ON THE NATURAL FACULTIES pdf

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The so-called blood-making faculty in the veins, then, as well as all the other faculties, fall within the category of relative concepts; primarily because the faculty is the cause of the activity, but also, accidentally, because it is the cause of the effect.

It was also shown that a sufficient supply of the matter which the part being nourished makes into nutriment for itself is ensured by virtue of another faculty which naturally attracts its proper juice [humour], that that juice is proper to each part which is adapted for assimilation, and that the faculty which attracts the juice is called, by reason of its activity, attractive or epispastic. It has also been shown that assimilation is preceded by adhesion, and this, again, by presentation, the latter stage being, as one might say, the end or goal of the activity corresponding to the attractive faculty. For the actual bringing up of nutriment from the veins into each of the parts takes place through the activation of the attractive faculty, whilst to have been finally brought up and presented to the part is the actual end for which we desired such an activity; it is attracted in order that it may be presented. After this, considerable time is needed for the nutrition of the animal; whilst a thing may be even rapidly attracted, on the other hand to become adherent, altered, and entirely assimilated to the part which is being nourished and to become a part of it, cannot take place suddenly, but requires a considerable amount of time. But if the nutritive juice, so presented, does not remain in the part, but withdraws to another one, and keeps flowing away, and constantly changing and shifting its position, neither adhesion nor complete assimilation will take place in front of them. This faculty, again, in view of its activity our predecessors were obliged to call retentive. Let us begin our exposition, then, by first dealing systematically for a while with certain definite parts of the body, in reference to which we may accurately test and enquire what sort of thing the retentive faculty is. Now, could one begin the enquiry in any better way than with the largest and hollowest organs? Personally I do not think one could. It is to be expected that in these, owing to their size, the activities will show quite clearly, whereas with respect to the smaller organs, even if they possess a strong faculty of this kind, its activation will not at once be recognisable to sense. Now those parts of the animal which are especially hollow and large are the stomach and the organ which is called the womb or uterus. What prevents us, then, from taking up these first and considering their activities, conducting the enquiry on our own persons in regard to those activities which are obvious without dissection, and, in the case of those which are more obscure, dissecting animals which are near to man; not that even animals unlike him will not show, in a general way, the faculty in question, but because in this manner we may find out at once what is common to all and what is peculiar to ourselves, and so may become more resourceful in the diagnosis and treatment of disease. Now it is impossible to speak of both organs at once, so we shall deal with each in turn, beginning with the one which is capable of demonstrating the retentive faculty most plainly. For the stomach retains the food until it has quite digested it, and the uterus retains the embryo until it brings it to completion, but the time taken for the completion of the embryo is many times more than that for the digestion of food. For, as we know, it takes nine months in most women for the foetus to attain maturity in the womb, this organ having its neck quite closed, and entirely surrounding the embryo together with the chlorion. Further, it is the utility of the function which determines the closure of the os and the stay of the foetus in the uterus. For it is not casually nor without reason that Nature has made the uterus capable of contracting upon, and of retaining the embryo, but in order that the latter may arrive at a proper size. When, therefore, the object for which the uterus brought its retentive faculty into play has been fulfilled, it then stops this faculty and brings it back to a state of rest, and employs instead of it another faculty hitherto quiescentâ€”the propulsive faculty. In this case again the quiescent and active states are both determined by utility; when this calls, there is activity; when it does not, there is rest. Here, then, once more, we must observe well the Art [artistic tendency] of Natureâ€”how she has not merely placed in each organ the capabilities of useful activities, but has also fore-ordained the times both of rest and movement. For everything connected with the pregnancy proceeds properly, the eliminative faculty remains quiescent as though it did not exist, but if anything goes wrong in connection either with the chlorion or any of the other membranes or with the foetus itself, and its completion is entirely despaired of, then the uterus no longer awaits the nine-months period, but the retentive faculty forthwith ceases and allows the heretofore inoperative faculty to come into action. Now it is that something is doneâ€”in fact, useful work effectedâ€”by the eliminative or propulsive faculty for so it, too, has been called, receiving, like the rest, its names from the corresponding activities. Further, our theory can, I think demonstrate both together; for seeing that they succeed each other, and that the one keeps giving place to the other according as utility demands, it seems not unreasonable to accept a common demonstration also for both. Thus it is the work of the retentive faculty to make the uterus contract upon the foetus at every point, so that, naturally enough, when the midwives palpate it, the os is found to be closed, whilst the pregnant women themselves, during the first daysâ€”and particularly on that on which conception takes placeâ€”experience a sensation as if the uterus were moving and contracting upon itself. Now, if both of these things occurâ€”if the os closes apart from inflammation or any other disease, and if this is accompanied by a feeling of movement in the uterusâ€—then the women believe that they have received the semen which comes from the male, and that they are retaining it. Now we are not inventing this for ourselves: Thus Herophilus does not hesitate to state in his writings that up to the time of labour the os uteri will not admit so much as the tip of a probe, that it no longer opens to the slightest degree if pregnancy has begunâ€”that, in fact, it dilates more widely at the times of the menstrual flow. With him are in agreement all the others who have applied themselves to this subject; and particularly Hippocrates, who was the first of all physicians and philosophers to declare that the os uteri closes during pregnancy and inflammation, albeit in pregnancy it does not depart from its own nature, whilst in inflammation it becomes hard. In the case of the opposite the eliminative faculty, the os opens, whilst the whole fundus approaches as near as possible to the os, expelling the embryo as it does so; and along with the fundus the contiguous partsâ€—which form as it were a girdle round the whole organâ€—cooperate in the work; they squeeze upon the embryo and propel it bodily outwards. And, in many women who exercise such a faculty immoderately, violent cause forcible prolapse of the whole womb; here almost the same thing happens as frequently occurs in wrestingâ€—bouts and struggles, when in our eagerness to overturn and throw others we are ourselves upset along with them; for similarly when the uterus is forcing the embryo forward it sometimes becomes entirely prolapsed, and particularly when the ligaments connecting it with the spine happen to be naturally lax. And when it is sufficient to allow of the transit of the foetus, she then makes the patient get up from her bed and sit on the chair, and bids her make every effort to expel the child. Now, this additional work which the patient does of herself is no longer the work of the uterus but of the epigastric muscles, which also help us in defaecation and micturition. For if it be in a natural condition, employing its contractile faculty in the ordinary way, then, even if its contents be very small, it grasps the whole of them and does not leave any empty space. When it is weak, however, being unable to lay hold of its contents accurately, it produces a certain amount of vacant space, and amount of vacant space, and allows the liquid contents to flow about in different directions in accordance with its changes of shape, and so to produce gurglings. Thus those who are troubled with this symptom expect, with good reason, that they will also be unable to digest adequately; proper digestion cannot take place in a weak stomach. In such people also, the mass of food may be plainly seen to remain an abnormally long time in the stomach, as would be natural if their digestion were slow. Indeed, the chief way in which these people will surprise one is in the length of time that not food alone but even fluids will remain in their stomachs. Now, the actual cause of this is not, as one would imagine, that the lower outlet of the stomach, being fairly narrow, will allow nothing to pass before being reduced to a fine state of division. There are a great many people who frequently swallow large quantities of big fruit-stones; one person who was holding a gold ring in his mouth, inadvertently swallowed it; another swallowed a coin, and various people have swallowed various hard and indigestible objects; yet all these people easily passed by the bowel what they had swallowed, without there being any subsequent symptoms. Now surely if narrowness of the gastric outlet were the cause of untriturated food remaining for an abnormally long time, none of these articles I have mentioned would ever have escaped. For, supposing a rapid descent were dependent upon emulsification, then soups, milk, and barleyâ€—emulsion would at once pass along in every case. But as a matter of fact this is not so. For in people who are extremely asthenic it is just these fluids which remain undigested, which accumulate and produce gurglings, and which oppress and overload the stomach, whereas in strong persons not merely do none of these things happen, but even a large quantity of bread or meat passes rapidly down. And it is not only because the stomach is distended and loaded and because the fluid runs from one part of it to another accompanied by gurglingsâ€"it is not only for these reasons that one would judge that there was an unduly long continuance of the food in it, in those people who are so disposed, but also from the vomiting. Thus, there are some who vomit up every particle of what they have eaten, not after three or four hours, but actually in the middle of the night, a lengthy period having elapsed since their meal. Suppose you fill any animal whatsoever with liquid foodâ€"an experiment I have often carried out in pigs, to whom I give a sort of mess of wheaten flour and water, there after cutting them open after three or four hours; if you will do this yourself, you will find the food still in the stomach. For it is not chylification which determines the length of its stay hereâ€"since this can also be effected outside the stomach; the determining factor is digestion which is a different thing from chylification, as are blood-production and nutrition. For, just as it has been shown that these two processes depend upon a change of qualities, similarly also the digestion of food in the stomach involves a transmutation of it into the quality proper to that which is receiving nourishment. Then, when it is completely digested, the lower outlet opens and the food is quickly ejected through it, even if there should be amongst it abundance of stones, bones, grape-pips, or other things which cannot be reduced to chyle. And you may observe this yourself in an animal, if you will try to hit upon the time at which the descent of food from the stomach takes place. But even if you should fail to discover the time, and nothing was yet passing down, and the food was still undergoing digestion in the stomach, still even then you would find dissection not without its uses. You will observe, as we have just said, that the pylorus is accurately closed, and that the whole stomach is in a state of contraction upon the food very much as the womb contracts upon the foetus. For it is never possible to find a vacant space in the uterus, the stomach, or in either of the two bladdersâ€"that is, either in that called bileâ€"receiving or in the other; whether their contents be abundant or scanty, their cavities are seen to be replete and full, owing to the fact that their coats contract constantly upon the contentsâ€"so long, at least, as the animal is in a natural condition. Now Erasistratus for some reason declares that it is the contractions of the stomach which are the cause of everythingâ€"that is to say, of the softening of the food, the removal of waste matter, and the absorption of the food when chylified [emulsified]. Now I have personally, on countless occasions, divided the peritoneum of a still living animal and have always found all the intestines contracting peristaltically upon their contents. The condition of the stomach, however, is found less simple; as regards the substances freshly swallowed, it had grasped these accurately both above and below, in fact at every point, and was as devoid of movement as though it had grown round and become united with the food. At the same time I found the pylorus persistently closed and accurately shut, like the os uteri on the foetus. In the cases, however, where digestion had been completed the pylorus had opened, and the stomach was undergoing peristaltic movements, similar to those of the intestines. For it has been already shown that the bladder by the liver draws bile into itself, while it is also quite obvious that it eliminates this daily into the stomach. Now, of course, if the eliminative were to succeed the attractive faculty and there were not a retentive faculty between the two, there would be found, on every occasion that animals were dissected, an equal quantity of bile in the gall-bladder. This, however, we do not find. For the bladder is sometimes observed to be very full, sometimes quite empty, while at other times you find in it various intermediate degrees of fulness, just as is the case with the other bladderâ€"that which receives the urine; for even without resorting to anatomy we may observe that the urinary bladder continues to collect urine up to the time that it becomes uncomfortable through the increasing quantity of urine or the irritation caused by its acidityâ€"the presumption thus being that there, too, there is a retentive faculty. Similarly, too, the stomach, when, as often happens, it is irritated by acidity, gets rid of the food, although still undigested, earlier than proper; or again, when oppressed by the quantity of its contents, or disordered from the co-existence of both conditions, it is seized with diarrhoea. Vomiting also is an affection of the upper [part of the] stomach analogous to diarrhoea, and it occurs when the stomach is overloaded or is unable to stand the quality of the food or surplus substances which it contains. Thus, when such a condition develops in the lower parts of the stomach, while the parts about the inlet are normal, it ends in diarrhoea, whereas if the condition is in the upper stomach, the lower parts being normal, it ends in vomiting. And those especially who have a dislike to some particular kind of food, sometimes take it under compulsion, and then promptly bring it up; or, if they force themselves to keep it down, they are nauseated and feel their stomach turned up, and endeavouring to relieve itself of its discomfort. Thus, as was said at the beginning, all the observed facts testify that there must exist in almost all parts of the animal a certain inclination towards, or, so to speak, an appetite for their own special quality, and an aversion to, or, as it were, a hatred of the foreign quality. And it is natural that when they feel an inclination they should attract, and that when they feel aversion they should expel. From these facts, then, again, both the attractive and the propulsive faculties have been demonstrated to exist in everything. But if there be an inclination or attraction, there will also be some benefit derived; for no existing thing attracts anything else for the mere sake of attracting, but in order to benefit by what is acquired by the attraction. And of course it cannot benefit by it if it cannot retain it. Herein, then, again, the retentive faculty is shown to have its necessary origin: And it exists to partake of that which is of a quality befitting and proper to it. Thus it attracts all the most useful parts of the food in a vaporous and finely divided condition, storing this up in its own coats, and applying it to them. And when it is sufficiently full it puts away from it, as one might something troublesome, the rest of the food, this having itself meanwhile obtained some profit from its association with the stomach. For it is impossible for two bodies which are adapted for acting and being acted upon to come together without either both acting or being acted upon, or else one acting and the other being acted upon. For if their forces are equal they will act and be acted upon equally, and if the one be much superior in strength, it will exert its activity upon its passive neighbour; thus, while producing a great and appreciable effect, it will itself be acted upon either little or not at all. But it is herein also that the main difference lies between nourishing food and a deleterious drug; the latter masters the forces of the body, whereas the former is mastered by them. There cannot, then, be food which is suited for the animal which is not also correspondingly subdued by the qualities existing in the animal. And to be subdued means to undergo alteration. Now, some parts are stronger in power and others weaker; therefore, while all will subdue the nutriment which is proper to the animal, they will not all do so equally. Thus the stomach will subdue and alter its food, but not to the same extent as will the liver, veins, arteries, and heart. We must therefore observe to what extent it does alter it. The alteration is more than that which occurs in the mouth, but less than that in the liver and veins. For the latter alteration changes the nutriment into the substance of blood, whereas that in the mouth obviously changes it into a new form, but certainly does not completely transmute it. And you may observe the extent of the alteration which occurs to food in the mouth if you will chew some corn and then apply it to an unripe [undigested] boil: And do not let this surprise you; this phlegm [saliva] in the mouth is also a cure for lichens [apparently skin-diseases in which a superficial crust resembling the lichen on a tree-trunk formsâ€”e. Now, the masticated food is all, firstly, soaked in and mixed up with this phlegm; and secondly, it is brought into contact with the actual skin of the mouth; thus it undergoes more change than the food which is wedged into the vacant space between the teeth. But just as masticated food is more altered than the latter kind, so is food which has been swallowed more altered than that which has been merely masticated. Indeed, there is no comparison between these two processes; we have only to consider what the stomach containsâ€”phlegm, bile, pneuma, [innate] heat, and, indeed the whole substance of the stomach. And if one considers along with this the adjacent viscera like a lot of burning hearths around a great cauldronâ€”to the right the liver, to the left the spleen, the heart above, and along with it the diaphragm suspended and in a state of constant movement , and the omentum sheltering them allâ€”you may believe what an extraordinary alteration it is which occurs in the food taken into the stomach. How could it easily become blood if it were not previously prepared by means of a change of this kind? It has already been shown that nothing is altered all at once from one quality to its opposite. How then could bread, beef, beans, or any other food turn into blood if they had not previously undergone some other alteration? And how could the faeces be generated right away in the small intestine? For what is there in this organ more potent in producing alteration than the factors in the stomach? Is it the number of the coats, or the way it is surrounded by neighbouring viscera, or the time that the food remains in it, or some kind of innate heat which it contains? Most assuredly the intestines have the advantage of the stomach in none of these respects. For what possible reason, then, will objectors have it that bread may often remain a whole night in the stomach and still preserve its original qualities, whereas when once it is projected into the intestines, it straightway becomes ordure?

