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Chapter 1 : II. THE POSITION OF MANAS - Online Books â€¢ Lucis Trust

Before the clip-path property was introduced, in CSS , the clip property was used to clip parts of an element, similar to the way clip-path works. However, the clip property was very limited: the only supported clipping shape was a rectangle shape created using the rect() function.

This abbreviated thesis will outline why we should consider adding another. Since its discovery over 50 years ago, the Reticular Activating System, or RAS, in the reticular formation of the brainstem, has been studied extensively. Less well known to Western medical scientists, there is a parallel system that develops in the subtle energy body of the human being. Within this parallel system, there are energy-junctions known as chakras. This energy body, while not visible with current western and mainstream technology, has been known in some of the ancient esoteric healing traditions of the East. According to these esoteric teachings, as the human being develops from a state of alert consciousness toward a condition of Spiritually Aware Consciousness, the locus of control over the functions of the bodies physical and subtle must shift from the physical brain to a Higher Mind within a more subtle body. This shift occurs after activation of the Alta Major Chakra. The proposed axis suggests a mechanism for the process of interaction between the person and the collective field. This type of consciousness is used to describe various states including awake and alert states, dream states, drug-induced-states, hypnotic and others. During his retirement speech, Wilder Penfield admonished his peers not to look for the mind within the brain. He had spent his career searching and could not find it there. We may come to find that neither consciousness nor Consciousness is under the control of a single structure, responding instead to reflexes within axes of structures. The measureable information is conveyed along several channels, primarily through the cerebral cortex, which takes an active role in processing thoughts and emotions. The brain produces a cascade of chemical substances, which influence physiology. With its function as the afferent and efferent cholinergic conduit, the RAS activates an alert status throughout the brain. The RAS is said to be the gas pedal that ignites the diencephalon the hypothalamus and thalamus as well as the cortical areas of the brain. Functional Magnetic Resonance Images fMRI have given us the view or neural maps of which brain cortices become activated with thoughts, emotions and memories. However, the results of fMRI imaging reveal only cortical brain activity, leaving out the important afferent and efferent messenger molecules through the brainstem, which is where the RAS is located. It might be the primary gateway for which messenger molecules afferently sensory and efferently motor distribute throughout the nervous system. Without a functioning RAS there is no bodily connection. These pathways integrate sensory, visceral, limbic, and motor functions. Reticular circuits branch throughout the central nervous system and exert important influences on autonomic regulation of vital organ systems, levels of alertness, sleep cycles, somatic motor activities, pain modulation and behavior. The vagus nerve is the main nerve of the ANS. The two branches of the ANS are the parasympathetic, which acts like a brake, and the sympathetic, which acts like an accelerator. Efferent impulses start in the central nervous system and pass peripherally along spinal or cranial nerves. Afferent impulses start out peripherally and pass into the central nervous system. There are two general modalities of the peripheral nervous system, the motor efferent and the sensory afferent. The vagus nerve is composed of both motor and sensory fibers, which communicate sensory and motor information bidirectionally between the brain and body. There is emerging experimental evidence that demonstrates that immune and inflammatory responses are modulated by communications along the vagus nerve. In normal anatomy, there is one vagus nerve on each side of the body see Figure 2. Referring to Figure 2, the medulla is located in the brainstem above the spinal cord and ventral to the reticular formation. The medulla is the main site in the brain for regulating sympathetic and parasympathetic outflow to the heart and blood vessels. The nucleus tractus solitarius NTS of the medulla receives sensory input from various systemic sensory receptors and mechanoreceptors, such as chemoreceptors, baroreceptors, thermoreceptors and osmoreceptors. A chemoreceptor also known as chemosensor is a sensory receptor that transduces a chemical

signal into an action potential. More generally, a chemosensor detects certain chemical stimuli in the environment. Some schools of thought believe that the hypothalamus is the locus of control regarding the visceral sensory receptors, while others believe that the RAS or medulla is the locus of control. At this time it has become increasingly apparent that the RAS is not only a neuronal superhighway, but also an active conduit by which messenger molecules e. Groups of cells related in structure and function are called tissues, from outer skin to each visceral organ. A cellular community creates these tissues, joined together in structured systems, with each system having a common function, e. Nearly every cell in the body has thousands of tiny formations faceted in its outer membrane called receptors. Receptors are like our senses, eyes, ears, nose, and their job is to detect signals coming to them via chemical messenger molecules. Just as cells use their receptors to sense the environment in which they exist, the outer body receives information using the five senses. One of the beliefs within the new paradigm in biology and physiology is that cellular signaling and communication is providing for an infrastructure of biological and subtle energy systems, e. Our sensory responses are evidence of human contact with the world at large, as well as our inner-world of mind and body. We are both an open and closed system. The word Spirit is derived from the Latin root of Spiritus, meaning the breath of life vitality. Spirit is the principle of conscious life and the vital principle in humans, animating a body or mediating between body and soul â€" the nonmaterial, intelligent and sentient part of a person. What is presented here is meant to inform regarding the importance of the alta major chakra as it pertains to its inclusion in the proposed RAS-Vagus Nerve-Alta Major Chakra Axis. Looking to the endocrine and lymphatic glands throughout the body, we find a striking parallel correlation to the chakra centers. The Theosophists were influenced by the Hermeticists of ancient Egypt, and have maintained the Hermetic arts and sciences, which they have taught since the mid 19th century. Their teachings included the anatomical and physiological mapping of how chakras relate to the energy surrounding the physical and subtle energy bodies â€" connecting our inner-world to the outer-world. The inset image of the head shows the three chakras as spinning vortices, and make up the three points of one of the head triangle sequences. The preceding image Figure 4 includes these glands in the overlay with the chakras. Energetically speaking, the glands are denser energy channels as they are in the physical body, and coordinate with the nervous system as a whole. Major chakras are believed to correspond to major nerve bundles in the physical body. The finger on the right is pointing to the ajna center in the etheric field. The organ point associated is the bilateral carotid gland. Esoterically speaking, the alta major center or chakra is believed to be in the etheric body. It is the final chakra or energy center of the human form to be activated. When the alta major center is activated, human consciousness expands to merge with Consciousness. While there are numerous fine details we could discuss, there are three major points with regard to the alta major center: How it becomes activated 2. In Esoteric Healing, Master D. The reason for this involves the purposeful waking of Consciousness. The alta major center is considered a minor chakra, but functions as a major chakra according to the teachings of Master D. In the head triangle, the alta major chakra has a unique position, first because of its relationship in the head triangle, and second due to its powerful link to the cerebellum, the medulla oblongata, the spine and vagus nerve. The cerebellum is part of the hindbrain and controls voluntary muscles and, therefore, movement â€" and is energetically linked to the root or base chakra. The medulla oblongata, also part of the hindbrain, is closest to the spinal cord and is involved, as is the vagus nerve, with the regulation of heartbeat and heart rate, breathing, blood pressure and the reflex centers. The medulla is energetically connected to the throat and heart chakras. When this congery of nerves is fully developed, it forms a centre of communication between the vital energy of the spinal column the kundalini fire and the energy of the two head centres above enumerated in the pineal, pituitary, carotid triangle. It is the physical correspondence to the antaskarana [the antaskarana is a thread or channel between the personality lower worlds and the higher worlds of Consciousness] on higher levels. Treatise on Cosmic Fire was published in It was more than thirty years later that knowledge of the reticular formation first came to Western medical science. It is likely that Master D. To know for certain that there is a correlation here, a proper investigation will have to wait until there is a more robust imaging detector

than the fMRI, since we cannot easily see the RAS using this current technology. Illustrated as well are the major chakras. The sushumna thin center line represents all three threads or currents. The ida and pingala represent the male and female subconscious mind aspects, but do not form threads as this image implies. The raising of kundalini energy occurs with the development of the antaskarana and antahkarana, once they are empowered and intertwined â€" this is not appropriately presented in this illustration. The connection through the crown chakra represented by the wings is the Monad Mind of God. Dedication to the Path of Consciousness means that the activated alta major chakra will become the distribution center of life-force energy. This life-force energy moves down and up the antahkarana, the energetic spinal column, radiating magnetically to open the chakra centers. As stated earlier, the RAS is the network hub of the physical nervous system, sending and receiving signals, creating connections using the endogenous hormones, neurotransmitters and neuropeptides that move throughout the body. The vagus nerve carries the signals that coordinate these collective movements and activations, creating a homeodynamically balanced nervous system within the body. In Magoun and Moruzzi discovered that the reticular formation was the area of the body that aroused the cortex of the brain. This thesis proposes that this RAS-Vagus Nerve-Alta Major Chakra connection is an axis which acts as a communication nexus between the physical systems and Consciousness, and which, when activated Consciously and consciously, can arouse a profound Spiritual connection. It is our individual choice to make. Our power is in the here and now, and the journey begins in our physical bodies. Whether or not we choose to acknowledge our psychic potential as presented by Master D. The time has come to reconnect with our true nature, which is both physical and Spiritual. Coupled with knowledge and awareness, we now, together, stand on a promontory looking to build our bridge. Accessed April 14, The Yogi Publication Society, , p. Bailey Nevada City, CA: Blue Dolphin Publishing, , p. Lucis Publishing Company, , p. Lucis Publishing Company, A Treatise on Cosmic Fire. Blue Dolphin Publishing, Inc.

