideas of beauty are ſo different, ſo capricious, and even contradictory, that the women, it is probable, have gained more by

by the art of making themſelves amiable, than by beauty itſelf, of which men form ſuch oppoſite judgments. Men are agreed as to the ultimate object of their paſſion for the other ſex, the eſtimation of which is augmented by the difficulty of acquiſition. The beauty of women commenced the moment they learned to make themſelves reſpectable, by refuſing all approaches to their hearts which proceeded not from delicacy of ſentiment; and, whenever the influence of ſentiment was felt, poliſhed manners was a neceſſary conſequence.

The taſte of beauty, among the ancients, differed widely from ours. With them, a ſmall fore-head and joined eye-brows were charming features in a female countenance; and, in Perſia, large joined eye-brows are ſtill highly eſteemed. In ſome Indian countries, black teeth and white hair are neceſſary ingredients in the character of a beauty; and in the Marian Iſlands it is a capital object with ladies to blacken their teeth with herbs, and to bleach their hair with certain liquors. Beauty, in China and Japan, is compoſed of a large countenance, ſmall and half concealed eyes, a broad noſe, minute feet, and a prominent belly. Some Indians of America and of Aſia compreſs the heads of their children between two wooden planks, with a view to enlarge and beautify the face; others compreſs them laterally, others depreſs the crown only, and others make the head as round as poſſible.

Every nation has ideas of beauty peculiar to itſelf; and every individual has his own notions and taſte concerning that quality. Theſe peculiarities probably originate from the firſt agreeable impreſſions we receive of certain objects; and therefore depend more upon chance and habit than upon difference of conſtitution. When we come to treat of the ſenſes, we ſhall perhaps be able to give more determined ideas concerning thoſe perceptions of beauty we receive by the eye.

SECT. IV.

Of Old Age and Death.

EVERY object in Nature muſt change and decay. The bodies of men no ſooner arrive at full maturity, than they inſtantly begin to decline. The waſte is at firſt inſenſible; ſeveral years frequently revolve before we perceive any conſiderable alteration. But we ought to feel the weight of our years, better than their number can be eſtimated by ſtrangers; and, as thoſe are ſeldom deceived who judge of our age by external characters, we would be ſtill more ſenſible of it from what paſſes within us, if we were more attentive to our feelings, and deceived not ourſelves by vanity and fallacious hopes.

When the body has acquired its full length, it increaſes in thickneſs: The commencement of this augmentation is the firſt ſtep towards decay; for this extenſion is not a continuation of growth, which would communicate force and activity, but merely an addition of ſuperfluous matter, that blows up the body, and loads it with a uſeleſs weight. This matter, which

which is denominated fat, generally appears at the age of 35 or 40 years; and, in proportion as the quantity of it augments, the body loſes its former lightneſs and freedom of motion; its generative faculty is diminiſhed; its members turn unwieldy; and it acquires extenſion at the expence of ſtrength and activity.

Beſides, the bones increaſe in ſolidity; the nutritious juices, which formerly ſerved to expand the bones, now increaſe their quantity of matter only, by filling up their internal cavities; the membranes are changed into cartilages, and the cartilages into bones; the fibres of the muſcles grow rigid; the ſkin is deprived of its moiſture, and wrinkles are gradually formed in it; the hair turns hoary; the teeth fall out; the viſage aſſumes a haggard appearance, the body bends forward, &c. The firſt approaches of this ſtate are perceptible before the age of 40; they advance by ſlow degrees till 60, and more rapidly from that to 70, when decrepitude commences, and continues to augment till 90 or 100, when death puts a final period to our exiſtence.

We ſhall now take a more particular ſurvey of theſe changes; and, as we have inquired into the cauſes of the growth and expanſion of the human body, let us alſo inveſtigate thoſe of its decay and diſſolution. At the commencement of our exiſtence, the bones are only ſmall fibres, of a ſoft and ductile ſubſtance, and gradually acquire conſiſtence and ſolidity. They may be

conſidered, in their original ſtate, as ſmall tubes lined both within and without with a thin membrane: This double membrane furniſhes the oſſeous matter; for the ſmall interval between the internal and external perioſteum is ſoon converted into a bony plate. Some idea of the production and growth of bones may be formed, by comparing them with the manner in which wood and the more ſolid parts of vegetables are produced. We ſhall take, for example, the fig-tree or the alder, which are at firſt hollow in the middle, like the thigh and other hollow bones of the body. When a bud, that is to form a branch, begins to extend, it is only a ſoft ductile matter, which, by extenſion, becomes a ſlender herbaceous tube filled with pith. The external and internal ſurfaces of this tube are covered with a fibrous membrane, as well as the internal partitions by which the cavity is divided. Theſe membranes, however thin, are compoſed of ſeveral plates of fibres lying above each other, which are ſtill ſoft, but gradually harden by depoſiting the ſap which they abſorb for their nouriſhment; and by this means a woody plate is formed, during the firſt year, between the two membranes, which is more or leſs thick in proportion to the quantity of ſap that has been depoſited between the external and internal membranes. But, though each of theſe membranes become woody internally, their external ſurfaces remain ſoft and

and ductile; and, the following year, when the bud at the top of the branch begins to expand, the ſap riſes through the ſoft fibres of each membrane, and converts them, by its ſediments, into other woody plates. The ſame proceſs goes on annually; and, in this manner, the tree or branch gradually increaſes in thickneſs. The internal cavity likewiſe augments in proportion to the growth of the branch; becauſe the internal membrane extends along with the other parts, and the woody plates are only applied ſucceſſively to the plates already formed. If we examine a branch, or a joint, which has been the product of one year, we ſhall find, that it uniformly preſerves the ſame figure through all the ſtages of its growth. The joints or knots which mark the production of each year, become fixed points for the reaction of thoſe powers that expand the contiguous parts during the following year. The ſuperior buds react againſt theſe points, and, by expanding themſelves, form new branches or joints in the ſame manner as the firſt were produced.

The proceſs of oſſification would be very ſimilar to that we have now deſcribed, if the fixed points of the bones began at the extremities, in place of the middle. At firſt the bones of the fœtus are only ſmall threads, or tubes, of a ductile matter, which are eaſily perceived through the delicate and tranſparent ſkin. The thigh-bone, for example, is then a ſmall ſhort tube, like

like the herbaceous tubes above deſcribed. This tube is ſhut at both ends by a pulpy ſubſtance, and its external and internal ſurfaces are covered with two membranes compoſed of ſeveral layers of ſoft and ductile fibres. In proportion as this tube receives nutritious juices, the two extremities extend and recede from the middle point, which always preſerves the ſame ſtation. The extremities cannot extend without reacting againſt this middle point; and the parts which are neareſt it begin firſt to acquire ſolidity. The firſt bony plate, like the firſt plate of wood, is produced in the interval which ſeparates the two membranes or perioſtea. But the oſſification commences in the middle, and gradually extends to the extremities, which remain ſoft long after the middle parts are converted into bone. The middle parts of bones, therefore, being firſt oſſified, it is impoſſible that they ſhould afterwards expand equally with thoſe parts which remain longer in a ſoft and ductile ſtate. This is the reaſon why bones are always thinneſt in the middle, and thickeſt at the extremities. But, independent of this difference between the longitudinal growth of bones and of wood, the analogy between their increaſe in thickneſs is very ſtriking: For the firſt bony plate is produced from the internal part of the perioſteum; and, after the formation of this plate between the two perioſtea, two other plates are ſoon formed, one on each ſide of the firſt, to

to which they adhere; and by this means both the circumference of the bone, and the diameter of its cavity, are augmented. Thus the interior parts of the two perioſtea continue ſucceſſively to produce bony plates, in the ſame manner as woody plates are produced from the bark of vegetables.