ON THE NATURAL FACULTIES pdf

2: Greek Medicine: THE NATURAL FACULTY

The principal organ of the Natural Faculty is the liver, which is the master metabolic chemist of the bloodstream. The liver generates the Four Humors from chyle through the combined action of the Metabolic Heat and the Natural Force, which are the basic thermal and kinetic energies of the Natural Faculty.

Description[edit] Galen produced more work than any author in antiquity , [1] [dubious â€" discuss] and may have possibly written up to treatises , although less than a third of his works have survived. His surviving work runs to around 3 million words. His edition, which is the most complete, although flawed, [1] consists of the Greek text with facing-page Latin translation. The text and translation are mainly taken from the edition of Chartier â€"39, Paris. List[edit] With Greek and Latin Titles and standardized bibliographical abbreviations: See also Cambridge Companion to Galen: Alternative names in parentheses. Of the appropriate writings of Galen. De Libris Propriis Galeni Lib. Of the order in which his writings are to be placed. De Ordine Librorum Suorum 7. Of different sects in medicine On Sects De Sectis An exposition of the empiric sect De Subfiguratio ne Empirica Subf. Of the art of medicine. De Constitutione Artis Medicae Physiology and Anatomy[edit] 1. Of temperaments On Mixtures: Of the atrabilis, or black bile. De Atra Bile, Libellus Atr. Is blood naturally contained in the arteries? Of the utility of respiration De Usu Utilitate Respirationis Of the causes of respiration De Causis Respirationis Of the motion movement of the thorax chest and lungs De Motu Thoracis et Pulmonis That the qualities of the mind depend on the temperament of the body Quod Animi Mores Corporis Temperatura Sequantur Of the foetal formation De Foetuum Formatione Foet. Of the semen On Semen De Semine.

3: On the Natural Faculties/Book Three - Wikisource, the free online library

On the Natural Faculties By Galen Translated by Arthur John Brock. On the Natural Faculties has been divided into the following sections: Book One [k].