Chapter 2 : Device for measuring a figure - Ushikata Mfg. Co., Ltd.

The physicists predict that this matter-formation mechanism could provide an entirely new way to look for dark matter, since it would leave a signature that could be experimentally detected.

See Syntax and Values sections. Clipping is a graphical operation that allows you to fully or partially hide portions of an element. The portions of the element that are shown or hidden are determined by a clipping path. This region is known as the clipping region. Conceptually, any parts of the element that lie outside of a clipping region are not drawn. This includes any content, background, borders, text decoration, outline and visible scrolling mechanism of the element to which the clipping path is applied, and those of its descendants. A clipping path middle is applied on a polygon shaded with different colors left. Source A clipping path is conceptually equivalent to a custom viewport for the element it applies to. Thus, it affects the rendering of an element. The boundaries of a clipped element must remain the same as if it were not clipped. If you want to change the way the content around the element flows and have it respond to the defined shape of the clip path, you can use the shape-outside property. What is rendered is the cumulative intersection. Pointer events must not be dispatched on the clipped non-visible regions of a shape. This means that the element should not respond to pointer events like hover or click events even if it is hovered or clicked outside its visible region. Animating Clipping Paths Clipping paths defined using basic shapes can be animated just like shapes defined for the shape-outside property can. In short, a clipping path can be animated from one shape to another because it is made up of points. These points have coordinates that are either length or percentage values. And since lengths and percentages are animatable, shapes can be animated as well. However, note that you can animate one shape into another only by using the same shape function for the initial and final shape, because the initial and final shape must have the same number of points, otherwise the animation is not possible. For more information please see the shape-outside property entry. However, the clip property was very limited: Moreover, clip only worked on absolutely-positioned element, which limites its use a lot. Even in SVG, it was limited to specific elements as well. These reasons, among others, are why the clip-path property was added to the SVG specification and then adapted by the CSS Masking module today. However, the shape does not change anything else about the element, like backgrounds and borders and such. This means that any borders and background images will not adapt to the shape created on the element. An example showing the result of changing the float area of an element using the shape-outside property. The background area of the element remains unchanged, resulting in the text overlapping it and therefore getting an unwanted result. The result of using the clip-path property to visually define a CSS Shape applied using shape-outside. You can read more about CSS Shapes and using clip-path with them in the shape-outside property entry, and see the above demo live in the Examples section below. It can be one of the following values: These boxes are applied and can be used on HTML elements. The other three geometry box values are applied to SVG elements. A basic shape makes use of the specified reference box to size and position the basic shape. If no reference box is specified, the border-box will be used as reference box. See the shape-outside property entry for details and more information. If specified by itself, uses the edges of the specified box as a reference box, including any corner shaping e. Stroke uses the stroke bounding box as reference box. If a viewBox attribute is specified for the SVG viewport creating element, the reference box is positioned at the origin of the coordinate system established by the viewBox attribute, and the dimension of the reference box is set to the width and height values of the viewBox attribute. For SVG elements without associated CSS layout box, the values content-box, padding-box, border-box and margin-box compute to fill. For elements with associated CSS layout box, the values fill, stroke and view-box compute to border-box. Notes A computed value of other than none results in the creation of a stacking context the same way that CSS opacity property does. If the URI reference is not valid e. Examples The following are examples of using the basic shape functions with the clip-path property: The code looks like the following: The following is a live demo of the above example.

Note that the demo may or may not work in your browser. Please see the note on browser compatibility below for more information. View this demo on the Codrops Playground Notes: The tool then generates the code for a polygon function which you can then directly use as a value for clip-path. Screenshot of the clip-path generator by CSSPlant. The clip path generator can be very useful and time-saving, so make sure to check it out! Live Demo The following demo uses the polygon function to clip an element using clip-path. The element has a scroll bar that is only partially visible because it lies almost completely outside the clipping region defined by the clip path. Moreover, the polygonal clip path is animated. It animates into another shape when you hover over the element.

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Chapter 3 : How the Heart Works | National Heart, Lung, and Blood Institute (NHLBI)

Before the occultist can manipulate wisely the matter of the solar system he must have mastered the laws that govern the microcosm, and even though he is naturally on the occult path yet will still have to find the God within his own being before he can safely venture on the path of occult law.

Greek psyche; Latin anima; French ame; German Seele. The question of the reality of the soul and its distinction from the body is among the most important problems of philosophy , for with it is bound up the doctrine of a future life. Various theories as to the nature of the soul have claimed to be reconcilable with the tenet of immortality , but it is a sure instinct that leads us to suspect every attack on the substantiality or spirituality of the soul as an assault on the belief in existence after death. The soul may be defined as the ultimate internal principle by which we think, feel, and will, and by which our bodies are animated. The term "mind" usually denotes this principle as the subject of our conscious states, while "soul" denotes the source of our vegetative activities as well. That our vital activities proceed from a principle capable of subsisting in itself, is the thesis of the substantiality of the soul: If there be a life after death, clearly the agent or subject of our vital activities must be capable of an existence separate from the body. The belief in an animating principle in some sense distinct from the body is an almost inevitable inference from the observed facts of life. Even uncivilized peoples arrive at the concept of the soul almost without reflection, certainly without any severe mental effort. The mysteries of birth and death, the lapse of conscious life during sleep and in swooning, even the commonest operations of imagination and memory, which abstract a man from his bodily presence even while awakeâ€”all such facts invincibly suggest the existence of something besides the visible organism, internal to it, but to a large extent independent of it, and leading a life of its own. In the rude psychology of the primitive nations, the soul is often represented as actually migrating to and fro during dreams and trances, and after death haunting the neighbourhood of its body. Nearly always it is figured as something extremely volatile, a perfume or a breath. Often, as among the Fijians, it is represented as a miniature replica of the body, so small as to be invisible. The Samoans have a name for the soul which means "that which comes and goes". Many peoples, such as the Dyaks and Sumatrans , bind various parts of the body with cords during sickness to prevent the escape of the soul. The soul in ancient philosophy Early literature bears the same stamp of Dualism. In the "Rig-Veda" and other liturgical books of India , we find frequent references to the coming and going of manas mind or soul. Indian philosophy, whether Brahminic or Buddhistic , with its various systems of metempsychosis , accentuated the distinction of soul and body, making the bodily life a mere transitory episode in the existence of the soul. They all taught the doctrine of limited immortality , ending either with the periodic world-destruction Brahminism or with attainment of Nirvana Buddhism. The doctrine of a world-soul in a highly abstract form is met with as early as the eighth century before Christ, when we find it described as "the unseen seer, the unheard hearer, the unthought thinker, the unknown knower, the Eternal in which space is woven and which is woven in it. In Homer, while the distinction of soul and body is recognized, the soul is hardly conceived as possessing a substantial existence of its own. Severed from the body, it is a mere shadow, incapable of energetic life. The philosophers did something to correct such views. The earliest school was that of the Hylozoists ; these conceived the soul as a kind of cosmic force, and attributed animation to the whole of nature. Any natural force might be designated psyche: With this we may compare the "mind-stuff" theory and Pan-psychism of certain modern scientists. Anaximander gives it an aeriform constitution, Heraclitus describes it as a fire. The fundamental thought is the same. The cosmic ether or fire is the subtlest of the elements, the nourishing flame which imparts heat, life, sense, and intelligence to all things in their several degrees and kinds. The Pythagoreans taught that the soul is a harmony, its essence consisting in those perfect mathematical ratios which are the law of the universe and the music of the heavenly spheres. With this doctrine was combined, according to Cicero, the belief in a universal world-spirit, from which all particular souls are derived. All these early theories were