But, after the bone has acquired its full growth, after the perioſtea ceaſe to furniſh oſſeous matter, then the nutritious juices, which were formerly employed in augmenting the bulk of the bone, ſerve only to increaſe its denſity. Theſe juices are depoſited in the internal parts of the bones, and give them more weight and ſolidity, as may eaſily be perceived by comparing the weight and denſity of an ox with thoſe of a calf. The ſubſtance of the bones become, in proceſs of time, ſo compact, as not to admit the circulation of thoſe juices which are neceſſary for their ſupport and nouriſhment. This ſubſtance, therefore, muſt now undergo a change ſimilar to that which takes place in old trees, after they have acquired their full ſolidity; and this change is one of the firſt cauſes which render the diſſolution of the human body inevitable.

The cartilages, which may be regarded as ſoft and imperfect bones, likewiſe receive nutritious juices, which gradually augment their denſity. They become more and more ſolid as we advance in years; and, in old age, are almoſt as

as hard as bones. This rigidity of the cartilages renders the motion of the joints extremely difficult, and, at laſt, deprives us of the uſe of our members, and produces a total ceſſation of external movements. This is a ſecond, and more marked cauſe of death, becauſe it manifeſts itſelf by a laborious performance of the common actions of the body.

The membranes likewiſe become hard and dry, as we advance in years. Thoſe, for example, which ſurround the bones, ſoon loſe their flexibility. At the age of 20, they are incapable of farther extenſion. The muſcular fibres ſuffer a ſimilar change, in proportion to the time of life; though, to the touch, they ſeem to be ſofter as age increaſes. It is not the muſcles, however, but the ſkin, that occaſions this perception. After the body is come to its full growth, the fat increaſes, and, by being interpoſed between the fibres of the muſcles, and between the ſkin and the muſcles themſelves, makes them feel ſofter, when, in reality, their denſity is greatly increaſed. Of this fact we have an inconteſtible proof, by comparing the fleſh of young with that of old animals. In the former, it is tender and delicate; but, in the latter, it is dry, hard, and unfit for eating.

The ſkin always extends as the body increaſes; but, when the body diminiſhes, the ſkin has not elaſticity enough to enable it to contract to its former dimenſions: It, therefore, continues in wrinkles

wrinkles and folds, which can never be effaced. The wrinkles of the face partly ariſe from this cauſe; but, in their production, they have a relation to the form, to the features, and to the habitual motions of the countenance. If we examine the face of a man of 25 or 30 years of age, we may trace the origin of all the wrinkles which will appear in old age, eſpecially when he laughs, cries, or makes any violent grimace. All the folds which are exhibited in theſe actions will in time become indelible wrinkles.

In proportion as we advance in years, the bones, the cartilages, the membranes, the fleſh, the ſkin, and every fibre of the body, become more ſolid, hard, and dry. Every part ſhrinks and contracts; and every movement is performed with ſlowneſs and difficulty: The circulation of the fluids is ſluggiſh and interrupted; perſpiration is diminiſhed; the ſecretions change; digeſtion becomes ſlow and laborious; the nutritious juices are leſs abundant, and, being rejected by parts which are already too denſe, they communicate no ſupplies. Theſe parts, therefore, may be regarded as already dead, becauſe they have ceaſed to receive nouriſhment. Thus the body dies by inches; its motions gradually decay; life wears away by imperceptible degrees; and death is only the laſt term in the ſeries.

As, in women, the bones, the cartilages, the muſcles, and every other part of the body, are ſofter

ſofter and leſs ſolid than thoſe of men, they muſt require more time in hardening to that degree which occaſions death: Women, of courſe, ought to live longer than men. This reaſoning is confirmed by experience; for, by conſulting the bills of mortality, it appears, that, after women have paſſed a certain age, they live much longer than men who have arrived at the ſame age.

From what has been ſaid, it may alſo be concluded, that men who have a weakly appearance, and approach nearer to the conſtitution of women, ſhould live longer than thoſe who are more robuſt; and likewiſe, that perſons of either ſex, who are long before they arrive at their full growth, ſhould outlive thoſe who advance more rapidly to that point; becauſe, in this caſe, the bones, cartilages, and fibres, are later in arriving at that degree of ſolidity which is neceſſary to their deſtruction.

This natural cauſe of death is common to all animals, and even to vegetables. An oak periſhes only becauſe the oldeſt parts of the wood, which are in the centre, become ſo hard and compact, that they can receive no further nouriſhment. The moiſture they contain being deprived of circulation, and not being replaced by freſh ſupplies, ferments, corrupts, and gradually reduces the fibres of the wood into powder.

The duration of life may, in ſome meaſure, be computed by the time occupied in growth. A plant or an animal that acquires maturity in a ſhort

a ſhort time, periſhes much ſooner than thoſe which are longer in arriving at that period. In animals, as well as vegetables, the longitudinal growth is firſt finiſhed. Man grows in ſtature till he be 16 or 18 years of age; but his body is not completely unfolded in thickneſs before that of 30. Dogs acquire their full length in leſs than one year; but their growth in thickneſs is not finiſhed till the ſecond year. A man, who grows 30 years, lives till 90 or 100; and a dog, whoſe growth terminates in two or three years, lives only 10 or 12. The ſame obſervation may be applied to moſt animals. Fiſhes continue to grow for a great number of years; they accordingly live for centuries; becauſe their bones never acquire the denſity of thoſe of other animals. When we give the particular hiſtory of animals, we ſhall examine whether there be any exception to this rule, which Nature ſeems to follow in proportioning the duration of life to the time of growth, and whether crows and ſtags live ſo long as is commonly imagined. But it may be laid down as a general fact, that large animals live much longer than ſmall animals, becauſe they require more time to finiſh their growth.

Thus the cauſes of our diſſolution are inevitable; and it is equally impoſſible to retard that fatal period, as to change the eſtabliſhed laws of Nature. The ideas of thoſe viſionaries, who conceived the poſſibility of perpetuating human

life by the uſe of certain medicines, would have periſhed with themſelves, if ſelf-love did not always induce us to believe what exceeds the powers of Nature, and to be ſceptical with regard to the moſt certain and invariable truths. The univerſal panacea, the transfuſion of the blood, and other methods which have been propoſed to render our bodies immortal, are as chimerical as the fountain of youth is fabulous.

When the conſtitution is ſound, life may, perhaps, be prolonged for a few years, by moderating the paſſions, and by temperance. But even this is a difficult point; for, if it be neceſſary that the body ſhould exert its whole force, and that it ſhould waſte all its powers by labour and exerciſe, what advantages can we derive from regimen and abſtinence? Some men have indeed exceeded the ordinary term of human life: Without mentioning thoſe extraordinary inſtances of longevity recorded in the Philoſophical Tranſactions, ſuch as that of Par who lived to the age of 144, and of Jenkins who lived 165 years, we have many examples of the prolongation of life to 110, and even 120. Theſe men, however, uſed no peculiar arts for the preſervation of their bodies. They appear, on the contrary, to have been peaſants, huntſmen, labourers, and people accuſtomed to abuſe their bodies, if it be poſſible to abuſe them by any other means than thoſe of continual idleneſs and debauchery.