And if there be anyone who allows a share in soul to plants as well, and separates the two kinds of soul, naming the kind in question vegetative, and the other sensory, this person is not saying anything else, although his language is somewhat unusual. We, however, for our part, are convinced that the chief merit of language is clearness, and we know that nothing detracts so much from this as do unfamiliar terms; accordingly we employ those terms which the bulk of people are accustomed to use, and we say that animals are governed at once by their soul and by their nature, and plants by their nature alone, and that growth and nutrition are the effects of nature, not of soul. II Thus we shall enquire, in the course of this treatise, from what faculties these effects themselves, as well as any other effects of nature which there may be, take their origin. First, however, we must distinguish and explain clearly the various terms which we are going to use in this treatise, and to what things we apply them; and this will prove to be not merely an explanation of terms but at the same time a demonstration of the effects of nature. When, therefore, such and such a body undergoes no change from its existing state, we say that it is at rest; but, if it departs from this in any respect we then say that in this respect it undergoes motion. Accordingly, when it departs in various ways from its pre-existing state, it will be said to undergo various kinds of motion. Thus, if that which is white becomes black, or what is black becomes white, it undergoes motion in respect to colour; or if what was previously sweet now becomes bitter, or, conversely, from being bitter now becomes sweet, it will be said to undergo motion in respect to flavour; to both of these instances, as well as to those previously mentioned, we shall apply the term qualitative motion. And further, it is not only things which are altered in regard to colour and flavour which, we say, undergo motion; when a warm thing becomes cold, and a cold warm, here, too we speak of its undergoing motion; similarly also when anything moist becomes dry, or dry moist. Now, the common term which we apply to all these cases is alteration. This is one kind of motion. But there is another kind which occurs in bodies which change their position, or as we say, pass from one place to another; the name of this is transference. These two kinds of motion, then, are simple and primary, while compounded from them we have growth and decay, as when a small thing becomes bigger, or a big thing smaller, each retaining at the same time its particular form. And two other kinds of motion are genesis and destruction, and destruction being the opposite. Now, common to all kinds of motion is change from the pre-existing state, while common to all conditions of rest is retention of the pre-existing state. The Sophists, however, while allowing that bread in turning into blood becomes changed as regards sight, taste, and touch, will not agree that this change occurs in reality. Thus some of them hold that all such phenomena are tricks and illusions of our senses; the senses, they say, are affected now in one way, now in another, whereas the underlying substance does not admit of any of these changes to which the names are given. Others such as Anaxagoras will have it that the qualities do exist in it, but that they are unchangeable and immutable from eternity to eternity, and that these apparent alterations are brought about by separation and combination. Now, if I were to go out of my way to confute these people, my subsidiary task would be greater than my main one. If, however, they know these, and yet willingly prefer the worse views to the better, they will doubtless consider my arguments foolish also. I have shown elsewhere that these opinions were shared by Hippocrates, who lived much earlier than Aristotle. In fact, of all those known to us who have been both physicians and philosophers Hippocrates was the first who took in hand to demonstrate that there are, in all, four mutually interacting qualities, and that to the operation of these is due the genesis and destruction of all things that come into and pass out of being. Nay, more; Hippocrates was also the first to recognise that all these qualities undergo an intimate mingling with one another; and at least the beginnings of the proofs to which Aristotle later set his hand are to be found first in the writings of Hippocrates. As to whether we are to suppose that the substances as well as their qualities undergo this intimate mingling, as Zeno of Citium afterwards declared, I do not think it necessary to go further into this question in the present treatise; [Greek text] need to recognize the complete alteration of substance. In this way, nobody will suppose that bread represents a kind of meeting-place for bone, flesh, nerve, and all the other parts, and that each of these subsequently becomes separated in the body and goes to join its own kind; before any separation takes place, the whole of the bread obviously becomes blood; at any rate, if a man takes no other food for a prolonged period, he will have blood enclosed in his veins all the same. And clearly this disproves the view of those who consider the elements unchangeable, as also, for that matter, does the oil which is entirely used up in the flame of the lamp, or the faggots which, in a somewhat longer time, turn into fire. I said, however, that I was not going to enter into an argument with these people, and it was only because the example was drawn from the subject-matter of medicine, and because I need it for the present treatise, that I have mentioned it. We shall then, as I said, renounce our controversy with them, since those who wish may get a good grasp of the views of the ancients from our own personal investigations into these matters. The discussion which follows we shall devote entirely, as we originally proposed, to an enquiry into the number and character of the faculties of Nature, and what is the effect which each naturally produces. Now, of course, I mean by an effect that which has already come into existence and has been completed by the activity of these facultiesâ€”for example, blood, flesh, or nerve. And activity is the name I give to the active change or motion, and the cause of this I call a faculty. Thus, when food turns into blood, the motion of the food is passive, and that of the vein active. Similarly, when the limbs have their position altered, it is the muscle which produces, and the bones which undergo the motion. In these cases I call the motion of the vein and of the muscle an activity, and that of the food and the bones a symptom or affection, since the first group undergoes alteration and the second group is merely transported. One might, therefore, also speak of the activity as an effect of Natureâ€”for example, digestion, absorption, blood-production; one could not, however, in every case call the effect an activity; thus flesh is an effect of Nature, but it is, of course, not an activity. It is, therefore, clear that one of these terms is used in two senses, but not the other. It appears to me, then, that the vein, as well as each of the other parts, functions in such and such a way according to the manner in which the four qualities are mixed. There are, however, a considerable number of not undistinguished menâ€”philosophers and physiciansâ€—who refer action to the Warm and the Cold, and who subordinate to these, as passive, the Dry and the Moist; Aristotle, in fact, was the first who attempted to bring back the causes of the various special activities to these principles, and he was followed later by the Stoic school. These latter, of course, could logically make active principles of the Warm and Cold, since they refer the change of the elements themselves into one another to certain diffusions and condensations. This does not hold of Aristotle, however; seeing that he employed the four qualities to explain the genesis of the elements, he ought properly to have also referred the causes of all the special activities to these. But if the cause is relative to somethingâ€—for it is the cause of what results from it, and of nothing elseâ€—it is obvious that the faculty also falls into the category of the relative; and so long as we are ignorant of the true essence of the cause which is operating, we call it a faculty. Thus we say that there exists in the veins a blood-making faculty, as also a digestive faculty in the stomach, a pulsatile faculty in the heart, and in each of the other parts a special faculty corresponding to the function or activity of that part. If, therefore, we are to investigate methodically the number and kinds of faculties, we must begin with the effects; for each of these effects comes from a certain activity, and each of these again is preceded by a cause. The effects of Nature, then, while the animal is still being formed in the womb, are all the different parts of its body; and after it has been born, an effect in which all parts share is the progress of each to its full size, and thereafter its maintenance of itself as long as possible. The activities corresponding to the three effects mentioned are necessarily threeâ€—one to eachâ€—namely, Genesis, Growth, and Nutrition. Genesis, however, is not a simple activity of Nature, but is compounded of alteration and of shaping. That is to say, in order that bone, nerve, veins, and all other [tissues] may come into existence, the underlying substance from which the animal springs must be altered; and in order that the substance so altered may acquire its appropriate shape and position, its cavities, outgrowths, attachments, and so forth, it has to undergo a shaping or formative process. One would be justified in calling this substance which undergoes alteration the material of the animal, just as wood is the material of a ship, and wax of an image. Growth is an increase and expansion in length, breadth, and thickness of the solid parts of the animal those which have been subjected to the moulding or shaping process. Nutrition is an addition to these, without expansion. Let us speak then, in the first place, of

Genesis, which, as we have said, results from alteration together with shaping. The seed having been cast into the womb or into the earth for there is no difference , then, after a certain definite period, a great number of parts become constituted in the substance which is being generated; these differ as regards moisture, dryness, coldness and warmth, and in all the other qualities which naturally derive therefrom. These derivative qualities, you are acquainted with, if you have given any sort of scientific consideration to the question of genesis and destruction. For, first and foremost after the qualities mentioned come the other so-called tangible distinctions, and after them those which appeal to taste, smell, and sight. Now, tangible distinctions are hardness and softness, viscosity, friability, lightness, heaviness, density, rarity, smoothness, roughness, thickness and thinness; all of these have been duly mentioned by Aristotle. And of course you know those which appeal to taste, smell, and sight. Therefore, if you wish to know which alterative faculties are primary and elementary, they are moisture, dryness, coldness, and warmth, and if you wish to know which ones arise from the combination of these, they will be found to be in each animal of a number corresponding to its sensible elements. The name sensible elements is given to all the homogeneous parts of the body, and these are to be detected not by any system, but by personal observation of dissections. Now the peculiar flesh of the liver is of this kind as well, also that of the spleen, that of the kidneys, that of the lungs, and that of the heart; so also the proper substance of the brain, stomach, gullet, intestines, and uterus is a sensible element, of similar parts all through, simple, and uncompounded. That is to say, if you remove from each of the organs mentioned its arteries, veins, and nerves, the substance remaining in each organ is, from the point of view of the senses, simple and elementary. As regards those organs consisting of two dissimilar coats, of which each is simple, of these organs the coats are the elementsâ€”for example, the coats of the stomach, oesophagus, intestines, and arteries; each of these two coats has an alterative faculty peculiar to it, which has engendered it from the menstrual blood of the mother. Thus the special alterative faculties in each animal are of the same number as the elementary parts; and further, the activities must necessarily correspond each to one of the special parts, just as each part has its special useâ€”for example, those ducts which extend from the kidneys into the bladder, and which are called ureters; for these are not arteries, since they do not pulsate nor do they consist of two coats; and they are not veins, since they neither contain blood, nor do their coats in any way resemble those of veins; from nerves they differ still more than from the structures mentioned. For in fact the two bladdersâ€”that which receives the urine, and that which receives the yellow bileâ€”not only differ from all other organs, but also from one another. Further, the ducts which spring out like kinds of conduits from the gall-bladder and which pass into the liver have no resemblance either to arteries, veins or nerves. As for the actual substance of the coats of the stomach, intestine, and uterus, each of these has been rendered what it is by a special alterative faculty of Nature; while the bringing of these together, the combination therewith of the structures which are inserted into them, the outgrowth into the intestine, the shape of the inner cavities, and the like, have all been determined by a faculty which we call the shaping or formative faculty; this faculty we also state to be artisticâ€”nay, the best and highest artâ€”doing everything for some purpose, so that there is nothing ineffective or superfluous, or capable of being better disposed. When, however, the animal has attained its complete size, then, during the whole period following its birth and until the acme is reached, the faculty of growth is predominant, while the alterative and nutritive faculties are accessoryâ€”in fact, act as its handmaids. What, then, is the property of this faculty of growth? To extend in every direction that which has already come into existenceâ€”that is to say, the solid parts of the body, the arteries, veins, nerves, bones, cartilages, membranes, ligaments, and the various coats which we have just called elementary, homogeneous, and simple. And I shall state in what way they gain this extension in every direction, first giving an illustration for the sake of clearness. Children take the bladders of pigs, fill them with air, and then rub them on ashes near the fire, so as to warm, but not to injure them. This is a common game in the district of Ionia, and among not a few other nations. As they rub, they sing songs, to a certain measure, time, and rhythm, and all their words are an exhortation to the bladder to increase in size. When it appears to them fairly well distended, they again blow air into it and expand it further; then they rub it again. This they do several times, until the bladder seems to them to have become large enough. Now, clearly, in these doings of the children, the more the interior cavity of the bladder increases in size, the thinner, necessarily, does its substance become. But, if the children were able to bring nourishment to this thin part, then they would make the bladder big in the same way that Nature does. As it is, however, they cannot do what Nature does, for to imitate this is beyond the power not only of children, but of any one soever; it is a property of Nature alone. It will now, therefore, be clear to you that nutrition is a necessity for growing things. For if such bodies were distended, but not at the same time nourished, they would take on a false appearance of growth, not a true growth. And further, to be distended in all directions belongs only to bodies whose growth is directed by Nature; for those which are distended by us undergo this distension in one direction but grow less in the others; it is impossible to find a body which will remain entire and not be torn through whilst we stretch it in the three dimensions. Thus Nature alone has the power to expand a body in all directions so that it remains unruptured and preserves completely its previous form. Such then is growth, and it cannot occur without the nutriment which flows to the part and is worked up into it. We have, then, it seems, arrived at the subject of Nutrition, which is the third and remaining consideration which we proposed at the outset. For, when the matter which flows to each part of the body in the form of nutriment is being worked up into it, this activity is nutrition, and its cause is the nutritive faculty. Of course, the kind of activity here involved is also an alteration, but not an alteration like that occurring at the stage of genesis. For in the latter case something comes into existence which did not exist previously, while in nutrition the inflowing material becomes assimilated to that which has already come into existence. Therefore, the former kind of alteration has with reason been termed genesis, and the latter, assimilation. Now, since the three faculties of Nature have been exhaustively dealt with, and the animal would appear not to need any others being possessed of the means for growing, for attaining completion, and for maintaining itself as long a time as possible , this treatise might seem to be already complete, and to constitute an exposition of all the faculties of Nature. If, however, one considers that it has not yet touched upon any of the parts of the animal I mean the stomach, intestines, liver, and the like , and that it has not dealt with the faculties resident in these, it will seem as though merely a kind of introduction had been given to the practical parts of our teaching. For the whole matter is as follows: Genesis, growth, and nutrition are the first, and, so to say, the principal effects of Nature; similarly also the faculties which produce these effectsâ€”the first facultiesâ€”are three in number, and are the most dominating of all. But as has already been shown, these need the service both of each other, and of yet different faculties. Now, these which the faculties of generation and growth require have been stated. I shall now say what ones the nutritive faculty requires. For I believe that I shall prove that the organs which have to do with the disposal of the nutriment, as also their faculties, exist for the sake of this nutritive faculty. For since the action of this faculty is assimilation, and it is impossible for anything to be assimilated by, and to change into anything else unless they already possess a certain community and affinity in their qualities, therefore, in the first place, any animal cannot naturally derive nourishment from any kind of food, and secondly, even in the case of those from which it can do so, it cannot do this at once. Therefore, by reason of this law, every animal needs several organs for altering the nutriment. For in order that the yellow may become red, and the red yellow, one simple process of alteration is required, but in order that the white may become black, and the black white, all the intermediate stages are needed. So also, a thing which is very soft cannot all at once become very hard, nor vice versa; nor, similarly can anything which has a very bad smell suddenly become quite fragrant, nor again, can the converse happen. How, then, could blood ever turn into bone, without having first become, as far as possible, thickened and white?