cosmological rather than psychological in character. Theology, physics, and mental science were not as yet distinguished. It is only with the rise of dialectic and the growing recognition of the problem of knowledge that a genuinely psychological theory became possible. In Plato the two standpoints, the cosmological and the epistemological , are found combined. Thus in the "Timaeus" p. First the world-soul is created according to the laws of mathematical symmetry and musical concord. It is composed of two elements, one an element of "sameness" tauton , corresponding to the universal and intelligible order of truth , and the other an element of distinction or "otherness" thateron , corresponding to the world of sensible and particular existences. The individual human soul is constructed on the same plan. Sometimes, as in the "Phaedrus", Plato teaches the doctrine of plurality of souls cf. The rational soul was located in the head, the passionate or spirited soul in the breast, the appetitive soul in the abdomen. In the "Republic", instead of the triple soul, we find the doctrine of three elements within the complex unity of the single soul. His account of the origin of the soul in the "Timaeus" leads him to deny the intrinsic immortality even of the world-soul, and to admit only an immortality conditional on the good pleasure of God. In the "Phaedo" the chief argument for the immortality of the soul is based on the nature of intellectual knowledge interpreted on the theory of reminiscence; this of course implies the pre-existence of the soul, and perhaps in strict logic its eternal pre-existence. The Platonic doctrine tended to an extreme Transcendentalism. Soul and body are distinct orders of reality, and bodily existence involves a kind of violence to the higher part of our composite nature. The body is the "prison", the "tomb", or even, as some later Platonists expressed it, the "hell" of the soul. In Aristotle this error is avoided. His definition of the soul as "the first entelechy of a physical organized body potentially possessing life" emphasizes the closeness of the union of soul and body. The difficulty in his theory is to determine what degree of distinctness or separateness from the matter of the body is to be conceded to the human soul. The Stoics taught that all existence is material, and described the soul as a breath pervading the body. Eight distinct parts of the soul were recognized by them: Absolute immortality they denied; relative immortality , terminating with the universal conflagration and destruction of all things, some of them e. Cleanthes and Chrysippus admitted in the case of the wise man; others, such as Panaetius and Posidonius, denied even this, arguing that, as the soul began with the body, so it must end with it. Epicureanism accepted the Atomist theory of Leucippus and Democritus. Soul consists of the finest grained atoms in the universe , finer even than those of wind and heat which they resemble: The soul-atoms themselves, however, could not exercise their functions if they were not kept together by the body. It is this which gives shape and consistency to the group. If this is destroyed, the atoms escape and life is dissolved; if it is injured, part of the soul is lost, but enough may be left to maintain life. The Lucretian version of Epicureanism distinguishes between animus and anima: The soul in Christian thought Graeco-Roman philosophy made no further progress in the doctrine of the soul in the age immediately preceding the Christian era. None of the existing theories had found general acceptance, and in the literature of the period an eclectic spirit nearly akin to Scepticism predominated. Of the strife and fusion of systems at this time the works of Cicero are the best example. On the question of the soul he is by turns Platonic and Pythagorean, while he confesses that the Stoic and Epicurean systems have each an attraction for him. Such was the state of the question in the West at the dawn of Christianity. In Jewish circles a like uncertainty prevailed. The Sadducees were Materialists , denying immortality and all spiritual existence. The Pharisees maintained these doctrines, adding belief in pre-existence and transmigration. The psychology of the Rabbins is founded on the Sacred Books, particularly the account of the creation of man in Genesis. Three terms are used for the soul: At all events, it is evident that the Old Testament throughout either asserts or implies the distinct reality of the soul. An important contribution to later Jewish thought was the infusion of Platonism into it by Philo of Alexandria. He taught the immediately Divine origin of the soul, its pre-existence and transmigration; he contrasts the pneuma, or spiritual essence, with the soul proper, the source of vital phenomena, whose seat is the blood; finally he revived the old Platonic Dualism , attributing the origin of sin and evil to the union of spirit with matter. It was Christianity that, after many centuries of struggle, applied the final criticisms to the various psychologies of antiquity, and brought their scattered elements of truth to full

focus. The Gospel language is popular, not technical. Psyche and pneuma are used indifferently either for the principle of natural life or for spirit in the strict sense. Body and soul are recognized as a dualism and their values contrasted: Paul we find a more technical phraseology employed with great consistency. Psyche is now appropriated to the purely natural life; pneuma to the life of supernatural religion, the principle of which is the Holy Spirit, dwelling and operating in the heart. The opposition of flesh and spirit is accentuated afresh Romans 1: According to this, man, perfect man teleios consists of three parts: Body and soul come by natural generation; spirit is given to the regenerate Christian alone. Thus, the "newness of life", of which St. Paul speaks, was conceived by some as a superadded entity, a kind of oversoul sublimating the "natural man" into a higher species. This doctrine was variously distorted in the different Gnostic systems. The Gnostics divided man into three classes: To each class they ascribed a different origin and destiny. Even in this life they are exempted from the possibility of a fall from their high calling; they therefore stand in no need of good works , and have nothing to fear from the contaminations of the world and the flesh. This class consists of course of the Gnostics themselves. The psychici are in a lower position: They stand in a middle place, and may either rise to the spiritual or sink to the hylic level. In this category stands the Christian Church at large. Lastly, the earthy souls are a mere material emanation, destined to perish: This class contains the multitudes of the merely natural man. Two features claim attention in this the earliest essay towards a complete anthropology within the Christian Church: It is probable that originally the terms pneumatici, psychici, and choici denoted at first elements which were observed to exist in all souls, and that it was only by an afterthought that they were employed, according to the respective predominance of these elements in different cases, to represent supposed real classes of men. The doctrine of the four temperaments and the Stoic ideal of the Wise Man afford a parallel for the personification of abstract qualities. The true genius of Christianity , expressed by the Fathers of the early centuries, rejected Gnosticism. The ascription to a creature of an absolutely spiritual nature, and the claim to endless existence asserted as a strictly de jure privilege in the case of the "perfect", seemed to them an encroachment on the incommunicable attributes of God.

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Chapter 4 : Writings of Teilhard de Chardin - Teilhard de Chardin

T/F: Extreme "mechanism"- (the concept that life is reducible to complex carbon-based chemistry) is as dogmatic and unproven as the animating life-force view of "naÃ¯ve" vitalism. T Does a "vitalistic" approach necessarily require the assumption of beliefs consistent with a theistic teleology?

The Valentinian View of the Creation Introduction The Valentinians had a very distincitive view of the material creation. Unlike other Gnostics, they saw the creation of the material world as part of the process of redemption. It was seen as instrumental in the destruction of the deficiency and the restoration of the fallen spiritual element to the divine fullness pleroma. This viewpoint had certain ethical consequences which serve to further distinguish them from their Gnostic contemporaries. Each person has a material body, an animating soul, and a spirit. Similarly, the cosmos itself is viewed as having a tripartite structure. It too is said to consist of spirit pneuma , soul psyche and matter hyle. Valentinians trace this tripartite structure back to the origin of the cosmos. According to their creation myth, the cosmos has its origins from the fall and redemption of the divine emanation Aeon Sophia or "Wisdom". Sophia attempted to know the Father through thinking alone and as a result she was excluded from the divine Fullness pleroma and fell into ignorance and suffering. She repented of her actions and began to plead for assistance. The Father had mercy on her and sent Christ to her and she attained knowledge gnosis of the Father. Matter hyle is said to originate from her suffering, soul psyche from her repentance, and spirit pneuma from her gnosis Against Heresies 1: Spirit is destined to attain salvation and reenter the presence of God along with Christ and Sophia. Matter or the "left" has no share in salvation and is dissolved by gnosis. Soul or the "right" is intermediate between matter and spirit and is characterized by free will and is capable of partial salvation Excerpts of Theodotus The Valentinian view of matter seems to indicate a fundamentally pessimistic view of material existence. However, as we shall see, this is far from the whole story. The Creation During her fall and redemption by Christ, Sophia gave rise to unformed spiritual substance pneuma. She was unable to form it herself. Therefore she was required to find a place for it to grow to maturity. This place is the material world. Thus in Valentinian thought, the creation of the world is instrumental in the process of redemption. The Demiurge is an unwitting instrument in this process". As Jonas indicates, Sophia was not regarded as having created the world directly. Rather she acted through the Demiurge and the lower powers. The Demiurge mediates between Sophia and matter in much the same way that the soul mediates between the spirit and matter within the individual person and allows the creation of the material world. The Demiurge is "the god through whom she Sophia made the heaven and the earth Excerpts of Theodotus Sophia "uses him as a hand, to beautify and work on the things below" Tripartite Tractate Though him she shaped matter into an image of the Fullness in order to provide a place for the seed to "grow and increase in it, and so become suitable for the reception of perfect Word" Against Heresies 1: Note that the substance of the world i. The ultimate purpose of this process is the creation of human beings Tripartite Tractate Sophia used the Demiurge to create human beings consisting of a material body and a soul. Into each soul she sows the spiritual seed. Thus every human being is a microcosm consisting of all three substances: Purpose of the Creation The human body is created in order to serve as a vessel in which the spiritual seed will grow to maturity. This is the main purpose of the Demiurge. According to Ptolemy, the spiritual element "was secretly deposited in him the Demiurge , so that it might be sown by him into the soul that comes from him and into this material body; might be carried by these as it were by a pregnant woman , and increase; and might become ready for the reception of the perfect Word" Against Heresies 1: As Herakleon says, it is the Demiurge and "the angels of the dispensation, through whom - as mediators - it the seed was sown and brought up" Herakleon Fragment The seed is "being trained and nourished here since it was sent out in immaturity, but was later deemed worthy of perfection" Against Heresies 1: As the Tripartite Tractate says, "the entire preparation of the adornment of the images and representations and likenesses, have come into being because of those who need education and teaching and formation, so that the smallness might