Beſide,

Beſides, the varieties of climate, and of the modes of living, make no difference as to the period of our exiſtence, which is the ſame in the European, the Negro, the Chineſe, the American, the civilized man and the ſavage, the rich and the poor, the citizen and the peaſant. Neither does the difference of races, of food, or of accommodation, make any change on the duration of life. Men who feed upon raw fleſh or dried fiſh, on ſago or rice, on caſſada or roots, live as long as thoſe who are nouriſhed with bread and prepared victuals. It is apparent, therefore, that the duration of life has no dependence either on manners or cuſtoms, or the qualities of particular food: If luxury and intemperance be excepted, nothing can alter thoſe laws of mechaniſm which regulate the number of our years.

Any little differences which may be remarked in the term of human life ſeem to be owing to the quality of the air. There are generally more old men in high than in low countries. The mountains of Scotland, of Wales, of Auvergne, and of Switzerland, have furniſhed more examples of extreme old age than the plains of Holland, Flanders, Germany, or Poland. But, taking mankind in general, there is hardly any difference in the duration of life. When men are not cut off by accidental diſeaſes, they every where live 90 or 100 years. Our anceſtors never exceeded this period; and, ſince the

the age of David, it has ſuffered no variation. If it ſhould be aſked, why the firſt races of men lived 900, 930, and even 969 years? we may, perhaps, be able to give a ſatisfactory anſwer. The productions of the earth were then of a different nature. The ſurface of the globe, as we remarked when treating of the Theory of the Earth, was, in the firſt ages of the world, leſs ſolid and compact; becauſe, gravity having acted for a ſhort time only, terreſtrial bodies had not acquired their preſent denſity and conſiſtence. The produce of the earth, therefore, muſt have been analogous to its condition. The ſurface being more looſe and moiſt, its productions would, of courſe, be more ductile and capable of extenſion: Their growth, therefore, and even that of the human body, would require a longer time of being completed. The ſoftneſs and ductility of the bones, muſcles, &c. would probably remain for a longer period, becauſe every ſpecies of food was more ſoft and ſucculent. Hence, the full expanſion of the human body, or when it was capable of generating, muſt have required 120 or 130 years; and the duration of life would be in proportion to the time of growth, as is uniformly the caſe at preſent: For if we ſuppoſe the age of puberty, among the firſt races of men, to have been 130 years, as they now arrive at that age in 14 years, the age of the Antedeluvians will be in exact proportion to that of the preſent race; ſince, by multi-

multiplying theſe two numbers by ſeven, for example, the age of the preſent race will be 90, and that of the Antedeluvians will be 910. The period of man's exiſtence, therefore, may have gradually diminiſhed in proportion as the ſurface of the earth acquired more ſolidity by the conſtant action of gravity; and it is probable, that the period from the creation to the days of David was ſufficient to give the earth all the denſity it was capable of receiving from the influence of gravitation; and, conſequently, that the ſurface of the earth has ever ſince remained in the ſame ſtate, and that the terms of growth, in the productions of the earth, as well as in the duration of life, have been invariably fixed from that period.

Independent of accidental diſeaſes, which are more frequent and dangerous in the latter periods of life, old men are ſubject to natural infirmities, that originate ſolely from the decay of the different parts of the body. The muſcles loſe their tone, the head ſhakes, the hands tremble, the legs totter, the ſenſibility of the nerves decreaſes, and every ſenſe is blunted. But the incapacity for generating is the moſt characteriſtic infirmity of old age. This impotency may be aſcribed to two cauſes; an alteration in the ſeminal fluid, and a want of tenſion in the external organs. The defect of tenſion is eaſily explained from the conformation of the organ itſelf, which is a ſpongy cavernous ſubſtance,

fitted to receive into its cavities a great quantity of blood, in order both to increaſe its ſize, and to render it more rigid. In youth, this organ is ſoft and flexible; and of courſe, it is eaſily extended by the impulſe of the blood. But, as we advance in years, like every other part of the body, it becomes more ſolid, and loſes its flexibility. Hence, though the impulſe of the blood were equal to what it was in youth, this impulſe is unable to dilate an organ which has become too denſe to admit blood in a quantity ſufficient to produce an erection that will anſwer the purpoſes of generation.

With regard to the change, or rather ſterility of the ſeminal fluid, it cannot be prolific unleſs when it contains organic particles tranſmitted from every part of the body; for we have already ſhown *, that the production of a ſmall organized being, ſimilar to its parent, cannot be effected without the union of the organic particles ſent from all parts of the body. But, in very aged men, the parts have become too ſolid, and can neither receive, aſſimilate, nor tranſmit the nutritive and prolific particles. The bones and other ſolids, therefore, can neither produce nor tranſmit organic particles correſpondent to their own natures; theſe particles muſt, of courſe, be wanting in the ſeminal fluids of old men; and this defect is ſufficient to render them incapable of generating.

* See above, ch. ii. iii. &c.

But,

But, admitting the ſterility of old men to be owing to a defect in the organic particles of their ſeminal fluids, this defect may ſtill be ſupplied by a young woman *, which not unfrequently happens; for old men ſometimes, though rarely, generate; and, when they do produce, they have a much ſmaller ſhare in their children than young men. This is likewiſe one reaſon why young women, who are married to old, decrepit, and deformed men, often produce monſters, or children ſtill more deformed than their fathers. But this is not a proper place for ſuch diſcuſſions.

The greateſt part of mankind die of the ſcurvy, the dropſy, or other diſeaſes which ſeem to proceed from a vitiation of the blood and other fluids. Whatever influence the fluids may have in the animal œconomy, they are only paſſive and diviſible ſubſtances, and obey the impulſes of the ſolids, which are the true organic active parts, and upon which the motion, the quality, and even the quantity of the fluids entirely depend. In old age, the cavities of the veſſels contract, the muſcles loſe their tone, the ſecretory organs are obſtructed; the blood, the lymph, and the other fluids, of courſe, grow viſcid, extravaſate, aed produce all thoſe diſeaſes and ſymptoms which are uſually aſcribed to a vitiation of the humours. But the natural decay of the ſolids is the original cauſe of theſe maladies.

* See above, ch. x.

Though

Though it be true, that the bad ſtate of the fluids proceeds from a depravity in the organization of the ſolids; yet the effects reſulting from a change in the fluids produce the moſt alarming ſymptoms, if they become ſtagnant, or if they be obſtructed in their circulation by the contraction of the veſſels; if, by the relaxation of the veſſels, they extravaſate, they muſt ſoon corrupt, and corrode the weaker parts of the ſolids. In this manner the cauſes of deſtruction perpetually multiply; our internal enemies grow more and more powerful, and at laſt put a period to our exiſtence.

All the cauſes of decay which I have mentioned, act continually upon the human body, and gradually lead to its diſſolution. Death, which appears ſo terrible to us, is the laſt term only in the ſeries of evils. Life begins to decay long before it is entirely extinguiſhed; and the changes are perhaps greater from youth till the beginning of our decay, than from decrepitude to death; for we ought here to conſider life as a ſubject capable of augmentation and of diminution. When the fœtus is firſt formed, the quantity of life is almoſt equal to nothing: It gradually extends and acquires conſiſtence and force, in proportion to the growth and expanſion of the body. On the other hand, when the body begins to decay, the quantity of life diminiſhes, till its final extinction. Thus life both

both commences and terminates by imperceptible degrees.

Why then ſhould we be afraid of death, if we have no reaſonable apprehenſions of its conſequences? Why dread this ſingle moment, which has been preceded by an affinity of others of the ſame order; ſince death is fully as natural as life, and both arrive in the ſame manner, without our being able to perceive their approach? If we inquire of phyſicians, and thoſe who are accuſtomed to obſerve the actions and ſentiments of the dying, we ſhall find, that, except in a few acute diſeaſes, attended with agitations and convulſions, which exhibit only the appearances of pain, moſt men expire quietly, and without the ſmalleſt indication of uneaſineſs. Even when patients ſeem to be afflicted with the moſt dreadful agonies, they have no exiſtence but in the imagination of the ſpectator: The truth of this has been repeatedly atteſted by many people who have recovered after the moſt violent commotions and convulſions, who, notwithſtanding, were unable to recollect a ſingle pang they had felt, or a ſingle idea or ſentiment that had paſſed during this ſeemingly diſtreſsful ſituation.