4: Galen Quotes (Author of On the Natural Faculties)

Galen (CE) crystallized all the best work of the Greek medical schools which had preceded his own time, including Hippocrates's foundational work six hundred years earlier.

Current location in this text. Enter a Perseus citation to go to another section or work. Full search options are on the right side and top of the page. PART 4 Thus the two faculties are clearly to be seen in the case of the uterus; in the case of the stomach they appear as follows: For if it be in a natural condition, employing its contractile faculty in the ordinary way, then, even if its contents be very small, it grasps the whole of them and does not leave any empty space. When it is weak, however, being unable to lay hold of its contents accurately, it produces a certain amount of vacant space, and amount of vacant space, and allows the liquid contents to flow about in different directions in accordance with its changes of shape, and so to produce gurglings. Thus those who are troubled with this symptom expect, with good reason, that they will also be unable to digest adequately; proper digestion cannot take place in a weak stomach. In such people also, the mass of food may be plainly seen to remain [p. Indeed, the chief way in which these people will surprise one is in the length of time that not food alone but even fluids will remain in their stomachs. Now, the actual cause of this is not, as one would imagine, that the lower outlet of the stomach, 1 being fairly narrow, will allow nothing to pass before being reduced to a fine state of division. There are a great many people who frequently swallow large quantities of big fruit-stones; one person who was holding a gold ring in his mouth, inadvertently swallowed it; another swallowed a coin, and various people have swallowed various hard and indigestible objects; yet all these people easily passed by the bowel what they had swallowed, without there being any subsequent symptoms. Now surely if narrowness of the gastric outlet were the cause of untriturated food remaining for an abnormally long time, none of these articles I have mentioned would ever have escaped. For, supposing a rapid descent were dependent upon emulsification, 2 then soups, milk, and barley-emulsion 3 would at once pass along in every case. But as a matter of fact this is not so. For in people who are extremely asthenic it is just these fluids which remain undigested, which accumulate and produce gurglings, and which oppress and overload the stomach, whereas in strong persons not merely do none of these things happen, but even a large quantity of bread or meat passes rapidly down. Thus, there are some who vomit up every particle of what they have eaten, not after three or four hours, but actually in the middle of the night, a lengthy period having elapsed since their meal. Suppose you fill any animal whatsoever with liquid food- an experiment I have often carried out in pigs, to whom I give a sort of mess of wheaten flour and water, there after cutting them open after three or four hours; if you will do this yourself, you will find the food still in the stomach. For it is not chylification 4 which determines the length of its stay here- since this can also be effected outside the stomach; the determining factor is digestion 5 which is a different thing from chylification, as are blood-production and nutrition. For, just as it has been shown 6 that these two processes depend upon a change of qualities, similarly also the digestion of food in the stomach involves a transmutation of it into the quality proper to that which is receiving nourishment. And you may observe this [p. But even if you should fail to discover the time, and nothing was yet passing down, and the food was still undergoing digestion in the stomach, still even then you would find dissection not without its uses. You will observe, as we have just said, that the pylorus is accurately closed, and that the whole stomach is in a state of contraction upon the food very much as the womb contracts upon the foetus. For it is never possible to find a vacant space in the uterus, the stomach, or in either of the two bladders- that is, either in that called bile-receiving 8 or in the other; whether their contents be abundant or scanty, their cavities are seen to be replete and full, owing to the fact that their coats contract constantly upon the contents- so long, as least, as the animal is in a natural condition. Now Erasistratus for some reason declares that it is the contractions 9 of the stomach which are the cause of everything- that is to say, of the softening of the food, 10 the removal of waste matter, and the absorption of the food when chylified [emulsified]. Now I have personally, on countless occasions, divided the peritoneum of a still living animal and have always found all the intestines contracting peristaltically 11 upon their contents. The condition of the stomach, however, is found less simple; as regards the substances freshly swallowed, it had grasped these accurately both above and below, in fact at every point, and was as devoid of movement [p. In the cases, however, where digestion had been completed the pylorus had opened, and the stomach was undergoing peristaltic movements, similar to those of the intestines. Wehre an organ had no obvious function, he dubbed it "useles"; e. On the Natural Faculties. This text was converted to electronic form by Data Entry and has been proofread to a high level of accuracy. An XML version of this text is available for download, with the additional restriction that you offer Perseus any modifications you make. Perseus provides credit for all accepted changes, storing new additions in a versioning system.

5: On the Natural Faculties â€” Galen | Harvard University Press

To ask other readers questions about On the Natural Faculties, please sign up. Be the first to ask a question about On the Natural Faculties The fact is that those who are enslaved to their sects are not merely devoid of all sound knowledge, but they will not even stop to learn! This little book was.