grow, little by little, as through a mirror image. For it was for this reason that he created mankind at the end, having first prepared and provided for him the things which he had created for his sake" TriTract The world has been formed into an image of the Pleroma and human being were created to serve as a vessel in which the seed may attain to maturity. Valentinians believed that the spiritual "fruit of hers i. The attaining of maturity by the seed is linked to it receiving form. The seeds are described as "immature" or "unformed" when sent out for "training" in the world. According to Ptolemy, "the spiritual substance has been sent forth so that it might be formed by being coupled with the animate psychic and learning along with it during its time of residence in this place" Irenaeus Against Heresies 1: Similarly, according to Theodotus, "From the three species sown in humanity there takes place both the formation of the spiritual substance and the changing of the substance of soul from slavery to freedom. Herakleon describes how Christ comes to "harvest" the souls of believers. He says, "The harvest is of the souls of believers. They are already ripe, ready for harvest, and suitable for being gathered into the barn, that is, through faith into rest, all those who are ready. For they are not all ready. Some were already ready, some were on the point of being ready, some are near to being ready, and some are still being sown" Her Frag Through the activity of Christ, the seed "is being gradually given form through knowledge gnosis " Excerpts of Theodotus Furthermore, "so long as the seed is unformed, it is a child of female alone. No longer weak and subject to the cosmic powers, visible and invisible, but, having become joined to the male, it becomes an imperishable fruit" Excerpts of Theodotus Other Valentinian sources describe this process in a slightly different manner. As described above, matter is identical with the fallen state or "deficiency. This is what Valentinus refers to when he addresses the elect: And you wanted death to be allocated to yourselves so that you might spend it and use it up, and that death might die in you and through you. For when you nullify the world and are not yourselves annihilated, you are lord over creation and all corruption" Valentinus Fragment 4. The matter of which the world was formed is regarded as identical with ignorance or "death". By entering the world, the seeds each are allocated a share of death or deficiency. It is their mission to "spend" and "use up" their share of death and thereby "nullify the world. As Valentinus elsewhere describes, "Inasmuch as the lack came into being because the Father was not known, from the moment the Father is known, the lack will not exist It is by acquaintance gnosis that all will purify themselves out of multiplicity into unity, consuming matter within themselves as fire" Gospel of Truth Just as the Demiurge created our material bodies out of matter or dust chous , the gnosis brought by Christ removes the matter or dust from us. Theodotus describes how Christ aids us in the desctuction of our inner ignorance or "dust" chous. According to him, "When the Savior came, he awakened the soul, but kindled the spark And after the resurrection when he breathed his spirit into the apostles, he blew away the dust chous like ashes and removed it, but he kindled and made alive the spark. The Holy Spirit removes the "dust" or ignorance and awakens the spiritual spark. Thus the creation can be understood as a mechanism by which lack and matter are gradually destroyed. As each person attains to gnosis, the lack and matter within them is destroyed and the universe is one step closer to reintegration with the pleroma. Eventually all of the ignorance will be used up and the world will be destroyed. As Ptolemy says, "the end is supposed to come when every spiritual element has been formed and perfected in acquaintance gnosis " Against Heresies 1: Once all the ignorance will has been "used up", the matter of which the world is composed will cease to exist. According to Ptolemy, "The fire which is hidden in the world will blaze up and ignite, annihilate all matter, and consume itself also at the same time, and pass into nothingness" Against Heresies 1: With the deficiency eliminated, Sophia along with the seed will be readmited to the divine pleroma Against Heresies 1: As Ptolemy says, "what leads them to the Fullness is the seed which was sent forth from there before it was mature, but attained to perfection here" Against Heresies 1: Entering the world is viewed positively in Valentinianism. It was seen as a necessary step towards receiving gnosis and returning to the pleroma. With this in mind, Valentinian teachers vigorously defended marriage and raising children. Ptolemy, an important teacher of the Valentinian school at Rome says of marriage: Similarly, the teacher Theodotus argues that marriage and rearing children "is indispensable for the salvation of those who believe - for this child-bearing is essential until the previously reckoned seed is

brought forth" Excerpts of Theodotus It is quite easy to see that the Valentinian view on marriage is a logical consequence of their teaching on the creation. If entering the world is the path to salvation for the spiritual element then the means by which this occurs i. For this reason Clement of Alexandria saw the Valentinians as allies against those who reject marriage Stromata 3: Such an attitude towards marriage and childbirth sharply contrasts with other Gnostics who condemned marriage and child-bearing. Those Gnostics who rejected marriage and reproduction saw the created world in purely negative terms as the end results of the fall. Valentinians in contrast saw the creation of the world as part of the process of redemption and consequently had a less negative view towards it. Rather than being the nadir of the fall into ignorance, the creation is the way back from the fall. It is created specifically as a place for the spiritual seeds to attain to gnosis. The attainment of gnosis also corresponds to the destruction of ignorance and lack as well as their concrete manifestation i. Thus the world is also a mechanism for the destruction of ignorance and matter. Valentinians agreed with Plato that the form of the created world preserved the image of the ideal realm the pleroma. For this reason they rarely criticisize the form of the world. In their view, the matter of which the world is formed is condensed or solidified deficiency and suffering. Thus while the world preserves the image of the pleroma, it is inevitably deficient on account of its substance. Valentinians could therefore appreciate that which was beautiful about the world while criticisizing that which was ugly.

Chapter 5 : CATHOLIC ENCYCLOPEDIA: Soul

Spirit of Fire, The Vision of Teilhard de Chardin - by Ursula King 4. The Life of Teilhard de Chardin - by Robert Speaight, pp 5. Memories of Teilhard de Chardin - by Helmut de Terra, pp Studies and Insights into the writings of Teilhard de Chardin 1.

Jupiter-Saturn, Heliocentric, with different settings: Venus-Earth, Heliocentric, with relative Z-coordinate colors: Venus-Earth, Heliocentric, with relative Z-coordinate colors and different settings: Geocentric Venus Longitude by Speed plot: Planet mandalas reveal an exquisite beauty in planetary orbits that has been largely overlooked by the community of scientists as well as artists. Planet mandalas are works of art created by the movement of planets and appear to have elements of shading, dynamic motion, sensitive symmetry, and elegant design elements similar to what a very skilled artist might produce but they are drawn by planetary motions rather than human hands. Also note that in addition to viewing the completed planet mandalas, as shown below, watching the planet mandala being drawn can be equally fascinating. There is one planet mandala in the Sirius program called the Shiva Dance which many people find particularly fascinating to watch. These animations can be saved to file and uploaded, and we plan to upload the Shiva Dance soon. Shown below is a diagram of the geocentric orbital path of Mars produced with modern computer software called Sirius: Note that these diagrams show the actual path of Mars as seen geocentrically. When Mars is opposition the Sun it is physically much closer to Earth than when Mars is conjunct the Sun. By holding the Earth stationary and plotting the motion of Mars we obtain the diagram shown above. Even more intriguing is the path of Venus, which produces a more symmetrical and easily identifiable 5-petaled shape. The intriguing geocentric orbit of Mars was drawn by Kepler as part of his intense and arduous work in determining the laws of planetary motion. The geocentric orbit of Mars was not dwelled upon by later astronomers; it was simply a step taken by Kepler in his work towards discovering the laws of planetary motion. The author contacted Mark Pottenger regarding these planet mandalas and Mark Pottenger generously shared his knowledge, program source code, and all of his work with planet mandalas. In developing the computer software, I added a few new variations to the concept of planet mandalas, the most important of which may be the addition of color. The planet positions that are plotted in most kinds of planet mandalas are the actual planet positions in 3-dimensional space, which is referred to as astronomers as rectangular coordinates. The rectangular coordinates of a planet are an x, y, and z coordinate positions in the 3 dimensions of space. The planet mandala plotted on a flat surface like paper or a computer screen is the x and y coordinates, and I added color to represent the z coordinate. Predicting the shape of a planet mandala from the planets and time period selected is extremely difficult, and in most cases impossible. Very often one simply arbitrarily changes values like the starting date, duration, and other factors, and simply draws the image to see what it looks like. Similarly, when I added color to represent the third dimension in space, I was not sure what the result would look like. The aesthetic effect of color was more dramatic than I imagined it to be. The diagram shown below is the path of Venus and the changes in color reflect the position of Venus in the 3rd dimension of space, i. By plotting the daily positions of two planets over a period of time from a few months to many years, and drawing a line to connect the daily positions, very intriguing shapes are produced, as shown in the planet mandalas earlier in this article. It is also fascinating to watch the images being drawn in a kind of time-lapse speeded up presentation of planetary motions. For example, there is one image that is referred to in the software used to produce these images Sirius software, which is described at www. Planet mandalas may simply be a curious phenomenon with no practical value or applications other than perhaps to engender aesthetic and artistic appreciation for the viewers of these images. However, there is a powerful new movement in physics that has an interesting parallel with the recent discovery of planet mandalas: Wolfram speaks with considerable authority. His achievements, honors, and his precocious discoveries in physics are simply extraordinary. Wolfram points out that previous to his work, one expected the explanation for a