The greateſt part of mankind, therefore, die without being ſenſible of the fatal ſtroke; and of thoſe who preſerve their ſenſes to the laſt groan, there is not, perhaps, one who does not entertain ſome hope of recovery. Nature, for the happineſs of man, has rendered this princi-

ple much ſtronger than reaſon. Men never ceaſe to flatter themſelves with hopes of recovery, even though they might judge of their real condition from the example of others who had been afflicted with the ſame incurable diſorders, from the tears of their friends, and from the countenances or deſertion of their phyſicians. All theſe mortifying circumſtances are only regarded as premature and ill-grounded fears; and hope never leaves us, till death ſhuts the ſcene.

A ſick man tells you, that he feels the hand of death, that the king of terrors is juſt about to arrive, and that recovery is impoſſible: But if, from zeal or indiſcretion, he is informed of his approaching diſſolution, his countenance inſtantly changes, and he betrays all that uneaſineſs which naturally attends the firſt intimation of death. This man, it is evident, gives no credit to his own aſſertions. He may entertain ſome doubts concerning his ſituation; but his hopes are always ſuperior to his fears: And, if he were not alarmed by that cruel parade of grief which too often imbitters the ſick man's couch, he would never perceive the approach of his diſſolution.

Death, therefore, is not that horrible object which we have fancied to ourſelves. It is a ſpectre which terrifies us at a diſtance, but diſappears when we approach it more cloſely. Our conceptions of it are founded on prejudice; and we regard it not only as the greateſt of all miſfortunes,

fortunes, but as accompanied with the moſt excruciating tortures. The pain, it is ſaid, muſt be extreme when the ſoul ſeparates from the body; its duration may alſo be long, ſince time is meaſured by the celerity of ideas; and one painful moment, by augmenting the rapidity of our ideas, may have the appearance of an age, when the train of ideas proceeds with their uſual gentleneſs and tranquillity. This reaſoning is ſuch an abuſe of philoſophy, that, if it had no influence in increaſing the miſeries of human life, it merits nothing but ſilence and contempt. As ſuch arguments, however, gain credit with weak minds, and render the aſpect of death a thouſand times more hideous than it really is, a refutation of them may be attended with utility.

When the ſoul is firſt united to the body, do we feel a joy that tranſports us? No. This union is effected without our perception; why, then, ſhould we be conſcious of their diſſolution? What reaſon have we to believe that the ſeparation of the ſoul and body is attended with extreme pain? What cauſe ſhould produce this pain? Does it reſide in the ſoul or in the body? Pain of mind can only reſult from thought; and pain of body is always proportioned to its ſtrength or weakneſs. At the approach of natural death, the body is in its weakeſt ſtate, and, of courſe, it can feel but very little, if any pain.

Let us now ſuppoſe a violent death: Can the ſufferings of a man, for example, whoſe head is carried

carried off by a cannon-ball, be more than inſtantaneous? Can the ſucceſſion of his ideas, during this inſtant, be ſo rapid as to make the pain ſeem to continue for an hour, a day, or a century? We ſhall endeavour to diſcuſs this point.

I acknowledge that the ſucceſſion of our ideas is the only natural meaſure of time, and that we conceive it to be ſhorter or longer in proportion to the uniformity or irregularity of their motions. But, in this meaſure, there is a unit or fixed point, which is neither arbitrary nor indefinite, but is determined by Nature, and correſponds with the particular organization of individuals. Two ideas, which ſucceed each other, muſt neceſſarily be ſeparated by an interval; one thought, however rapid, muſt require ſome portion of time before it can be followed by another. No ſucceſſion can take place in an indiviſible inſtant. The ſame remark is applicable to ſentiment or feeling. A certain time muſt elapſe in the tranſition from pain to pleaſure, or from one painful ſenſation to another. This interval between our thoughts and ſenſations is the unit or fixed point formerly mentioned; and it can neither be extremely long nor extremely ſhort, but muſt be nearly equal in its duration; becauſe it depends on the nature of the mind and the organization of the body, the movements of which muſt have a determined degree of celerity. In the ſame individual,

vidual, therefore, there can be no ſucceſſion of ideas ſo rapid, or ſo ſlow, as to produce that enormous difference in duration, by which a momentary pain is prolonged to that of an hour, a day, or a century.

A very acute pain, if continued for a certain time, uniformly brings on either fainting or death. Our organs, which are endowed only with a certain degree of force, cannot reſiſt more than a certain quantity of pain. If the pain becomes exceſſive, the organs are unable to ſupport it; and, of courſe, they can tranſmit no intelligence of it to the mind, with which there is no correſpondence but by the diſtinct action of theſe organs. In this caſe, the action of the organs is interrupted; and, conſequently, all internal ſenſation is at an end.

What I have already remarked is perhaps more than is ſufficient to evince, that the inſtant of death is neither accompanied with extreme nor long-continued pain. But, in order to eradicate the fears of the moſt timid of mankind, we ſhall ſtill add a few words upon this ſubject. Exceſſive pain extinguiſhes all reflection, though ſymptoms of it have ſometimes appeared in the very moment of violent death. When Charles XII. received the blow which terminated, in an inſtant, both his enterpriſes and his exiſtence, he clapped his hand upon his ſword. This mortal pang, ſince it excluded not reflection, could not be exceſſive. He found himſelf attacked; he

he conſidered that he ought to defend himſelf; it is evident, therefore, that he felt no greater pain than he would have ſuffered from an ordinary ſtroke. This action could not be the reſult of a mechanical impulſe; for I have ſhewn, in the deſcription of man, that the moſt precipitate movements of the paſſions depend upon reflection, and are nothing but habitual exertions of the mind.

I would not have dwelt ſo long upon this ſubject, if I had not been anxious to eradicate a prejudice ſo repugnant to the happineſs of man. I have ſeen many victims ſacrificed to this prejudice, eſpecially among the female ſex, who die daily through the terror of death. Such dreadful apprehenſions ſeem peculiarly to affect thoſe who, by nature or education, are endowed with ſuperior ſenſibility; for the vulgar look forward to their diſſolution, either with indifference, or, at leaſt, without any degree of terror.

True philoſophy views objects as they exiſt. Our internal feelings would uniformly accord with this philoſophy, if they were not perverted by the illuſions of imagination, and by the unfortunate habit of creating hypothetical phantoms of exceſſive pains, and of pleaſures which exceed the limits of human nature. Objects are only terrible or raviſhing at a diſtance; when we have the reſolution or the wiſdom to take a near inſpection of them, every alarming

and every alluring circumſtance inſtantly diſappear.