Since feeling and voluntary motion are peculiar to animals, whilst growth and nutrition are common to plants as well, we may look on the former as effects of the soul and the latter as effects of the nature. And if there be anyone who allows a share in soul to plants as well, and separates the two kinds of soul, naming the kind in question vegetative, and the other sensory, this person is not saying anything else, although his language is somewhat unusual. We, however, for our part, are convinced that the chief merit of language is clearness, and we know that nothing detracts so much from this as do unfamiliar terms; accordingly we employ those terms which the bulk of people are accustomed to use, and we say that animals are governed at once by their soul and by their nature, and plants by their nature alone, and that growth and nutrition are the effects of nature, not of soul. Similarly, when the limbs have their position altered, it is the muscle which produces, and the bones which undergo the motion. In these cases I call the motion of the vein and of the muscle an activity, and that of the food and the bones a symptom or affection, since the first group undergoes alteration and the second group is merely transported. Thus we shall enquire, in the course of this treatise, from what faculties these effects themselves, as well as any other effects of nature which there may be, take their origin. First, however, we must distinguish and explain clearly the various terms which we are going to use in this treatise, and to what things we apply them; and this will prove to be not merely an explanation of terms but at the same time a demonstration of the effects of nature. When, therefore, such and such a body undergoes no change from its existing state, we say that it is at rest; but, notwithstanding, if it departs from this in any respect we then say that in this respect it undergoes motion. Accordingly, when it departs in various ways from its preexisting state, it will be said to undergo various kinds of motion. Thus, if that which is white becomes black, or what is black becomes white, it undergoes motion in respect to colour; or if what was previously sweet now becomes bitter, or, conversely, from being bitter now becomes sweet, it will be said to undergo motion in respect to flavour; to both of these instances, as well as to those previously mentioned, we shall apply the term qualitative motion. And further, it is not only things which are altered in regard to colour and flavour which, we say, undergo motion; when a warm thing becomes cold, and a cold warm, here too we speak of its undergoing motion; similarly also when anything moist becomes dry, or dry moist. Now, the common term which we apply to all these cases is alteration. This is one kind of motion. But there is another kind which occurs in bodies which change their position, or as we say, pass from one place to another; the name of this is transference. These two kinds of motion, then, are simple and primary, while compounded from them we have growth and decay, as when a small thing becomes bigger, or a big thing smaller, each retaining at the same time its particular form. And two other kinds of motion are genesis and destruction, genesis being a coming into existence, and destruction being the opposite. Now, common to all kinds of motion is change from the preexisting state, while common to all conditions of rest is retention of the preexisting state. The Sophists, however, while allowing that bread in turning into blood becomes changed as regards sight, taste, and touch, will not agree that this change occurs in reality. Thus some of them hold that all such phenomena are tricks and illusions of our senses; the senses, they say, are affected now in one way, now in another, whereas the underlying substance does not admit of any of these changes to which the names are given. Others such as Anaxagoras will have it that the qualities do exist in it, but that they are unchangeable and immutable from eternity to eternity, and that these apparent alterations are brought about by separation and combination. Now, if I were to go out of my way to confute these people, my subsidiary task would be greater than my main one. If, however, they know these, and yet willingly prefer the worse views to the better, they will doubtless consider my arguments foolish also. I have shown elsewhere that these opinions were shared by Hippocrates, who lived much earlier than Aristotle. In fact, all those known to us who have been both physicians and philosophers Hippocrates was the first who took in hand to demonstrate that there are, in all, four mutually interacting qualities, and that to the operation of these is due the genesis and destruction of all things that come into and pass out of being. Nay, more; Hippocrates was also the first to recognise that all these qualities undergo an intimate mingling with one another; and at least the beginnings of the proofs to which Aristotle later set his hand are to be found first in the writings of Hippocrates. As to whether we are to suppose that the substances as well as their qualities undergo this intimate mingling, as Zeno of Citium afterwards declared, I do not think it necessary to go further into this question in the present treatise; for immediate purposes we only need to recognize the complete alteration of substance. In this way, nobody will suppose that bread represents a kind of meeting-place for bone, flesh, nerve, and all the other parts, and that each of these subsequently becomes separated in the body and goes to join its own kind; before any separation takes place, the whole of the bread obviously becomes blood; at any rate, if a man takes no other food for a prolonged period, he will have blood enclosed in his veins all the same. And clearly this disproves the view of those who consider the elements unchangeable, as also, for that matter, does the oil which is entirely used up in the flame of the lamp, or the faggots which, in a somewhat longer time, turn into fire. I said, however, that I was not going to enter into an argument with these people, and it was only because the example was drawn from the subject-matter of medicine, and because I need it for the present treatise, that I have mentioned it. We shall then, as I said, renounce our controversy with them, since those who wish may get a good grasp of the views of the ancients from our own personal investigations into these matters. The discussion which follows we shall devote entirely, as we originally proposed, to an enquiry into the number and character of the faculties of Nature, and what is the effect which each naturally produces. Now, of course, I mean by an effect that which has already come into existence and has been completed by the activity of these faculties - for example, blood, flesh, or nerve. And activity is the name I give to the active change or motion, and the cause of this I call a faculty. Thus, when food turns into blood, the motion of the food is passive, and that of the vein active. One might, therefore, also speak of the activity as an effect of Nature - for example, digestion, absorption, blood-production; one could not, however, in every case call the effect an activity; thus flesh is an effect of Nature, but it is, of course, not an activity. It is, therefore, clear that one of these terms is used in two senses, but not the other. It appears to me, then, that the vein, as well as each of the other parts, functions in such and such a way according to the manner in which the four qualities are mixed. There are, however, a considerable number of not undistinguished men - philosophers and physicians - who refer action to the Warm and the Cold, and who subordinate to these, as passive, the Dry and the Moist; Aristotle, in fact, was the first who attempted to bring back the causes of the various special activities to these principles, and he was followed later by the Stoic school. These latter, of course, could logically make active principles of the Warm and Cold, since they refer the change of the elements themselves into one another to certain diffusions and condensations. This does not hold of Aristotle, however; seeing that he employed the four qualities to explain the genesis of the elements, he ought properly to have also referred the causes of all the special activities to these. How is it that he uses the four qualities in his book "On Genesis and Destruction," whilst in his "Meteorology," his "Problems," and many other works he uses the uses the two only? Of course, if anyone were to maintain that in the case of animals and plants the Warm and Cold are more active, the Dry and Moist less so, he might perhaps have even Hippocrates on his side; but if he were to say that this happens in all cases, he would, I imagine, lack support, not merely from Hippocrates, but even from Aristotle himself - if, at least, Aristotle chose to remember what he himself taught us in his work "On Genesis and Destruction," not as a matter of simple statement, but with an accompanying demonstration. I have, however, also investigated these questions, in so far as they are of value to a physician, in my work "On Temperaments. The so-called blood-making faculty in the veins, then, as well as all the other faculties, fall within the category of relative concepts; primarily because the faculty is the cause of the activity, but also, accidentally, because it is the cause of the effect. But, if the cause is relative to something - for it is the cause of what results from it, and of nothing else - it is obvious that the faculty also falls into the category of the relative; and so long as we are ignorant of the true essence of the cause which is operating, we call it a faculty. Thus we say that there exists in the veins a blood-making faculty, as also a digestive faculty in the stomach, a pulsatile faculty in the heart, and in each of the other parts a special faculty corresponding to the function or activity of that part. If, therefore, we are to investigate methodically the number and kinds of faculties, we must begin with the effects; for each of these effects comes from a certain activity, and each of these again is preceded by a cause. The effects of Nature, then, while the animal is still being formed in the womb, are all the different parts of its body; and after it has been born, an effect in which all parts share is the progress of each to its full size, and thereafter its maintenance of itself as long as possible. The activities corresponding to the three effects mentioned are necessarily three - one to each - namely, Genesis, Growth, and Nutrition. Genesis, however, is not a simple activity of Nature, but is compounded of alteration and of shaping. That is to say, in order that bone, nerve, veins, and all other [tissues] may come into existence, the underlying substance from which the animal springs must be altered; and in order that the substance so altered may acquire its appropriate shape and position, its cavities, outgrowths, attachments, and so forth, it has to undergo a shaping or formative process. One would be justified in calling this substance which undergoes alteration the material of the animal, just as wood is the material of a ship, and wax of an image. Growth is an increase and expansion in length, breadth, and thickness of the solid parts of the animal those which have been subjected to the moulding or shaping process. Nutrition is an addition to these, without expansion. Let us speak then, in the first place, of Genesis, which, as we have said, results from alteration together with shaping. The seed having been cast into the womb or into the earth for there is no difference , then, after a certain definite period, a great number of parts become constituted in the substance which is being generated; these differ as regards moisture, dryness, coldness and warmth, and in all the other qualities which naturally derive therefrom. These derivative qualities, you are acquainted with, if you have given any sort of scientific consideration to the question of genesis and destruction. For, first and foremost after the qualities mentioned come the other so-called tangible distinctions, and after them those which appeal to taste, smell, and sight. Now, tangible distinctions are hardness and softness, viscosity, friability, lightness, heaviness, density, rarity, smoothness, roughness, thickness and thinness; all of these have been duly mentioned by Aristotle. And of course you know those which appeal to taste, smell, and sight. Therefore, if you wish to know which alterative faculties are primary and elementary, they are moisture, dryness, coldness, and warmth, and if you wish to know which ones arise from the combination of these, they will be found to be in each animal of a number corresponding to its sensible elements. The name sensible elements is given to all the homogeneous parts of the body, and these are to be detected not by any system, but by personal observation of dissections. Now the peculiar flesh of the liver is of this kind as well, also that of the spleen, that of the kidneys, that of the lungs, and that of the heart; so also the proper substance of the brain, stomach, gullet, intestines, and uterus is a sensible element, of similar parts all through, simple, and uncompounded. That is to say, if you remove from each of the organs mentioned its arteries, veins, and nerves, the substance remaining in each organ is, from the point of view of the senses, simple and elementary. As regards those organs consisting of two dissimilar coats, of which each is simple, of these organs the coats are the are the elements - for example, the coats of the stomach, oesophagus, intestines, and arteries; each of these two coats has an alterative faculty peculiar to it, which has engendered it from the menstrual blood of the mother. Thus the special alterative faculties in each animal are of the same number as the elementary parts; and further, the activities must necessarily correspond each to one of the special parts, just as each part has its special use - for example, those ducts which extend from the kidneys into the bladder, and which are called ureters; for these are not arteries, since they do not pulsate nor do they consist of two coats; and they are not veins, since they neither contain blood, nor do their coats in any way resemble those of veins; from nerves they differ still more than from the structures mentioned. For in fact the two bladders - that which receives the urine, and that which receives the yellow bile - not only differ from all other organs, but also from one another. Further, the ducts which spring out like kinds of conduits from the gall-bladder and which pass into the liver have no resemblance either to arteries, veins or nerves. But these parts have been treated at a greater length in my work "On the Anatomy of Hippocrates," as well as elsewhere. As for the actual substance of the coats of the stomach, intestine, and uterus, each of these has been rendered what it is by a special alterative faculty of Nature; while the bringing of these together, the therewith of the structures which are inserted into them, the outgrowth into the intestine, [1] the shape of the inner cavities, and the like, have all been determined by a faculty which we call the shaping or formative faculty; this faculty we also state to be artistic - nay, the best and highest art - doing everything for some purpose, so that there is nothing ineffective or superfluous, or capable of being better disposed. This, however, I shall demonstrate in my work "On the Use of Parts. Passing now to the faculty of Growth let us first mention that this, too, is present in the foetus in utero as is also the nutritive faculty, but that at that stage these two faculties are, as it were, handmaids to those already mentioned, and do not possess in themselves supreme authority. When, however, the animal has attained its complete size, then, during the whole period following its birth and until the acme is reached, the faculty of growth is predominant, while the alterative and nutritive faculties are accessory - in fact, act as its handmaids. What, then, is the property of this faculty of growth? To extend in every direction that which has already come into existence - that is to say, the solid parts of the body, the arteries, veins, nerves, bones, cartilages, membranes, ligaments, and the various coats which we have just called elementary, homogeneous, and simple. And I shall state in what way they gain this extension in every direction, first giving an illustration for the sake of clearness. Children take the bladders of pigs, fill them with air, and then rub them on ashes near the fire, so as to warm, but not to injure them. This is a common game in the district of Ionia, and among not a few other nations. As they rub, they sing songs, to a certain measure, time, and rhythm, and all their words are an exhortation to the bladder to increase in size. When it appears to them fairly well distended, they again blow air into it and expand it further; then they rub it again. This they do several times, until the bladder seems to them to have become large enough. Now, clearly, in these doings of the children, the more the interior cavity of the bladder increases in size, the thinner, necessarily, does its substance become. But, if the children were able to bring nourishment to this thin part, then they would make the bladder big in the same way that Nature does. As it is, however, they cannot do what Nature does, for to imitate this is beyond the power not only of children, but of any one soever; it is a property of Nature alone. It will now, therefore, be clear to you that nutrition is a necessity for growing things. For if such bodies were distended, but not at the same time nourished, they would take on a false appearance of growth, not a true growth. And further, to be distended in all directions belongs only to bodies whose growth is directed by Nature; for those which are distended by us undergo this distension in one direction but grow less in the others; it is impossible to find a body which will remain entire and not be torn through whilst we stretch it in the three dimensions. Thus Nature alone has the power to expand a body in all directions so that it remains unruptured and preserves completely its previous form. Such then is growth, and it cannot occur without the nutriment which flows to the part and is worked up into it. We have, then, it seems, arrived at the subject of Nutrition, which is the third and remaining consideration which we proposed at the outset. For, when the matter which flows to each part of the body in the form of nutriment is being worked up into it, this activity is nutrition, and its cause is the nutritive faculty. Of course, the kind of activity here involved is also an alteration, but not an alteration like that occurring at the stage of genesis. For in the latter case something comes into existence which did not exist previously, while in nutrition the inflowing material becomes assimilated to that which has already come into existence. Therefore, the former kind of alteration has with reason been termed genesis, and the latter, assimilation. Now, since the three faculties of Nature have been exhaustively dealt with, and the animal would appear not to need any others being possessed of the means for growing, for attaining completion, and for maintaining itself as long a time as possible , this treatise might seem to be already complete, and to constitute an exposition of all the faculties of Nature. If, however, one considers that it has not yet touched upon any of the parts of the animal I mean the stomach, intestines, liver, and the like , and that it has not dealt with the faculties resident in these, it will seem as though merely a kind of introduction had been given to the practical parts of our teaching. For the whole matter is as follows: Genesis, growth, and nutrition are the first, and, so to say, the principal effects of Nature; similarly also the faculties which produce these effects - the first faculties - are three in number, and are the most dominating of all. But as has already been shown, these need the service both of each other, and of yet different faculties.