complex system to be very complex as well, but simple iterative processes produce forms that are surprisingly complex. The complex forms produced by a simple iterative process cannot always be predicted. One must simply run the iterative process on a computer and see the results. Even to a genius in the field of mathematics and physics such as Wolfram is often startled by the resulting patterns produced by iterative processes. While reading the book A New Kind of Science, I repeatedly wondered how and where the iterative processes that Wolfram supposes generate complex systems exist. Cell division and growth patterns are possibilities. Planets travel on their paths in a seemingly endless cycles and arrange themselves in various configurations, as noted by astrologers throughout the ages. Although astrology has failed thus far to produce any scientifically verifiable results and even some astrologers see astrological processes as existing outside the realm of science, it is possible that there is some unnoticed relationship between planetary positions and terrestrial behavior because the mechanism through which this relationship operates may lie largely outside the domain of both astrologers and scientists. The two processes are different but similar in many respects. Both processes are simple and both are processes are iterative. In both cases complex and beautiful patterns are produced. Planet mandalas and discrete automata also have much in common with fractals. In all of these mathematical calculations a relatively simple formula is calculated iteratively, feeding back into the variables in the formula results from the previous calculation. Fractals have proven to have useful applications in the determination of fracture lines in shattered or cracked materials, weather prediction, and other applications. Planet mandalas may, or may not, prove to eventually be useful for practical applications. Note that there are three distinguishing factors of planet mandalas as compared to fractals and cellular automata as they are typically calculated: In nature, patterns are not perfect. For example, a sliced apple that shows the star-shaped arrangement of the apple seeds reveals a 5-petaled shape that is highly symmetric but of course not perfectly symmetrical. In this regards planet mandalas more closely resemble the shapes we see in nature than most mathematical algorithms produce. Fractals and cellular automata tend to produce shapes that are jagged and may more closely resemble cracks in a ceramic or glass material, while planet mandalas tend to produce curved shapes more similar to the forms of living things, both of the plant and animal life. Many of the formulae used in fractal theory and in cellular automata are formula that a mathematician thinks of but have not been identified with a physical process. There may be exceptions to this rule but the distinction remains valid in that all planet mandalas are shapes based on a physical reality but not all fractals cellular automata are based on something that has been identified to exist in nature. Stephen Wolfram states that he believes that iterative functions play a vital role in biological development and evolution. Given the facts provided in the previous paragraph, planet mandalas may through some as yet undiscovered process provide a basis for these biological processes. At this stage of research, we are simply noting similarities in the development of mathematical and fundamental theory in physics, and noting that there may be further integration of these findings. Although it may be premature to speculate too far at this point, perhaps future findings in physics will identify a mechanism whereby the movement of relatively small and dense aggregations of matter i. Large aggregates of matter, whether they are solid, liquid, or gas, are relatively rare. Planets, asteroids, and other celestial objects in our solar system are not crammed together like cars on a freeway. There are relatively large expanses of space separating especially the larger celestial objects i. Perhaps the arrangement of these celestial objects and the intricate patterns that they create, as revealed in planet mandalas, create patterns which, like a great cosmic fractal, can be relevant to the patterns in our lives. Consider, for example, this statement by physicist and inventor Ray Kurzweil: Norbert Weiner heralded a fundamental change in focus from energy to information in his book Cybernetics, and suggested that the transformation of information, not energy, was the fundamental building block for the Universe. Perhaps the most enthusiastic proponent of an information-based theory of physics was Edward Fredkin, who in the early s proposed what he called a new theory of physics based on the idea that the Universe was comprised ultimately of software. We should not think of ultimate reality as particles and forces, according to Fredkin, but rather as bits of data modified according to computation rules. If transformation of information is the fundamental building block of the Universe, then we

might think that nature may be very efficient, rather than highly inefficient, and use the placement of the relatively rare planets, stars, and other celestial objects as nodes or points for transferring information. Again, we are making a very large leap from a general conceptual model, but the positive results of the research in cosmic cybernetics indicates that such a leap may not be as large as we might otherwise think that it is. In my view, the fundamental reality in the world is not stuff, but patterns. However, the specific set of particles that comprise my body and brain are completely different from the atoms and molecules than comprised me only a short while on the order of weeks ago. We know that most of our cells are turned over in a matter of weeks. Even those that persist longer e. So I am a completely different set of stuff than I was a month ago. All that persists is the pattern of organization of that stuff. The pattern changes also, but slowly and in a continuum from my past self. From this perspective I am rather like the pattern that water makes in a stream as it rushes past the rocks in its path. The actual molecules of water change every millisecond, but the pattern persists for hours or even years. It is patterns e. Perhaps it is a bit hyperbolic to go a step further and state that energy and matter exist solely for the purpose of supporting patterns. The gorgeous planet mandalas, therefore, do not seem like coincidences that just happen to be created by celestial motions, but rather as nodes in an informational network designed to create these patterns. The positive results of statistical studies on cosmic cybernetics, the case studies, and fairly detailed theoretical developments within cosmic cybernetics may eventually lead to replicable, consistent findings. The reader is referred to the list of articles by the author at http: Cosmic cybernetics bears some resemblance to the patterns provided by planet mandalas in that the arrangement of planets are considered relevant to our lives and behavior on Earth. The addition of color to represent the Z coordinate of the planet positions, a new discovery presented in this article and in the Sirius software for the first time, reveals a great depth, elegance, and beauty to planet mandalas than had been found previously. However, a direct mechanism through which planet mandalas could affect behavior on Earth is unknown at this time. Cosmic cybernetic theory posits that the position of planetary bodies act as points at the crest of waves marking wave lengths as viewed geocentrically. This theory is based on anecdotal evidence, a modern revision of ancient astrological lore, and statistical studies that have shown promising, but not conclusive, results. If a mechanism for the transmission of these waves which in many regards are similar to electromagnetic waves but are based on the placement of celestial objects, is discovered in dark matter, quantum gravity, or some other as yet undeveloped part of the fundamental theories of physics, then cosmic cybernetics as well as the practical importance of planet mandalas in our lives could be firmly established. However, there appears at this time to be no clear and direct line of theoretical development that would supply a theoretical basis for the practical relevance of planet mandalas and the validity of cosmic cybernetic theory. Without a theoretical basis it is possible that even repeated and consistent replication of studies that validate cosmic cybernetic theory may tend to be ignored. Paradigm shifts can be slow even when a theoretical basis is established, and without a solid theoretical foundation, cosmic cybernetics and the practical application of planet mandalas for understanding behavior on Earth may be very slow. The missing link, in short, is a theoretical model that can tie cosmic cybernetic theory to fundamental physics. Analogies and similarities with cellular automata and the importance of patterns is promising, but fall short of being a clear theoretical foundation grounded in specific mathematical formulae. Nevertheless, planet mandalas are important now as a bridge between astronomy and art â€" a curious intersection of aesthetics and astrophysics that deserves attention for the inspiration and wonder that they inspire. Further research in cosmic cybernetics and the development of a theoretical framework that is more solidly grounded in fundamental physics are two important areas for future research and development.

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Chapter 6 : Wave interference - Wikipedia

Scott Onstott is a trainer specializing in the CAD, BIM, 3D, and real-time software used in the AEC calendrierdelascience.com is a consultant, lecturer, author, and independent video producer who has been.

James Chiang A set of cupping hands supporting life denotes the concept of stewardship at every level: In other words, stewardship means being a good caretaker â€" of people, of things, of oneself. If someone should have the title of responsibility such as a producer or a director, he should be looking to do everything he can to enable the health and success of his team or staff, just as he would when looking after his family. But to do this job well, he must first look after that which is most essential, himself. The mind, body and spirit which encompasses him must be balanced and maintained if he is to be functional. A sick or weak caretaker is a lousy caretaker. Creative work is mostly a mentally-stimulating activity; it requires much envisioning, researching, analysis and decision-making. This is perhaps the reason why art can never really be mastered. But getting enough stimulus is rarely the problem. Our lives are excessively cerebral today. Our rational mind is constantly spinning and reacting to the overwhelming set of thoughts and emotions that come our way. This entails segmenting part of our day for that to happen. I like to fill my mind every chance I get and everywhere I go â€" looking, touching, hearing whatever comes my way. These are things unrelated to my regular everyday concerns or obligations, kinda like stopping to smell the roses. But reading is usually what does the job for me most reliably. Ancient Egyptian stone carvings reveal the practice of Yoga as far back as BC. But how many of us ignore or mistreat our bodies? Overwork, anxiety, regrets, and excessive visual stimuli the dark side of technology are all part of the problem. If we want to create good art we must take care of this vessel. A weakened body is one that performs poorly. This is true not just of athletes, but of actors and singers alike. These professionals have strict regimens as to exercise, sleep, food, alcohol consumption etc. Furthermore, a body neglected repetitively is one that takes much longer to heal. There are some people, like myself, who had to give up our careers because of physical issues. If the body stops, you stop. No amount of mind power can correct a damaged ship. Assign 30 minutes a day minimum to move the body around. Healthy foods are good AND beautiful. Our spirit can also be the totality of our emotions, our passions and our energy. Unfortunately, many people take either a very guarded or lackadaisical approach to managing their emotions. The excessively rational and conservative mind tries to hide it, control it or use it strategically to his advantage. He has no trust in his feelings or intuition leading to a life of uncompromising rigidity and self-righteousness. In truth, neither approach to dealing with our emotional reality is optimal. We need balance for our creative juices to flow optimally. The successful and productive artist works hard to manage and flow with his emotions. In other words, he needs to be spiritually and emotionally healthy. Although these may drive him initially, more often than not they impede him AND his art. In fact, they often entered long periods of creative droughts when they struggled with their emotions and turned to the bottle or other forms of substance abuse. How else could they have produced such beautifully balanced art? Set aside times of the day or week to heal the heart. Spend more moments with things and people you love. Enjoy time with nature. The Chinese have a single word for the spirit-heart-mind. They are viewed as one and the same. If we want to create art and do it for a long time, then we must remedy this now, not tomorrow. We must be good stewards. Remember also, that the mind, body and spirit heavily effect each other. A crack in one seam leads to cracks in the others.