If this doctrine, concerning the gradual and generally inſenſible decay of the vital powers, required any farther ſupport, no inconſiderable aid might be derived to it from the uncertainty of the ſigns of death. If we conſult the writers on this ſubject, and particularly thoſe of Winſlow and Bruhier, we ſhall receive full conviction, that between life and death, the ſhade is often ſo undiſtinguiſhable, as to elude all the powers of the medical art. They inform us, 'That the colour of the face, the heat of the body, the ſuppleneſs of the joints, are uncertain marks of life; and that the paleneſs of the countenance, the coldneſs of the body, the rigidity of the extremities, the ceſſation of motion, and the abolition of the ſenſes, are very equivocal ſigns of death.' The ſame remark may be made with regard to the apparent ceſſation of the pulſe, and of reſpiration: Theſe motions are often ſo ſlow, that they elude all our perceptions. A mirror or a candle is applied near the mouth of a ſick man; if the mirror be ſullied, or the flame vibrates, life is concluded not to be extinguiſhed. But theſe effects are often produced, after death has actually taken place; and ſometimes they appear not, though the patient be ſtill alive. When we wiſh to be certain of the death of any perſon, we apply fumes of tobacco, and other irritating bodies, to the noſtrils; we endeavour

to excite the organs by violent agitations, by pricking or ſcarifying the hands and feet, by applying red hot iron or wax to different parts of the body, by raiſing loud and unuſual cries, &c. But inſtances have occurred where all theſe and ſimilar trials have proved abortive; and yet, to the aſtoniſhment of the ſpectators, the perſon ſuppoſed to be dead has afterwards recovered the powers of life.

Hence nothing can be more apparent, than that a certain condition of life has a great reſemblance to actual death. Both humanity and reaſon, therefore, require that we ſhould be cautious of abandoning the body, and of committing it too haſtily to the grave. Neither ten, twenty, nor twenty-four hours are ſufficient to diſtinguiſh a real from an apparent death; ſince inſtances are not wanting of perſons returning from the tomb at the end of two and of three days. Why ſhould we precipitate the interment of thoſe perſons, the prolongation of whoſe lives we moſt ardently deſire? Why ſhould a practice ſubſiſt, in the abolition of which all men are equally intereſted? Are not the frequent abuſes recorded by phyſicians ſufficient to deter us from too haſty interments? Mr. Winſlow * informs us, 'That the body, though living, is 'ſometimes ſo completely deprived of every vi-'tal function, that it has every external appear-

* See Winſlow Diſſert. ſur l'Incertitude des Signes de la Mort, p. 84.

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'ance of death. But,' he remarks, 'both re-'ligion and charity require, that a reaſonable 'time ſhould be allowed to diſcover whether any 'ſigns of life may not ſtill manifeſt themſelves, 'otherwiſe we become actual murderers, by 'burying people who are not dead. If we may 'credit the greateſt number of authors, three 'days, or 72 hours, are ſufficient for this pur-'poſe. If, during this period, no ſigns of life 'appear, but, on the contrary, the body begins 'to emit a cadaverous odour, which is an infal-'lible mark of death, we may then bury it with-'out ſcruple.'

We ſhall afterwards have an opportunity of mentioning the cuſtoms of different nations with regard to funerals, embalming, &c. The greateſt part, even of the moſt ſavage people, pay more attention than we to their departed friends: What we eſteem a ceremony only, they regard as a primary duty: They reſpect their dead; they clothe them; they ſpeak to them; they recite their exploits; they praiſe their virtues: But we, who pretend to ſuperior ſenſibility, fly from our dead, and inhumanly abandon them; we deſire not to ſee them; we have neither the courage nor the inclination to ſpeak of them; we even avoid ſuch objects or ſituations as might recal the idea of them: We are, therefore, either more indifferent, or weaker, than ſavages.

Having

Having thus traced the hiſtory of life and death with regard to the individual, let us now conſider both in relation to the whole ſpecies. Man dies at every age; and, though the duration of his life be longer than that of moſt animals, yet it is unqueſtionably more various and uncertain. Attempts have lately been made to aſcertain theſe uncertainties, and, by obſervations, to fix ſome ſtandard with regard to the mortality of mankind at different periods of life. If theſe obſervations were ſufficiently numerous and exact, they would be of great utility in determining the number of people, their increaſe, the conſumption of proviſions, &c. Many authors have written with ability on this ſubject. M. de Parcieux, of the academy of ſciences, has lately publiſhed an excellent work for regulating tontins and annuities. But, as his principal object was to calculate the mortality of annuitants, and as ſuch perſons are particularly pitched upon for their apparent ſtrength of conſtitution, his calculations cannot be applied to mankind in general. For the ſame reaſon, his curious tables of the mortality of the different orders of religious muſt be confined to their proper objects. Hally, Grant, Kerſboom, Simpſon, &c. have alſo given tables of the mortality of the human ſpecies. But, as their obſervations have been limited to the bills of mortality in a few pariſhes of London, Breſlau, and other large towns, they can afford little information as to the genera mortality

mortality of mankind. To make complete tables of this kind, it is neceſſary to ſcrutinize the pariſh-regiſters, not only of London, Paris, &c. where there is a perpetual ingreſs of ſtrangers, and egreſs of natives, but likewiſe thoſe of the country, that, by comparing the reſults of both, general concluſions may be formed. M. Dupré de St. Maur, a member of the French Academy, has executed this plan upon twelve pariſhes in the country of France, and three in Paris. Having obtained his permiſſion to publiſh his tables, I do it the more chearfully, as they are the only calculations by which the probability of human life, in general, can be aſcertained with any degree of certainty.

Parishes.	Deaths.	YEARS of LIFE. 1	2	3	4	5
Clemont -	1391	578	73	36	29	16
Brinon - -	1141	441	75	31	27	10
Jouy - -	588	231	43	11	13	5
Leſtiou - -	223	89	16	9	7	1
Vandeuvre -	672	156	58	18	19	10
St. Agil - -	954	359	64	30	21	20
Thury - -	262	103	31	8	4	3
St. Amant -	748	170	61	24	11	12
Montigny -	833	346	57	19	25	16
Villeneuve -	131	14	3	5	1	1
Gouſſainville -	1615	565	184	63	38	34
Ivry - -	2247	686	298	96	61	50
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		3738	963	350	256	178
Deaths before the end of 1ſt, 2d, &c. years.		3738	4701	5051	5307	5485
Number of perſons entered into their 1ſt; 2d, &c. years.		10805	7067	6104	5754	5498
St. André -	1728	201	122	94	82	50
St. Hippolyte	2516	754	361	127	64	60
St. Nicolas -	8945	1761	932	414	298	221
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		2716	1415	635	444	331
Deaths before the end of 1ſt, 2d, &c. years.		2716	4131	4766	5210	5541
Number of perſons entered into their 1ſt, 2d, &c. years.		13189	10473	9058	8423	7979
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		6454	2378	985	700	509
Deaths before the end of 1ſt, 2d, &c. years.		6454	8832	9817	10517	11026
Number of perſons entered into their 1ſt, 2d, &c. years.		23994	17540	15162	14177	12477

YEARS of LIFE. 6	7	8	9	10	11	12	13
16	14	10	8	4	6	5	6
16	9	9	8	5	2	12	2
8	4	6	1	0	3	0	3
4	3	1	1	1	0	1	0
11	8	10	3	2	1	3	3
11	4	7	2	7	3	3	3
2	2	2	1	2	0	0	0
15	3	6	8	6	4	4	2
21	9	7	5	5	2	4	4
0	0	0	0	0	0	1	0
21	17	15	12	8	5	5	9
29	34	26	13	19	9	6	4
154	107	99	62	59	35	44	36
5639	5746	5845	5907	5960	6001	6045	6081
5320	5166	5059	4960	4898	4839	4804	4760
35	28	14	8	7	3	9	6
55	25	16	20	8	9	9	6
162	147	111	64	40	34	38	25
252	200	141	92	55	46	56	37
5793	5993	6134	6226	6281	6327	6383	6420
7648	7396	7196	7055	6963	6908	6862	6806
406	307	240	154	114	81	100	73
11432	11639	11979	12133	12247	12328	12428	12501
12968	12562	12255	12015	11861	11747	11666	11566