6: On the Natural Faculties by Galen

c) The four faculties, growth, nutritive, alterative, and shaping actually function at all times, according to galen, but before birth the shaping and alterative faculties take the lead, while in youth the faculty of growth is in command.

Current location in this text. Enter a Perseus citation to go to another section or work. Full search options are on the right side and top of the page. PART 6 Let us speak then, in the first place, of Genesis, which, as we have said, results from alteration together with shaping. The seed having been cast into the womb or into the earth for there is no difference , 1 then, after a certain definite period, a great number of parts become constituted in the substance which is being generated; these differ as regards moisture, dryness, coldness and warmth, 2 and in all the other qualities [p. For, first and foremost after the qualities mentioned come the other so-called tangible distinctions, and after them those which appeal to taste, smell, and sight. Now, tangible distinctions are hardness and softness, viscosity, friability, lightness, heaviness, density, rarity, smoothness, roughness, thickness and thinness; all of these have been duly mentioned by Aristotle. Therefore, if you wish to know which alterative faculties are primary and elementary, they are moisture, dryness, coldness, and warmth, and if you wish to know which ones arise from the combination of these, they will be found to be in each animal of a number corresponding to its sensible elements. The name sensible elements is given to all the homogeneous 5 parts of the body, and these are to be detected not by any system, but by personal observation of dissections. Now the peculiar 9 flesh of the liver is of this kind as well, also that of the spleen, that of the kidneys, that of the lungs, and that of the heart; so also the proper substance of the brain, stomach, gullet, intestines, and uterus is a sensible element, of similar parts all through, simple, and uncompounded. That is to say, if you remove from each of the organs mentioned its arteries, veins, and nerves, 10 the substance remaining in each organ is, from the point of view of the senses, simple and elementary. As regards those organs consisting of two dissimilar coats 11 , of which each is simple, of these organs the coats are the are the elements- for example, the coats of the stomach, oesophagus, intestines, and arteries; each of these two coats has an alterative faculty peculiar to it, which has engendered it from the menstrual blood of the mother. Thus the special alterative faculties in each animal are of the same number as the elementary parts 12 ; and further, the activities must necessarily correspond each to one of the special parts, just as each part has its special use- for example, those ducts which extend from the kidneys into the bladder, and which are called ureters; for these are not arteries, since they do not pulsate nor do they consist of two coats; and they [p. For in fact the two bladders- that which receives the urine, and that which receives the yellow bile- not only differ from all other organs, but also from one another. Further, the ducts which spring out like kinds of conduits from the gall-bladder and which pass into the liver have no resemblance either to arteries, veins or nerves. But these parts have been treated at a greater length in my work "On the Anatomy of Hippocrates," as well as elsewhere. As for the actual substance of the coats of the stomach, intestine, and uterus, each of these has been rendered what it is by a special alterative faculty of Nature; while the bringing of these together, 14 the therewith of the structures which are inserted into them, the outgrowth into the intestine, 15 the shape of the inner cavities, and the like, have all been determined by a faculty which we call the shaping or formative faculty 16 ; this faculty we also state to be artistic- nay, the best and highest art- doing everything for some purpose, so that [p. This, however, I shall demonstrate in my work "On the Use of Parts. Strictly speaking, of course, semen corresponds to pollen. Note pre-eminence of sense of touch. The observer is here called an autoptes or "eye-witness. Galen added many new tissues to those described by Aristotle. On the Natural Faculties. This text was converted to electronic form by Data Entry and has been proofread to a high level of accuracy. An XML version of this text is available for download, with the additional restriction that you offer Perseus any modifications you make. Perseus provides credit for all accepted changes, storing new additions in a versioning system.