Chapter 7 : Cartesianism | philosophy | calendrierdelascience.com

While RenÃ© Descartes () is well-known as one of the founders of modern philosophy, his influential role in the development of modern physics has been, until the later half of the twentieth century, generally under-appreciated and under-investigated by both historians and philosophers of science.

The Conservation of Energy The principle of conservation is the cornerstone of both science and religion. Since conservation upholds reality itself, it is meaningless to speak of anything in its absence. The world of "Alice in Wonderland" is a literary example of a world without conservation laws. In such a place, anything can happen, nothing is predictable, it is a world of chaos "wild and rude". In its Christian religious connotation, conservation equates with the "Father" of the Trinity, the salvation of souls, the idea of a conserved personal identity which transcends the cycle of biological life and death, and of a "Heaven" which is the "eternal home" conservation domain of spirit, beyond the finite, transient, and relative dimensional parameters of space and time. All religions refer to a spiritual reality which is a dimensionless source, counterpart, and permanent refuge from our temporal and ephemeral material experience of life. All science and mathematics depends upon the principle of conservation for its predictive quality. Mathematics is useful in science precisely because we have fashioned it to be a symbolic or abstract system of quantitative conservation laws which we use to model and understand the energetically conserved natural system. In monetary terms, the fact that the one hundred pennies pennies are the "quanta" of our monetary system in a dollar are not lost in the transformation of "making change" is a common and well understood example of the operation of a monetary and arithmetic conservation law. Inflation is an example of the weakening or relativity of the monetary conservation law not the arithmetic law , in which the quanta of the system do not retain their absolute value through time. Quantum mechanics, the transformation mechanism of the weak force IVBs, and the tangential connection between space and time, prevent any analogous inflation of charge units or symmetry debts in nature. In the Tetrahedron Model , conservation in the case of free energy light is realized in three principle modes: The breaking of the symmetric energy state of light, space, and virtual particle-antiparticle pairs by the weak force during the "Big Bang" gives rise to our familiar compound world of free energy light and space , plus bound energy mass-matter, charge, time, gravity. Spacetime is a compound dimensional conservation domain created by the "intrinsic" entropic motions of light, time, and gravity, in which both free and bound forms of electromagnetic energy can find all their conservation requirements satisfied. Entropy Note to Readers Concerning "Entropy": Unless the context indicates otherwise, when I refer to "entropy" in these papers especially in such phrases as "space and spatial entropy" or "time and historical entropy" , I am referring to entropy in its most primordial or pure form, as the intrinsic motion of light "gauged" or regulated by "velocity c" in the case of "spatial entropy" , or as the intrinsic motion of time "gauged" or regulated by "velocity T" in the case of historical or "temporal entropy". Of course, time is also ultimately "gauged" or regulated by "velocity c", since time is defined as the duration measured by a clock required for light to travel a given distance measured by a meter stick. The connection between the three primordial types of entropy and their "gauges", "drives" or "intrinsic motions" c, G, T the "intrinsic motions" of light, gravity, and time is as follows: History is an alternative entropic form of space, in which local, asymmetric bits of information are causally connected in a temporal sequence; the sequence ages and becomes diluted by the march of time, the expansion of history, and the continuous multiplication, divarication, and concatenation of causally connected events. Whereas the electromagnetic constant c is the gauge of the metric relation between light, space, and time, the gravitational constant G is the gauge of the entropic relation between mass, space, and time. A portion of the entropy-energy driving the spatial expansion of the Universe is gravitationally converted to the entropy-energy driving the historical expansion of the Universe, decelerating the spatial expansion in consequence. When this reaction is reversed, as when mass is converted to light in stars, the cosmic gravitational field is weakened and the spatial universe expands as

recently observed. Does Light Create a Gravitational Field? The gravitational conversion of space to time is physically demonstrated by black holes, and mathematically formulated in the Bekenstein-Hawking theory relating the surface area of a black hole to its entropy content. In the physical system, entropy takes several forms, including the familiar principle which allows the transformation of energy to "work" by protecting energy conservation in all such transformations. Entropy will not allow the abuse or non-conservation of energy in transformations to work, for example, forbidding the "perpetual motion machine", or any device which creates net energy; hence it is entropy which permits energy to be used at all. Entropy is conserved in the sense that it must never decrease in any isolated system, and when energy is transformed or transferred as from a spatial form light to a temporal form matter or vice versa , so too is the primordial entropy drive. Entropy, in its primordial forms, is transformed and conserved in metrically equivalent units by gravity from its primary form, the spatial entropy drive of free energy expressed as the intrinsic motion of light and the expansion and cooling of the spatial Universe , to its secondary or alternative form, the temporal entropy drive of bound energy expressed as the intrinsic motion of time and the aging and decay of matter and the expansion of history , in any process which transforms free into bound energy. Mixed spatio-temporal or tertiary forms of entropy include "heat", thermal or "work" entropy Clausius , statistical entropy Boltzmann , and information or communication entropy Shannon. The role of the primary and secondary forms of entropy is to produce dimensional conservation domains space and history , in which energy can be simultaneously conserved, transformed, and used. This is the connection between the 1st and 2nd laws of thermodynamics. It is the principle of entropy which makes energy available for our use by preventing us from breaking the conservation laws while we are using energy. Nature does not allow us to "cook the books" in energy transformations; this is the practical or utilitarian function of entropy. Thus the three entropy gauges c, T, G, regulate entropy drives "intrinsic" dimensional motions: It is essentially the "infinite" velocities of c and T which endow light and time with the entropic ability to protect energy transformations and their energy domains against abuse from causality violations via "time machine" or "rocket ship", or energy conservation violations via "perpetual motion" machines. Similarly, gravity protects spacetime against causality or energy conservation violations via "wormholes" through the closure of the spacetime metric at the "event horizon" and central "singularity" of black holes. The three entropy drives not only create dimensional conservation arenas of action where energy may be safely transformed and used, they proactively defend their conservation domains against violations or trespass. The active principle of the gravitational "location" charge is time. Finally, in material systems, entropy and symmetry are related through statistical thermodynamics, since at any given temperature, the most symmetric random distributions have the greatest entropy. Massless light is non-local, a-temporal, and a-causal. Massive matter is local, temporal, and causal. In addition to providing sufficient negative energy to balance the positive energy of the "Big Bang", the rationale for gravitation is twofold: Symmetry and Charge Symmetry The principle of symmetry corresponds to the spiritual principle of beauty, and to the "Son", or 2nd person of the Christian Trinity. The "Golden Rule" is an exact prescription for symmetric behavior in our social relations also: From this we deduce the connection between beauty and truth, surmised by Keats in his famous "Ode on a Grecian Urn", where beauty corresponds to symmetry and conservation corresponds to truth. Similarly, the connection between the beautiful and the good, and between beauty and Heaven, God, or the Spirit, has been made since classical times. The connection between beauty and truth in the sciences has been expressly stated by Einstein, Dirac, Schroedinger, and many other of the greatest scientists, who judge the validity and quality of their work by among other things the beauty of their equations. Charges are a temporally conserved form of symmetry, just as mass is a temporally conserved form of energy. Charge and spin conservation makes possible symmetry-breaking in the "Big Bang", ensuring that the symmetry debts held as charges will be repaid in the new dimension expressly created for this purpose: If the Universe were not allowed to pay its symmetry debts through time, the Cosmos of matter could not exist - matter-antimatter annihilations would result instead. Time is created so symmetry debts can be created, held through history, and finally paid off. In the "meantime", through that special, one-way, 4th dimension created