PARISHES.	Deaths.	YEARS of LIFE. 14	15	16	17	18	19	20	21	22	23	24	25	26
Clemont -	1391	5	5	6	6	10	3	13	8	9	10	7	22	9
Brinon - -	1141	6	4	5	9	4	5	14	8	14	7	11	24	9
Jouy - -	588	3	1	6	4	4	3	5	2	4	4	4	5	2
Leſtiou - -	223	1	1	1	1	0	0	0	0	0	3	0	1	1
Vandeuvre -	672	4	5	6	3	3	4	7	4	6	8	6	22	3
St. Agil - -	954	3	5	2	7	8	5	6	4	6	3	6	11	10
Thury - -	262	0	1	0	1	1	1	1	1	3	1	1	2	2
St. Amant -	748	5	1	5	3	6	1	4	7	6	6	4	5	4
Montigny - -	833	2	4	2	2	3	3	5	4	3	10	8	7	3
Villeneuve -	131	0	1	0	2	4	0	1	1	4	1	0	1	0
Gouſſainville -	1615	5	5	2	5	10	9	10	6	10	5	6	11	9
Ivry - -	2247	4	8	7	4	14	10	12	6	15	10	9	10	14
Total deaths	10805													
Diviſion of 10805 deaths into the years they happened.		38	41	42	47	67	44	78	51	80	68	62	121	66
Deaths before the end of 14th, 15th, &c. years.		6119	6160	6202	6249	6316	6360	6438	6480	6569	6637	6699	6820	6886
Number of perſons entered into their 14th, 15th, &c. years.		4724	4686	4645	4603	4556	4489	4445	4367	4316	4236	4168	4106	3985
St. André -	1728	7	10	13	13	11	10	7	9	17	11	9	9	8
St. Hippolyte	2516	7	6	5	7	9	7	3	2	8	7	9	10	13
St Nicolas -	8945	21	33	37	37	28	44	53	31	56	48	41	59	47
Total deaths	13189													
Diviſion of 13189 deaths into the years they happened.		35	49	55	57	48	61	63	42	81	66	59	78	68
Deaths before the end of 14th, 15th, &c. years.		6455	6504	6559	6616	6664	6725	6788	6830	6911	6977	7036	7114	7182
Number of perſons entered into their 14th, 15th, &c. years.		6769	6734	6685	6630	6573	6525	6464	6401	6359	6278	6212	6153	6075
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		73	90	97	104	115	105	141	93	161	134	121	199	134
Deaths before the end of 14th, 15th, &c. years.		12574	12664	12761	12865	12980	13085	13226	13319	13480	13614	13735	13934	14068
Number of perſons entered into their 14th, 15th, &c. years.		11493	11420	11330	11233	11129	11014	10909	10768	10675	10514	10380	10259	10060

Parishes.	Deaths.	YEARS of LIFE. 27	28	29	30	31
Clemont - -	1391	13	10	7	24	4
Brinon - -	1141	7	13	6	28	6
Jouy - -	588	2	3	4	8	2
Leſtiou - -	223	1	3	1	1	4
Vandeuvre -	672	5	10	1	28	2
St. Agil - -	954	4	9	2	16	8
Thury - -	262	0	5	2	2	0
St. Amant -	748	4	3	3	8	2
Montigny -	833	3	3	0	6	1
Villeneuve -	131	2	1	1	2	1
Gouſſainville -	1615	9	8	10	10	4
Ivry - -	2247	5	9	5	13	8
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		55	77	42	146	42
Deaths before the end of 27th, 28th, &c. years.		6941	7018	7060	7206	7248
Number of perſons entered into their 27th, 28th, &c. years.		3919	3864	3787	3745	3599
St. André -	1728	17	13	11	21	6
St. Hippolyte	2516	10	10	9	7	9
St. Nicolas -	8945	53	51	34	63	25
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		80	74	54	91	40
Deaths before the end of 27th, 28th, &c. years.		7262	7336	7390	7481	7521
Number of perſons entered into their 27th, 28th, &c. years.		6007	5927	5853	5799	5708
Diviſion of 25994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		135	151	96	237	82
Deaths before the end of 27th, 28th, &c. years.		14203	14354	14450	14687	14769
Number of perſons entered into their 27th, 28th, &c. years.		9926	9793	9640	9544	9307

YEARS of LIFE. 32	33	34	35	36	37	38	39
13	14	8	17	12	18	15	3
15	3	4	20	8	8	8	6
5	4	3	13	6	7	4	1
4	3	1	6	4	4	1	1
9	1	3	17	5	5	4	0
7	2	5	18	9	4	5	1
3	1	0	7	0	1	2	2
8	6	5	7	4	5	5	3
10	3	4	8	4	1	2	0
2	1	0	6	5	0	5	0
14	6	7	8	8	5	2	7
11	18	10	19	12	13	23	3
101	62	50	146	77	71	76	27
7349	7411	7461	7607	7684	7755	7831	7858
3557	3456	3394	3344	3198	3121	3050	2974
10	17	15	21	14	8	12	4
12	13	13	16	21	15	13	10
57	41	54	82	75	58	59	46
79	71	82	119	110	81	84	60
7600	7671	7753	7872	7982	8063	8147	8207
5668	5589	5518	5436	5317	5207	5126	5042
180	133	132	265	187	158	160	87
14949	15082	15214	15479	15666	15818	15978	16065
9245	9045	8912	8770	8515	8328	8176	8016

Parishes.	Deaths.	YEARS of LIFE. 40	41	42	43	44
Clemont -	1391	41	4	10	10	6
Brinon -	1141	37	6	8	3	6
Jouy - -	588	20	0	3	0	4
Leſtiou - -	223	4	0	2	2	0
Vandeuvre -	672	41	1	3	2	2
St. Agil - -	954	22	2	8	7	3
Thury - -	262	4	1	3	1	4
St. Amant -	748	20	1	6	2	4
Montigny -	833	8	3	6	5	4
Villeneuve -	131	7	0	3	1	0
Gouſſainville -	1615	14	10	11	4	5
Ivry - -	2247	27	7	19	7	14
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		245	35	82	44	52
Deaths before the end of 40th, 41ſt, &c. years.		8103	8138	8220	8264	8316
Number of perſons entered into their 40th, 41ſt, &c. years.		2947	2702	2667	2585	2541
St. André -	1728	26	5	19	12	10
St. Hippolyte -	2516	24	4	18	14	9
St. Nicolas -	8945	109	37	73	58	45
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		159	46	110	84	64
Deaths before the end of 40th, 41ſt, &c. years.		8366	8412	8522	8606	8670
Number of perſons entered into their 40th, 41ſt, &c. years.		4982	4823	4777	4667	4583
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		404	81	192	128	116
Deaths before the end of 40th, 41ſt, &c. years.		16469	16550	16742	16870	16986
Number of perſons entered into their 40th, 41ſt, &c. years.		7929	7525	7444	7252	7124

YEARS of LIFE.