7: Galenic corpus - Wikipedia

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A text-only version is available for download. Since feeling and voluntary motion are peculiar to animals, whilst growth and nutrition are common to plants as well, we may look on the former as effects of the soul and the latter as effects of the nature. And if there be anyone who allows a share in soul to plants as well, and separates the two kinds of soul, naming the kind in question vegetative, and the other sensory, this person is not saying anything else, although his language is somewhat unusual. We, however, for our part, are convinced that the chief merit of language is clearness, and we know that nothing detracts so much from this as do unfamiliar terms; accordingly we employ those terms which the bulk of people are accustomed to use, and we say that animals are governed at once by their soul and by their nature, and plants by their nature alone, and that growth and nutrition are the effects of nature, not of soul. Thus we shall enquire, in the course of this treatise, from what faculties these effects themselves, as well as any other effects of nature which there may be, take their origin. First, however, we must distinguish and explain clearly the various terms which we are going to use in this treatise, and to what things we apply them; and this will prove to be not merely an explanation of terms but at the same time a demonstration of the effects of nature. When, therefore, such and such a body undergoes no change from its existing state, we say that it is at rest; but, not withstanding, if it departs from this in any respect we then say that in this respect it undergoes motion. Accordingly, when it departs in various ways from its preexisting state, it will be said to undergo various kinds of motion. Thus, if that which is white becomes black, or what is black becomes white, it undergoes motion in respect to colour; or if what was previously sweet now becomes bitter, or, conversely, from being bitter now becomes sweet, it will be said to undergo motion in respect to flavour; to both of these instances, as well as to those previously mentioned, we shall apply the term qualitative motion. And further, it is not only things which are altered in regard to colour and flavour which, we say, undergo motion; when a warm thing becomes cold, and a cold warm, here too we speak of its undergoing motion; similarly also when anything moist becomes dry, or dry moist. Now, the common term which we apply to all these cases is alteration. This is one kind of motion. But there is another kind which occurs in bodies which change their position, or as we say, pass from one place to another; the name of this is transference. These two kinds of motion, then, are simple and primary, while compounded from them we have growth and decay, as when a small thing becomes bigger, or a big thing smaller, each retaining at the same time its particular form. And two other kinds of motion are genesis and destruction, genesis being a coming into existence, and destruction being the opposite. Now, common to all kinds of motion is change from the preexisting state, while common to all conditions of rest is retention of the preexisting state. The Sophists, however, while allowing that bread in turning into blood becomes changed as regards sight, taste, and touch, will not agree that this change occurs in reality. Thus some of them hold that all such phenomena are tricks and illusions of our senses; the senses, they say, are affected now in one way, now in another, whereas the underlying substance does not admit of any of these changes to which the names are given. Others such as Anaxagoras will have it that the qualities do exist in it, but that they are unchangeable and immutable from eternity to eternity, and that these apparent alterations are brought about by separation and combination. Now, if I were to go out of my way to confute these people, my subsidiary task would be greater than my main one. If, however, they know these, and yet willingly prefer the worse views to the better, they will doubtless consider my arguments foolish also. I have shown elsewhere that these opinions were shared by Hippocrates, who lived much earlier than Aristotle. In fact, all those known to us who have been both physicians and philosophers Hippocrates was the first who took in hand to demonstrate that there are, in all, four mutually interacting qualities, and that to the operation of these is due the genesis and destruction of all things that come into and pass out of being. Nay, more; Hippocrates was also the first to recognise that all these qualities undergo an intimate mingling with one another; and at least the beginnings of the proofs to which Aristotle later set his hand are to be found first in the writings of Hippocrates. As to whether we are to suppose that the substances as well as their qualities undergo this intimate mingling, as Zeno of Citium afterwards declared, I do not think it necessary to go further into this question in the present treatise; for immediate purposes we only need to recognize the complete alteration of substance. In this way, nobody will suppose that bread represents a kind of meeting-place for bone, flesh, nerve, and all the other parts, and that each of these subsequently becomes separated in the body and goes to join its own kind; before any separation takes place, the whole of the bread obviously becomes blood; at any rate, if a man takes no other food for a prolonged period, he will have blood enclosed in his veins all the same. And clearly this disproves the view of those who consider the elements unchangeable, as also, for that matter, does the oil which is entirely used up in the flame of the lamp, or the faggots which, in a somewhat longer time, turn into fire. I said, however, that I was not going to enter into an argument with these people, and it was only because the example was drawn from the subject-matter of medicine, and because I need it for the present treatise, that I have mentioned it. We shall then, as I said, renounce our controversy with them, since those who wish may get a good grasp of the views of the ancients from our own personal investigations into these matters. The discussion which follows we shall devote entirely, as we originally proposed, to an enquiry into the number and character of the faculties of Nature, and what is the effect which each naturally produces. Now, of course, I mean by an effect that which has already come into existence and has been completed by the activity of these faculties- for example, blood, flesh, or nerve. And activity is the name I give to the active change or motion, and the cause of this I call a faculty. Thus, when food turns into blood, the motion of the food is passive, and that of the vein active. Similarly, when the limbs have their position their position altered, it is the muscle which produces, and the bones which undergo the motion. In these cases I call the motion of the vein and of the muscle an activity, and that of the food and the bones a symptom or affection, since the first group undergoes alteration and the second group is merely transported. One might, therefore, also speak of the activity as an effect of Nature- for example, digestion, absorption, blood-production; one could not, however, in every case call the effect an activity; thus flesh is an effect of Nature, but it is, of course, not an activity. It is, therefore, clear that one of these terms is used in two senses, but not the other. It appears to me, then, that the vein, as well as each of the other parts, functions in such and such a way according to the manner in which the four qualities are mixed. There are, however, a considerable number of not undistinguished men- philosophers and physicians- who refer action to the Warm and the Cold, and who subordinate to these, as passive, the Dry and the Moist; Aristotle, in fact, was the first who attempted to bring back the causes of the various special activities to these principles, and he was followed later by the Stoic school. These latter, of course, could logically make active principles of the Warm and Cold, since they refer the change of the elements themselves into one another to certain diffusions and condensations. This does not hold of Aristotle, however; seeing that he employed the four qualities to explain the genesis of the elements, he ought properly to have also referred the causes of all the special activities to these. How is it that he uses the four qualities in his book "On Genesis and Destruction," whilst in his "Meteorology," his "Problems," and many other works he uses the uses the two only? Of course, if anyone were to maintain that in the case of animals and plants the Warm and Cold are more active, the Dry and Moist less so, he might perhaps have even Hippocrates on his side; but if he were to say that this happens in all cases, he would, I imagine, lack support, not merely from Hippocrates, but even from Aristotle himself- if, at least, Aristotle chose to remember what he himself taught us in his work "On Genesis and Destruction," not as a matter of simple statement, but with an accompanying demonstration. I have, however, also investigated these questions, in so far as they are of value to a physician, in my work "On Temperaments. The so-called blood-making faculty in the veins, then, as well as all the other faculties, fall within the category of relative concepts; primarily because the faculty is the cause of the activity, but also, accidentally, because it is the cause of the effect. But, if the cause is relative to something- for it is the cause of what results from it, and of nothing else- it is obvious that the faculty also falls into the category of the relative; and so long as we are ignorant of the true essence of the cause which is operating, we call it a faculty. Thus we say that there exists in the veins a blood-making faculty, as also a digestive faculty in the stomach, a pulsatile faculty in the heart, and in each of the other parts a special faculty corresponding to the function or activity of that part. If, therefore, we are to investigate methodically the number and kinds of faculties, we must begin with the effects; for each of these effects comes from a certain activity, and each of these again is preceded by a cause. The effects of Nature, then, while the animal is still being formed in the womb, are all the different parts of its body; and after it has been born, an effect in which all parts share is the progress of each to its full size, and thereafter its maintenance of itself as long as possible. The activities corresponding to the three effects mentioned are necessarily three- one to each- namely, Genesis, Growth, and Nutrition. Genesis, however, is not a simple activity of Nature, but is compounded of alteration and of shaping. That is to say, in order that bone, nerve, veins, and all other [tissues] may come into existence, the underlying substance from which the animal springs must be altered; and in order that the substance so altered may acquire its appropriate shape and position, its cavities, outgrowths, attachments, and so forth, it has to undergo a shaping or formative process. One would be justified in calling this substance which undergoes alteration the material of the animal, just as wood is the material of a ship, and wax of an image. Growth is an increase and expansion in length, breadth, and thickness of the solid parts of the animal those which have been subjected to the moulding or shaping process. Nutrition is an addition to these, without expansion. Let us speak then, in the first place, of Genesis, which, as we have said, results from alteration together with shaping. The seed having been cast into the womb or into the earth for there is no difference , then, after a certain definite period, a great number of parts become constituted in the substance which is being generated; these differ as regards moisture, dryness, coldness and warmth, and in all the other qualities which naturally derive therefrom. These derivative qualities, you are acquainted with, if you have given any sort of scientific consideration to the question of genesis and destruction. For, first and foremost after the qualities mentioned come the other so-called tangible distinctions, and after them those which appeal to taste, smell, and sight. Now, tangible distinctions are hardness and softness, viscosity, friability, lightness, heaviness, density, rarity, smoothness, roughness, thickness and thinness; all of these have been duly mentioned by Aristotle. And of course you know those which appeal to taste, smell, and sight. Therefore, if you wish to know which alterative faculties are primary and elementary, they are moisture, dryness, coldness, and warmth, and if you wish to know which ones arise from the combination of these, they will be found to be in each animal of a number corresponding to its sensible elements. The name sensible elements is given to all the homogeneous parts of the body, and these are to be detected not by any system, but by personal observation of dissections. Now the peculiar flesh of the liver is of this kind as well, also that of the spleen, that of the kidneys, that of the lungs, and that of the heart; so also the proper substance of the brain, stomach, gullet, intestines, and uterus is a sensible element, of similar parts all through, simple, and uncompounded. That is to say, if you remove from each of the organs mentioned its arteries, veins, and nerves, the substance remaining in each organ is, from the point of view of the senses, simple and elementary. As regards those organs consisting of two dissimilar coats, of which each is simple, of these organs the coats are the are the elements- for example, the coats of the stomach, oesophagus, intestines, and arteries; each of these two coats has an alterative faculty peculiar to it, which has engendered it from the menstrual blood of the mother. Thus the special alterative faculties in each animal are of the same number as the elementary parts; and further, the activities must necessarily correspond each to one of the special parts, just as each part has its special use- for example, those ducts which extend from the kidneys into the bladder, and which are called ureters; for these are not arteries, since they do not pulsate nor do they consist of two coats; and they are not veins, since they neither contain blood, nor do their coats in any way resemble those of veins; from nerves they differ still more than from the structures mentioned. For in fact the two bladders- that which receives the urine, and that which receives the yellow bile- not only differ from all other organs, but also from one another. Further, the ducts which spring out like kinds of conduits from the gall-bladder and which pass into the liver have no resemblance either to arteries, veins or nerves. But these parts have been treated at a greater length in my work "On the Anatomy of Hippocrates," as well as elsewhere. As for the actual substance of the coats of the stomach, intestine, and uterus, each of these has been rendered what it is by a special alterative faculty of Nature; while the bringing of these together, the therewith of the structures which are inserted into them, the outgrowth into the intestine, the shape of the inner cavities, and the like, have all been determined by a faculty which we call the shaping or formative faculty; this faculty we also state to be artistic- nay, the best and highest art- doing everything for some purpose, so that there is nothing ineffective or superfluous, or capable of being better disposed. This, however, I shall demonstrate in my work "On the Use of Parts. Passing now to the faculty of Growth let us first mention that this, too, is present in the foetus in utero as is also the nutritive faculty, but that at that stage these two faculties are, as it were, handmaids to those already mentioned, and do not possess in themselves supreme authority. When, however, the animal has attained its complete size, then, during the whole period following its birth and until the acme is reached, the faculty of growth is predominant, while the alterative and nutritive faculties are accessory- in fact, act as its handmaids. What, then, is the property of this faculty of growth? To extend in every direction that which has already come into existence- that is to say, the solid parts of the body, the arteries, veins, nerves, bones, cartilages, membranes, ligaments, and the various coats which we have just called elementary, homogeneous, and simple. And I shall state in what way they gain this extension in every direction, first giving an illustration for the sake of clearness. Children take the bladders of pigs, fill them with air, and then rub them on ashes near the fire, so as to warm, but not to injure them. This is a common game in the district of Ionia, and among not a few other nations. As they rub, they sing songs, to a certain measure, time, and rhythm, and all their words are an exhortation to the bladder to increase in size. When it appears to them fairly well distended, they again blow air into it and expand it further; then they rub it again. This they do several times, until the bladder seems to them to have become large enough. Now, clearly, in these doings of the children, the more the interior cavity of the bladder increases in size, the thinner, necessarily, does its substance become. But, if the children were able to bring nourishment to this thin part, then they would make the bladder big in the same way that Nature does. As it is, however, they cannot do what Nature does, for to imitate this is beyond the power not only of children, but of any one soever; it is a property of Nature alone. It will now, therefore, be clear to you that nutrition is a necessity for growing things. For if such bodies were distended, but not at the same time nourished, they would take on a false appearance of growth, not a true growth. And further, to be distended in all directions belongs only to bodies whose growth is directed by Nature; for those which are distended by us undergo this distension in one direction but grow less in the others; it is impossible to find a body which will remain entire and not be torn through whilst we stretch it in the three dimensions. Thus Nature alone has the power to expand a body in all directions so that it remains unruptured and preserves completely its previous form. Such then is growth, and it cannot occur without the nutriment which flows to the part and is worked up into it. We have, then, it seems, arrived at the subject of Nutrition, which is the third and remaining consideration which we proposed at the outset. For, when the matter which flows to each part of the body in the form of nutriment is being worked up into it, this activity is nutrition, and its cause is the nutritive faculty. Of course, the kind of activity here involved is also an alteration, but not an alteration like that occurring at the stage of genesis. For in the latter case something comes into existence which did not exist previously, while in nutrition the inflowing material becomes assimilated to that which has already come into existence. Therefore, the former kind of alteration has with reason been termed genesis, and the latter, assimilation. Now, since the three faculties of Nature have been exhaustively dealt with, and the animal would appear not to need any others being possessed of the means for growing, for attaining completion, and for maintaining itself as long a time as possible , this treatise might seem to be already complete, and to constitute an exposition of all the faculties of Nature. If, however, one considers that it has not yet touched upon any of the parts of the animal I mean the stomach, intestines, liver, and the like , and that it has not dealt with the faculties resident in these, it will seem as though merely a kind of introduction had been given to the practical parts of our teaching. For the whole matter is as follows: Genesis, growth, and nutrition are the first, and, so to say, the principal effects of Nature; similarly also the faculties which produce these effects- the first faculties- are three in number, and are the most dominating of all.