expressly to accommodate massive, causal, local, temporal matter, the Universe can live, evolve, explore, and experience itself. Charge conservation is the "credit card" of the material Cosmos. The particles and their charges constitute the "fermions" - the leptons and hadrons which make up the atomic matter of the periodic table of the elements. A General Systems Perspective ". These are the two internal lines of the Tetrahedron Model running from the peripheral Conservation and Entropy poles to the central Causality pole. However, if we wish to consider the conversion of free energy into an isolated particle a "singlet", not a particle-antiparticle pair , born new into the Universe, then we must add "charge" to our accounting, the third internal line of the Tetrahedron Model, running from the Symmetry to the Causality pole. The charges, in the case of the creation of the elementary leptons for example , are the strictly conserved electric and weak force charges, the latter known as "number", or as I prefer, "identity" charge. In the case of the creation of the composite hadrons particles containing quarks , the internal quark charges "color" strictly conserved and "flavor" only partially conserved must also be added. Below I will discuss only the leptons and the "identity" charge, including the "Intermediate Vector Bosons" "IVBs" , the field vectors or force carriers of the leptonic "identity" charge. The other charges, including gravity, are discussed in " Symmetry Principles of the Unified Field Theory ". For the gravitational charge and force: Like electric charge, identity charge is strictly conserved and must always sum to zero; that is, a "positive" identity charge must always be balanced by a "negative" anti-identity charge, but unlike electric charge, in the case of "identity" the balancing can be accomplished by either the implicit or the explicit form of the charge. The elementary massive leptons, the electron, muon, and tau, carry identity charge implicitly, in "hidden", latent, or potential form, whereas their respective neutrinos carry identity charge in explicit or "bare" form. A neutrino is nothing else but the pure, explicit, or "bare" form of an identify charge. The electron, for example, in addition to spin carries two charges, an electric charge, and an implicit "hidden" identity charge. When an isolated elementary particle a "singlet" - not a particle-antiparticle pair is created or destroyed, an identity charge must record the event explicitly - an antineutrino or neutrino must be emitted - notifying spacetime of a change or asymmetry in its population of elementary particles. The protocol of identity charge is very similar to our religious notion of a human soul implicit in the body from birth, which becomes explicit at death, conserving the essential element of personal identity. While we can think of the neutrinos and anti-neutrinos in terms of positive and negative arithmetic signs which sum to zero, nature distinguishes matter from antimatter by spin: Only the massive leptons - the electron, muon, and tau, are known to have associated neutrinos, and each neutrino is specific to its massive lepton partner and namesake. Neutrinos are the hallmark of an elementary particle, and therefore only the three massive leptons are elementary particles. Quarks, for example, have no associated neutrinos, but quarks are sub-elementary particles, as we know because they carry fractional elementary leptonic electric charges. The partial identity charges of the quarks if they have any may be collectively summed up, carried, and conserved by the hypothetical "leptoquark" neutrino. The neutrinos themselves are also usually accounted as elementary particles. However, there remains a lot we do not know about neutrinos, and if they have mass, they may also be composite particles. Current observations suggest neutrinos have a tiny mass and oscillate more or less freely between the three types, somewhat as the three massive leptons can transform into one another albeit less freely, requiring in the latter case the services of the "W" IVB to mediate their identity transformations. Neutrinos comprise an accounting system by which spacetime keeps track of all elementary particles existing within its conservation domain - much as the government records the number and identity of its citizens. Neutrinos are weak force "identity" charges, and so they must record, carry, and be the consequence of a broken symmetry of light. All photons are exactly alike, and the photon is also its own antiparticle. Elementary particles, however, are not all alike and they are not their own antiparticles , and can be separated into three types plus antiparticles: These particles are distinguished by large and exact rest mass differences; anti-neutrinos are distinguished by right-handed spins, whereas neutrinos have left-handed spins "parity". Nature is telling us through the charges of matter exactly what symmetries of light she considers worth conserving. As noted above, the massive leptons the electron, muon, and tau and perhaps the

hypothetical leptoquark, carry identity charge in hidden or implicit form, while the massless or nearly massless neutrinos are the "bare" or explicit form of identity charge. Each massive lepton is paired with a corresponding massless neutrino or explicit identity charge. As the field vector of identity charge, it is the role of the IVBs to mediate transformations of identity charge among the elementary leptonic particles, including, when necessary, transformations of "flavor" among the quarks. Unlike the bosons or field vectors of the other charges photons, gluons, gravitons , which are massless particles with intrinsic motion c, the weak force IVBs are extremely massive particles: The IVBs are apparently "metric" particles, whose great mass is entirely due to the binding energy required to compress and perhaps fold? The compressed metric of the heavy IVB brings the real particle and the selected virtual particle pair into very close contact with each other, perhaps even "touching" , such that they can safely exchange charges and energy in a manner they could not when separated by normal distances because of the danger of violating charge, energy, and causality conservation laws, interference from unwelcome virtual particles, etc. The IVBs of the weak force can also be conceived as recreating the original energy-densities of the "Big Bang" force-unity eras the "W" IVB reproduces the environment of the electroweak era, for example during which the reactions they now mediate first took place. This is the fail-safe method of the weak force IVBs for ensuring the invariance of all single elementary particles it produces. The global gauge character invariant everywhere always of the spacetime particle metric or Dirac-Heisenberg "vacuum" ensures the invariance of particle-antiparticle pairs when they are created by the electromagnetic, strong, or gravitational forces. But when single elementary particles must be created, the IVBs of the weak force play this particle gauge role on a local stage - an important example of a "local gauge symmetry current" operating in the weak force also suggesting an analogy between the weak force Higgs boson, IVBs, and the spacetime metric. A connection between the weak and electromagnetic forces is also hinted - since both seem able to create the same elementary particles. This connection was of course formalized as the Electroweak Unification by Salam, Glashow, and Weinberg, for which they received the Nobel Prize in physics. For more details of the weak force transformation mechanism, see: The IVBs therefore are a form of "metric catalyst", mediating reactions between real and virtual particles; the IVBs form a bridge between ordinary 4-dimensional reality and 2-dimensional virtual reality, a bridge which makes available to "real" particles the infinite charge resources of the virtual particle "sea", bringing virtual particles into the "real" world and sinking "real" particles into the virtual world. No identity change occurs in the real world which is not also reflected in changes in the virtual world. This bridge of the IVBs is all that remains of the primordial unity and connection of the electroweak force-unity era which existed during the early micro-moments of the "Big Bang". The bridge, in the form of the primordial condensed metric of the IVBs, remains in the world today as a massive connecting link with the symmetric, virtual, and primordial electroweak era like an actual "time machine" , providing a secure pathway for elementary particles and identity charges to move between 2-D virtual reality and 4-D "real time".

Chapter 8 : Binary star - Wikipedia

Figure 1 Ascending pain pathways. DRG dorsal root ganglion, PAG periaqueductal grey matter Pain processing in the brain The experience of pain is complex and subjective, and is affected by factors.

Discovery[edit] The term binary was first used in this context by Sir William Herschel in , [3] when he wrote: This should be called a real double star; and any two stars that are thus mutually connected, form the binary sidereal system which we are now to consider. By the modern definition, the term binary star is generally restricted to pairs of stars which revolve around a common center of mass. Binary stars which can be resolved with a telescope or interferometric methods are known as visual binaries. The latter are termed optical doubles or optical pairs. Early examples include Mizar and Acrux. The Washington Double Star Catalog , a database of visual double stars compiled by the United States Naval Observatory , contains over , pairs of double stars, [17] including optical doubles as well as binary stars. Orbits are known for only a few thousand of these double stars, [18] and most have not been ascertained to be either true binaries or optical double stars. If the motion is part of an orbit, or if the stars have similar radial velocities and the difference in their proper motions is small compared to their common proper motion, the pair is probably physical. Edge-on disc of gas and dust present around the binary star system HD Visual binary A visual binary star is a binary star for which the angular separation between the two components is great enough to permit them to be observed as a double star in a telescope , or even high-powered binoculars. The angular resolution of the telescope is an important factor in the detection of visual binaries, and as better angular resolutions are applied to binary star observations, an increasing number of visual binaries will be detected. The relative brightness of the two stars is also an important factor, as glare from a bright star may make it difficult to detect the presence of a fainter component. The brighter star of a visual binary is the primary star, and the dimmer is considered the secondary. In some publications especially older ones , a faint secondary is called the comes plural comites; companion. If the stars are the same brightness, the discoverer designation for the primary is customarily accepted. The time of observation is also recorded. After a sufficient number of observations are recorded over a period of time, they are plotted in polar coordinates with the primary star at the origin, and the most probable ellipse is drawn through these points such that the Keplerian law of areas is satisfied. This ellipse is known as the apparent ellipse, and is the projection of the actual elliptical orbit of the secondary with respect to the primary on the plane of the sky. From this projected ellipse the complete elements of the orbit may be computed, where the semi-major axis can only be expressed in angular units unless the stellar parallax , and hence the distance, of the system is known. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. July Learn how and when to remove this template message Sometimes, the only evidence of a binary star comes from the Doppler effect on its emitted light. In these cases, the binary consists of a pair of stars where the spectral lines in the light emitted from each star shifts first towards the blue, then towards the red, as each moves first towards us, and then away from us, during its motion about their common center of mass , with the period of their common orbit. In these systems, the separation between the stars is usually very small, and the orbital velocity very high. Unless the plane of the orbit happens to be perpendicular to the line of sight, the orbital velocities will have components in the line of sight and the observed radial velocity of the system will vary periodically. Most of these cannot be resolved as a visual binary, even with telescopes of the highest existing resolving power. In some spectroscopic binaries, spectral lines from both stars are visible and the lines are alternately double and single. Such a system is known as a double-lined spectroscopic binary often denoted "SB2". In other systems, the spectrum of only one of the stars is seen and the lines in the spectrum shift periodically towards the blue, then towards red and back again. Such stars are known as single-lined spectroscopic binaries "SB1". The orbit of a spectroscopic binary is determined by making a long series of observations of the radial velocity of one or both components of the system. The observations are plotted against time, and from the resulting curve a