45	46	47	48	49	50	51	52
20	5	8	5	6	31	0	5
11	5	6	9	0	23	1	3
13	3	4	2	0	20	2	3
3	3	0	3	3	5	1	1
14	5	3	1	0	31	0	2
14	1	3	3	0	24	3	9
3	0	0	0	0	3	0	0
13	3	4	6	0	23	1	4
13	6	1	6	1	10	2	5
2	1	2	3	0	7	2	1
11	9	5	12	6	15	4	9
22	10	7	12	6	24	6	14
139	51	43	62	22	216	22	56
8455	8506	8549	8611	8633	8849	8871	8927
2489	2350	2299	2256	2194	2172	1956	1934
24	21	9	13	10	24	7	18
33	14	13	15	12	20	10	19
111	54	47	68	50	120	40	59
168	89	69	96	72	164	57	96
8838	8927	8996	9092	9164	9328	9385	9481
4519	4351	4262	4193	4097	4025	3861	3804
307	140	112	158	94	380	79	152
17293	17433	17545	17703	17797	18177	18256	18408
7098	6701	6561	6449	6291	6167	5817	5738

Parishes.	Deaths.	YEARS of LIFE. 53	54	55	56	57
Clemont - -	1391	5	5	14	5	5
Brinon - -	1141	3	2	10	6	2
Jouy - -	588	2	5	7	4	5
Leſtiou - -	223	0	0	2	2	0
Vandeuvre -	672	1	1	13	1	1
St. Agil - -	954	2	2	10	3	5
Thury - -	262	1	1	4	0	1
St. Amant -	748	4	4	6	5	4
Montigny -	833	2	5	10	3	4
Villeneuve -	131	0	1	0	3	1
Gouſſainville -	1615	5	9	6	10	10
Ivry - -	2247	13	9	29	12	13
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		38	44	111	54	51
Deaths before the end of 53d, 54th, &c. years.		8965	9009	9120	9174	9225
Number of perſons entered into their 53d, 54th, &c. years.		1878	1840	1796	1685	1631
St. André -	1728	8	10	19	11	15
St. Hippolyte -	2516	6	10	25	9	15
St. Nicolas -	8945	49	46	125	56	48
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		63	66	169	76	78
Deaths before the end of 53d, 54th, &c. years.		9544	9610	9779	9855	9933
Number of perſons entered into their 53d, 54th, &c. years.		3708	3645	3579	3410	3334
Diviſion of 23394 deaths in the three pariſhes of Paris, and 12 country pariſhes.		101	110	280	130	129
Deaths before the end of 53d, 54th, &c. years.		18509	18619	18899	19029	19158
Number of perſons entered into their 53d, 54th, &c. years.		5586	5485	5375	5095	4965

YEARS of LIFE. 58	59	60	61	62	63	64	65
4	4	52	2	6	5	2	5
3	0	24	1	3	4	7	7
2	0	20	0	5	2	4	5
3	0	2	0	0	1	0	3
2	0	35	0	0	1	1	5
3	3	22	3	2	7	5	7
3	1	6	0	3	2	2	2
7	2	27	0	4	3	4	12
9	2	13	3	7	5	5	7
2	1	4	3	0	1	1	2
10	3	24	6	9	7	6	13
13	3	40	3	12	12	11	14
61	19	269	21	51	50	48	82
9286	9305	9574	9595	9646	9696	9744	9826
1580	1519	1500	1231	1210	1159	1109	1061
17	11	46	11	21	19	17	20
18	12	35	7	28	21	23	25
86	48	184	42	77	71	73	95
121	71	265	60	126	111	113	140
10054	10125	10390	10450	10576	10687	10800	10940
3256	3135	3064	2799	2739	2613	2502	2389
182	90	534	81	177	161	161	122
19340	19430	19964	20045	20222	20383	20544	20766
4836	4654	4564	4030	3949	3772	3611	3450

Parishes.	Deaths.	YEARS of LIFE. 66	67	68	69	70
Clemont -	1391	5	3	4	1	11
Brinon - -	1141	6	3	6	0	6
Jouy - -	588	2	1	1	1	3
Leſtiou - -	223	1	1	0	1	0
Vandeuvre -	672	3	0	2	1	9
St. Agil - -	954	3	6	5	2	19
Thury - -	262	1	3	1	0	7
St. Amant -	748	7	5	6	6	18
Montigny -	833	6	2	5	1	9
Villeneuve -	131	3	0	1	0	4
Gouſſainville -	1615	17	13	15	5	16
Ivry - -	2247	21	5	23	7	31
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		75	42	69	25	133
Deaths before the end of 66th, 67th, &c. years.		9901	9943	10012	10037	10170
Number of perſons entered into their 66th, 67th, &c. years.		979	904	862	793	768
St. André -	1728	27	21	25	9	36
St. Hippolyte -	2516	19	12	20	13	35
St. Nicolas -	8945	95	67	115	50	177
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		141	100	160	72	248
Deaths before the end of 66th, 67th, &c. years.		11081	11181	11341	11413	11661
Number of perſons entered into their 66th, 67th, &c. years.		2249	2108	2008	1848	1776
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		216	142	229	97	382
Deaths before the end of 66th, 67th, &c. years.		20982	21124	21353	21450	21831
Number of perſons entered into their 66th, 67th, &c. years.		3228	3012	2870	2641	2544

YEARS of LIFE. 71	72	73	74	75	76	77	78
1	3	1	3	5	1	1	2
2	12	2	0	4	2	0	3
1	2	0	1	1	0	0	0
0	2	0	0	0	0	0	0
1	4	0	0	3	0	1	0
1	11	5	5	8	0	3	4
0	2	1	0	0	0	1	0
3	10	2	2	18	2	4	4
2	8	3	2	9	1	4	2
0	3	0	0	0	0	2	1
8	22	12	12	16	6	6	8
6	21	11	19	24	12	11	14
25	100	37	44	88	24	33	38
10195	10295	10332	10376	10464	10488	10521	10559
635	610	510	473	429	341	317	284
9	25	14	19	20	16	10	25
10	28	5	15	23	11	18	15
64	118	53	90	127	63	59	69
83	171	72	124	170	90	87	109
11744	11915	11987	12111	12281	12371	12458	12567
1528	1445	1274	1202	1078	908	818	731
108	271	109	168	258	114	120	147
21939	22210	22319	22487	22745	22859	22979	23126
2160	2155	1784	1675	1507	1249	1135	1015

Parishes.	Deaths.	YEARS of LIFE. 79	80	81	82	83
Clemont -	1391	2	6	0	0	0
Brinon - -	1141	0	3	1		
Jouy - -	588	0	2	0	0	0
Leſtiou - -	223	0	1	0	0	0
Vandeuvre -	672	0	7	0	0	0
St. Agil -	954	0	6	0	0	0
Thury - -	262	0	3			
St. Amant -	748	2	17	1	3	1
Montigny -	833	0	5	1	4	1
Villeneuve -	131	1	1	0	0	0
Gouſſainville -	1615	1	17	6	9	5
Ivry - -	2247	9	19	7	14	4
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		15	89	16	30	11
Deaths before the end of 79th, 80th, &c. years.		10574	10663	10679	10709	10720
Number of perſons entered into their 79th, 80th, &c. years.		246	231	142	126	96
St. André -	1728	8	17	4	10	8
St. Hippolyte -	2516	8	18	4	5	16
St. Nicolas -	8945	30	121	32	41	37
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		46	156	40	56	61
Deaths before the end of 79th, 80th, &c. years.		12613	12769	12809	12865	12926
Number of perſons entered into their 79th, 80th, &c. years.		622	576	420	380	324
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		61	245	56	86	72
Deaths before the end of 79th, 80th, &c. years.		23187	23432	23488	23574	23646
Number of perſons entered into their 79th, 80th, &c. years.		868	807	562	506	420

YEARS of LIFE.