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Then I came to this passage near the end: While, however, the statements which the Ancients made on these points were correct, they yet omitted to defend their arguments with logical proofs; of course they never suspected that there could be sophists so shameless as to try to contradict obvious facts. More recent physicians, again, have been partly conquered by the sophistries of these fellows and have given credence to them; whilst others who attempted to argue with them appear to me to lack to a great extent the power of the Ancients. For this reason I have attempted to put together my arguments in the way in which it seems to me the Ancients, had any of them been still alive, would have done, in opposition to those who would overturn the finest doctrines of our art. I am not, however, unaware that I shall achieve either nothing at all or else very little. For I find that a great many things which have been conclusively demonstrated by the Ancients are unintelligible to the bulk of the Moderns owing to their ignorance- nay, that, by reason of their laziness, they will not even make an attempt to comprehend them; and even if any of them have understood them, they have not given them impartial examination. The fact is that he whose purpose is to know anything better than the multitude do must far surpass all others both as regards his nature and his early training. And when he reaches early adolescence he must become possessed with an ardent love for truth, like one inspired; neither day nor night may he cease to urge and strain himself in order to learn thoroughly all that has been said by the most illustrious of the Ancients. And when he has learnt this, then for a prolonged period he must test and prove it, observing what part of it is in agreement, and what in disagreement with obvious fact; thus he will choose this and turn away from that. To such an one my hope has been that my treatise would prove of the very greatest assistance Still, such people may be expected to be quite few in number, while, as for the others, this book will be as superfluous to them as a tale told to an ass. Wikipedia and Google , it became apparent that Galen was the authority on medicine until the Renaissance. His authoritative claims went unchallenged for over a millennia. He suffers no fools as he haughtily dismisses the theories that fail to survive his experimentation and logical conclusions. A true empiricist, he devotes himself to questioning all theories and constructing medical proofs while simultaneously reverently referring to his predecessors whom he deemed worthy- especially Hippocrates and Aristotle. Similarly, opponents maintained that urine separated from blood because it was the thinner fluid, and was extracted through channels that blood was too thick to enter; Galen argues instead that the kidneys extract urine from the blood and pass it to the bladder, using an "attractive" faculty like that used by lodestone to attract metal. An interesting read for those interested in the development, both of ideas in general, and medicine in particular. Amateurish, cheap, antiquated, and typo-ridden. Back to Galen himself. The man made some progress, but was still incredibly ignorant about the way the body worked. Saddening, but interesting and very much in contrast with the speedy march of new advances in the field in the last century.

9: Galen On the Natural Faculties - Galen - Google Books

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It is responsible for all digestion and metabolism, nutrition and growth. The Natural Faculty is most developed in plants or vegetable life, which can make their own food. And so, the functions of the Natural Faculty are sometimes called the vegetative functions. The Liver The principal organ of the Natural Faculty is the liver, which is the master metabolic chemist of the bloodstream. All the other organs and vessels of the Natural Faculty are ultimately the servants and attendants of the liver. From the liver, the inferior vena cava takes the fresh humors to the heart, to be infused with the vital principles and pumped out all over the body. And so, a close relationship exists between the liver and the veins. In Greek Medicine, the veins serve the liver and the Natural Faculty, whereas the arteries serve the heart and the Vital Faculty. The Thermal Aspect of Digestion The thermal aspect of digestion is primary, for without it there woud be no digestion. In digestion, the organism uses its own Metabolic Heat to cook or concoct the food into chyle, and chyle into the Four Humors. In the First Digestion, the Digestive Fire in the stomach and small intestine concocts the raw food into chyle. The chyle is then sent to the liver to be concocted into the Four Humors by the Metabolic Heat in the Second Digestion. The subtler, more refined pepsis that occurs in the Third and Fourth digestions, through which the humors are transformed into living tissue, is actually called metabolism. Actually, metabolism is nothing more than micro-digestion, which is occurring all throughout the organism, all the way down to the cellular level. The food, or raw ore, is consumed or digested and the humors, or pure metal, is distilled or extracted; then the dross, or waste products, are cast off. Something is consumed or digested, something is produced, distilled, or extracted, and some byproduct is cast off as unusable waste. Either overcooking or undercooking will result in the production of toxic humors that can poison or clog the organism. Each one of the Four Humors is then infused with a certain Administering Virtue, which is a specialized form of the Natural Force. The Attractive Virtue is also responsible for our tastes and appetites, and the ability to assimilate nutrients. The Choleric humor is infused with the Digestive Virtue, or force, which enables it to consume and digest things. The digestive organs of the middle GI tract and their secretions are strong in the Digestive Virtue. The Digestive virtue enables an organ to digest or process things in the proper manner. The Retentive Virtue also enables an organ to hold on to the substances it has drawn into itself long enough to process them properly. The Phlegmatic humor is infused with the Expulsive Virtue, which enables it to expel, transport, smooth, lubricate, and wash away impurities. The Expulsive Virtue enables an organ to release its contents when the time is right to do so, and is necessary for all eliminative functions. So, the general digestive process or cycle is: The balanced, harmonious function of all four Administering Virtues ultimately depends on the smooth, harmonious flow and functioning of the Natural Force in the liver. The basic functions of an organ are determined by its dominant humor and its Administering Virtue. In the colon, which absorbs fluids and electrolytes and solidifies the stool, the dominant humor is black bile, with its Retentive Virtue. However, all four Administering Virtues, in the right proportion, are necessary for the proper, balanced functioning of each organ. The Digestive Process Subtle vapors of black bile from the spleen enter the stomach to awaken the gastric secretions and the appetite, and one feels hungry. The tongue signals to the digestive organs what to secrete through its sense of taste. In the mouth, the teeth thoroughly chew or masticate the food with ample saliva to form a semiliquid bolus, which can easily be propelled down the esophagus to the stomach. Residues of black bile in the stomach enable it to hold on to its contents long enough to process them properly. When the time is ripe, the pyloric valve opens under the action of the Phlegmatic humor and its Expulsive Virtue. In the duodenum, yellow bile is secreted into it from the liver and gall bladder. Yellow bile facilitates the digestion and absorption of fats, and also eliminates excess fats and cholesterol from the body. Bile also acts as a natural laxative, stimulating intestinal peristalsis. Then, the pancreas secretes its digestive enzymes and bicarbonates, which neutralize and tone down the caustic, acidic heat of the middle GI tract, giving the food and digestive juices a more balanced, Sanguine nature, which facilitates absorption. The digestion of food into chyle is completed in the small intestine. After the digestion of chyle is completed, the villi of the small intestine absorb its nutrients via the Attractive Virtue of the blood that runs through them. The Retentive Virtue of black bile enables the stool to be held until the time is right for defecation. The drying, hardening action of black bile is tempered and counterbalanced by the moistening, lubricating action of the Phlegmatic humor, which makes the stools soft enough to expel through its Expulsive Virtue. The presence of yellow bile, a natural laxative, tips the balance in favor of excretion. The elimination of wastes is usually the last step in a long chain of metabolic events in which many byproducts are reused and recycled. Finally, what can no longer be used is eliminated as waste. There are four major waste products of the body in Greek Medicine, which correspond to the Four Elements. Each is produced via the thermal energies and eliminated via the kinetic energies of its respective eliminative organ. Sweat is the waste product of the Fire element, and is eliminated through the skin, which is the largest eliminative organ of the body. Urine is the main liquid waste of the body. Feces, also called the stool or Alvine Discharge, is the waste product of the Earth element, and is eliminated via the colon. Feces are the main solid waste of the body. Humorally, the organism will try to eliminate escesses and superfluities, whatever they may be, through the wastes. Analysis of the urine and stool are important diagnostic procedures in Greek Medicine. The right balance between the retention and evacuation of wastes is important to proper hygiene. The Digestive Tract, or Alimentary Canal The digestive tract is a great central tube running through the core of the organism, from mouth to anus. Although it consists of many different organs, the digestive tract is actually one continuous tube. And so, an intricate network of reflex relationships exists between its various component orgns, through which one part affects others, and the whole of the digestive tract. This Great Central Channel is able to either assimilate or eliminate via both ends, which makes it very useful, both physiologically and therapeutically. From the bottom end, defecation is the usual means of elimination, although evacuations may also be therapeutic or procured, as in purgatives or enemas. Many deep organs of digestion and metabolism, such as the liver, gall bladder, spleen and pancreas, pour their various digestive secretions into this Gret Central Channel. Therapeutically, their secretions can also become vehicles for the ripening and elimination of morbid humors and metabolic residues, or toxins.

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