84	85	86	87	88	89	90	91
3	0	1	0	0	1		
0	0	0	0	1			
0	1						
0	0	0	1	1			
0	0	0	0	0	0	2	0
3	4	0	1	2	0	4	1
1	0	0	0	0	0	1	
0	0	0	0	0	1		
7	2	4	4	2	2		
7	5	4	2	3	1	2	0
21	12	9	8	9	5	9	1
10741	10753	10762	10770	10779	10784	10793	10794
85	64	52	43	35	26	21	12
7	3	7	4	5	2	4	0
4	10	4	1	4	2	2	2
25	35	19	20	25	4	17	5
36	48	30	25	34	8	23	7
12962	13010	13040	13065	13099	13107	13130	13137
263	227	179	149	124	90	82	59
57	50	39	33	43	13	32	8
23703	23763	23802	23835	22878	23891	23923	23931
348	291	231	192	159	116	103	71

		YEARS of LIFE.				
Parishes.	Deaths.	92	93	94	95	96
Clemont - -	1391					
Brinon - -	1141					
Jouy - -	588					
Leſtiou - -	223					
Vandeuvre -	672					
St. Agil -	954	0	0	0	0	0
Thury - -	262					
St. Amant -	748	1	0	0	2	1
Montigny -	833					
Villeneuve -	131					
Gouſſainville -	1615					
Ivry - -	2247	2	0	0	1	0
Total deaths	10805					
Diviſion of 10805 deaths into the years they happened.		3	0	0	3	1
Deaths before the end of 92d, 93d, &c. years.		10797	10797	10797	10800	10801
Number of perſons entered into their 92d, 93d, &c. years.		11	8	8	8	5
St. André -	1728	2	1	2	0	1
St. Hippolyte -	2516	2	1	1	2	1
St. Nicolas -	8945	9	5	4	5	2
Total deaths	13189					
Diviſion of 13189 deaths into the years they happened.		13	7	7	7	4
Deaths before the end of 92d, 93d. &c. years.		13150	13157	13164	13171	13175
Number of perſons entered into their 92d, 93d, &c. years.		52	39	32	25	18
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		16	7	7	10	5
Deaths before the end of 92d, 93d, &c. years.		23947	23954	23961	23971	23976
Number of perſons entered into their 92d, 93d, &c. years.		63	47	41	33	23

		YEARS of LIFE.			
Parishes.	Deaths.	97	98	99	100
Clemont - -	1391				
Brinon - -	1141				
Jouy - -	588				
Leſtiou - -	223				
Vandeuvre -	672				
St. Agil - -	954	0	0	0	
Thury - -	262				
St. Amant -	748	0	3		
Montigny -	833				
Villeneuve -	131				
Gouſſainville -	1615				
Ivry - -	2247				
Total deaths	10805				
Diviſion of 10805 deaths into the years they happened.		0	3	0	1
Deaths before the end of 97th, 98th, &c. years.		10801	10804	10804	10805
Number of perſons entered into their 97th, 98th, &c. years.		4	4	1	1
St. André -	1728	1	0	0	0
St. Hippolyte	2516	0	1		
St. Nicolas -	8945	1	4	1	4
Total deaths	13189				
Diviſion of 13189 deaths into the years they happened.		2	5	1	4
Deaths before the end of 97th, 98th, &c. years.		13177	13182	13183	13187
Number of perſons entered into their 97th, 98th, &c. years.		14	12	7	6
Diviſion of 23994 deaths in the three pariſhes of Paris, and 12 country pariſhes.		2	8	1	5
Deaths before the end of 97th, 98th, &c. years.		23978	23986	23987	23992
Number of perſons entered into their 97th, 98th, &c. years.		18	16	8	7

Many uſeful concluſions might be drawn from the above tables of M. Dupré. But I ſhall confine myſelf to thoſe which regard the probabilities of the duration of life. In the columns under the years, 10, 20, 30, 40, 50, 60, 70, 80, and other round numbers, as 25, 35, &c. there are, in the country-pariſhes, more deaths than in the preceding or ſubſequent columns. This is owing to the ages not being juſtly regiſtered, moſt country-people being unable to aſcertain their ages within leſs than two or three years. If they die at 58 or 59, they are regiſtered at 60, and ſo of other round numbers. But this irregularity gives riſe to no great inconvenience, as it can eaſily be corrected by the manner in which the numbers ſucceed each other in the tables.

It appears from the tables of the country-pariſhes, that one half of the children die nearly about the end of the fourth year; but, from the Paris table, 16 years are neceſſary to produce the ſame effect. This great difference proceeds from a general practice of the Pariſians, who ſend their children to be nurſed in the country, which neceſſarily increaſes the number of deaths during the firſt years of infancy. In the following calculation, I have eſtimated the probabilities of the duration of life from a combination of both tables; which muſt, therefore, make a very near approach to the truth.

TABLE,

TABLE, ſhowing the Probabilities of the Duration of Human Life.

Age.	Duration of life.		Age.	Duration of life.		Age.	Duration of life.	
Years.	Years.	Months.	Years.	Years.	Months.	Years.	Years.	Months.
0	8	0	29	28	6	58	12	3
1	33	0	30	28	0	59	11	8
2	38	0	31	27	6	60	11	1
3	40	0	32	26	11	61	10	6
4	41	0	33	26	3	62	10	0
5	41	6	34	25	7	63	9	6
6	42	0	35	25	0	64	9	0
7	42	3	36	24	5	65	8	6
8	41	6	37	23	10	66	8	0
9	40	10	38	23	3	67	7	6
10	40	2	39	22	8	68	7	0
11	39	6	40	22	1	69	6	7
12	38	9	41	21	6	70	6	2
13	38	1	42	20	11	71	5	8
14	37	5	43	20	4	72	5	4
15	36	9	44	19	9	73	5	0
16	36	0	45	19	3	74	4	9
17	35	4	46	18	9	75	4	6
18	34	8	47	18	2	76	4	3
19	34	0	48	17	8	77	4	1
20	33	5	49	17	2	78	3	11
21	32	11	50	16	7	79	3	9
22	32	4	51	16	0	80	3	7
23	31	10	52	15	6	81	3	5
24	31	3	53	15	0	82	3	3
25	30	9	54	14	6	83	3	2
26	30	2	55	14	0	84	3	1
27	29	7	56	13	5	85	3	0
28	29	0	57	12	10			

From this table, it appears, that a new born infant, or a child of 0 age, has an equal chance of living 8 years; that a child of 1 year will live 33 more; that a child of 2 years will live 38 more; that a man of 20 years will live 33 and five months more; and that a man of 30 years will live 28 more, &c.

It may be farther obſerved, 1. That 7 years is the age at which the longeſt duration of life is to be expected; for there is then an equal chance of ſurviving 42 years 3 months; 2. That, at 12 years, one fourth of life is expired, ſince we have no reaſon to hope for above 38 or 39 years more; 3. That, at 28 or 29 years, we have lived one half of our days, ſince there are only 28 more to be expected; and, laſtly, That, at the age of 50, three fourths of life are gone, the remaining chance extending only to 16 or 17 years longer.

But theſe phyſical truths, however mortifying, may be alleviated by moral conſiderations. The firſt 15 years of our exiſtence may be regarded as nothing: Every thing that paſſes during this long period, is either obliterated from the memory, or has ſo little connection with the views and objects which afterwards occupy our attention, that it ceaſes entirely to be intereſting. The train of our ideas, and even the nature of our exiſtence, ſuffer a total change. We begin not to live, in a moral ſenſe, till after we have learned

learned to arrange our thoughts, to direct them towards futurity, to aſſume a kind of conſiſtency of character ſimilar to that ſtate at which we are ultimately deſtined to arrive. Conſidering the duration of life in this point of view, which is the only real one, at the age of 25, we have paſſed one fourth of our days, at the age of 38, one half, and, at the age of 56, three fourths.

END OF THE SECOND VOLUME.