period is determined. If the orbit is circular then the curve will be a sine curve. If the orbit is elliptical , the shape of the curve will depend on the eccentricity of the ellipse and the orientation of the major axis with reference to the line of sight. It is impossible to determine individually the semi-major axis a and the inclination of the orbit plane i. However, the product of the semi-major axis and the sine of the inclination i. If either a or i can be determined by other means, as in the case of eclipsing binaries, a complete solution for the orbit can be found. About 40 are known. Visual binary stars often have large true separations, with periods measured in decades to centuries; consequently, they usually have orbital speeds too small to be measured spectroscopically. Conversely, spectroscopic binary stars move fast in their orbits because they are close together, usually too close to be detected as visual binaries. Binaries that are found to be both visual and spectroscopic thus must be relatively close to Earth. Eclipsing binaries[edit] Algol B orbits Algol A. This animation was assembled from 55 images of the CHARA interferometer in the near-infrared H-band, sorted according to orbital phase. An eclipsing binary star is a binary star system in which the orbit plane of the two stars lies so nearly in the line of sight of the observer that the components undergo mutual eclipses. Algol , a triple star system in the constellation Perseus , contains the best-known example of an eclipsing binary. As the two stars orbit each other they pass in front of one another and their combined brightness, seen from a distance, decreases. Eclipsing binaries are variable stars, not because the light of the individual components vary but because of the eclipses. The light curve of an eclipsing binary is characterized by periods of practically constant light, with periodic drops in intensity when one star passes in front of the other. The brightness may drop twice during the orbit, once when the secondary passes in front of the primary and once when the primary passes in front of the secondary. The deeper of the two eclipses is called the primary regardless of which star is being occulted, and if a shallow second eclipse also occurs it is called the secondary eclipse. The size of the brightness drops depends on the relative brightness of the two stars, the proportion of the occulted star that is hidden, and the surface brightness ie. Typically the occultation of the hotter star causes the primary eclipse. This makes it feasible to use them to directly measure the distances to external galaxies, a process that is more accurate than using standard candles. The first is by observing extra light which the stars reflect from their companion. The third method is by looking at how relativistic beaming affects the apparent magnitude of the stars. Detecting binaries with these methods requires accurate photometry. Astrometric binaries are relatively nearby stars which can be seen to wobble around a point in space, with no visible companion. The same mathematics used for ordinary binaries can be applied to infer the mass of the missing companion. The companion could be very dim, so that it is currently undetectable or masked by the glare of its primary, or it could be an object that emits little or no electromagnetic radiation , for example a neutron star. The position of the star is repeatedly measured relative to more distant stars, and then checked for periodic shifts in position. Typically this type of measurement can only be performed on nearby stars, such as those within 10 parsecs. Nearby stars often have a relatively high proper motion , so astrometric binaries will appear to follow a wobbly path across the sky. If the companion is sufficiently massive to cause an observable shift in position of the star, then its presence can be deduced. From precise astrometric measurements of the movement of the visible star over a sufficiently long period of time, information about the mass of the companion and its orbital period can be determined. Detection of position shifts of a star is a very exacting science, and it is difficult to achieve the necessary precision. Configuration of the system[edit] Detached Semidetached Contact Configurations of a binary star system with a mass ratio of 3. The black lines represent the inner critical Roche equipotentials, the Roche lobes. Another classification is based on the distance between the stars, relative to their sizes: The stars have no major effect on each other, and essentially evolve separately. Most binaries belong to this class. Gas from the surface of the Roche-lobe-filling component donor is transferred to the other, accreting star. The mass transfer dominates the evolution of the system. In many cases, the inflowing gas forms an accretion disc around the accretor. A contact binary is a type of binary star in which both components of the binary fill their Roche lobes. The uppermost part of the stellar atmospheres forms a common envelope that surrounds both stars. As the friction of the envelope brakes the orbital motion ,

the stars may eventually merge. This releases gravitational potential energy , causing the gas to become hotter and emit radiation. Cataclysmic variable stars , where the compact object is a white dwarf, are examples of such systems. These binaries are classified as low-mass or high-mass according to the mass of the donor star. High-mass X-ray binaries contain a young, early-type , high-mass donor star which transfers mass by its stellar wind , while low-mass X-ray binaries are semidetached binaries in which gas from a late-type donor star or a white dwarf overflows the Roche lobe and falls towards the neutron star or black hole. In Cygnus X-1, the mass of the unseen companion is estimated to be about nine times that of the Sun, [37] far exceeding the Tolmanâ€”Oppenheimerâ€”Volkoff limit for the maximum theoretical mass of a neutron star. It is therefore believed to be a black hole; it was the first object for which this was widely believed. Variations in period[edit] Main article: Applegate mechanism The Applegate mechanism explains long term orbital period variations seen in certain eclipsing binaries. This is quite distinct from the far more common observations of alternating period increases and decreases explained by the Applegate mechanism. Additional letters, such as C, D, etc. Antares Alpha Scorpii is a red supergiant star in a binary system with a hotter blue main-sequence star Antares B. Antares B can therefore be termed a hot companion of the cool supergiant. Since the nature of the companion is not well-established in all cases, it may be termed a "hot companion". The secondary appears to have a higher temperature than the primary and has therefore been described as being the "hot companion" star. It may be a Wolfâ€”Rayet star. This combination is the result of a cool red supergiant accompanied by a smaller, hotter companion. Matter flows from the supergiant to the smaller, denser companion.

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Chapter 9 : Kinematics - Wikipedia

b. Matter is the vehicle for the manifesting of soul. c. Soul is the vehicle for the manifesting of Spirit. Therefore: 1st Logos, 2nd Logos, 3rd Logos co-operate. Illustration: Life of the 3rd Logosâ€"animating atoms of matter. Life of the 2nd Logosâ€"animating the forms, or aggregate of atoms. Life of the 1st Logosâ€"animating the composite forms. 2.

Your heart is a muscular organ that pumps blood to your body. Your heart is at the center of your circulatory system. This system consists of a network of blood vessels, such as arteries, veins, and capillaries. These blood vessels carry blood to and from all areas of your body. When the walls contract, blood is pumped into your circulatory system. Inlet and outlet valves in your heart chambers ensure that blood flows in the right direction. Your heart is vital to your health and nearly everything that goes on in your body. Your blood carries the oxygen and nutrients that your organs need to work well. Blood also carries carbon dioxide a waste product to your lungs so you can breathe it out. A healthy heart supplies your body with the right amount of blood at the rate needed to work well. Anatomy of the Heart Your heart is located under your ribcage in the center of your chest between your right and left lungs. Its muscular walls beat, or contract, pumping blood to all parts of your body. The size of your heart can vary depending on your age, size, and the condition of your heart. A normal, healthy, adult heart usually is the size of an average clenched adult fist. Some diseases can cause the heart to enlarge. The Exterior of the Heart Below is a picture of the outside of a normal, healthy, human heart. Heart Exterior Figure A shows the location of the heart in the body. Figure B shows the front surface of the heart, including the coronary arteries and major blood vessels. In figure B, the heart is the muscle in the lower half of the picture. The heart has four chambers. Some of the main blood vessels arteries and veins that make up your circulatory system are directly connected to the heart. The Right Side of Your Heart In figure B above, the superior and inferior vena cavae are shown in blue to the left of the heart muscle as you look at the picture. These veins are the largest veins in your body. The superior vena cava carries oxygen-poor blood from the upper parts of your body, including your head, chest, arms, and neck. The inferior vena cava carries oxygen-poor blood from the lower parts of your body. From the right ventricle, the blood is pumped through the pulmonary PULL-mun-ary arteries shown in blue in the center of figure B to your lungs. Once in the lungs, the blood travels through many small, thin blood vessels called capillaries. There, the blood picks up more oxygen and transfers carbon dioxide to the lungsâ€"a process called gas exchange. The oxygen-rich blood passes from your lungs back to your heart through the pulmonary veins shown in red to the left of the right atrium in figure B. The Left Side of Your Heart Oxygen-rich blood from your lungs passes through the pulmonary veins shown in red to the right of the left atrium in figure B above. The blood enters the left atrium and is pumped into the left ventricle. From the left ventricle, the oxygen-rich blood is pumped to the rest of your body through the aorta. The aorta is the main artery that carries oxygen-rich blood to your body. Like all of your organs, your heart needs oxygen-rich blood. They carry oxygen-rich blood to all parts of your heart. The Interior of the Heart Below is a picture of the inside of a normal, healthy, human heart. Heart Interior Figure A shows the location of the heart in the body. Figure B shows a cross-section of a healthy heart and its inside structures. The blue arrow shows the direction in which oxygen-poor blood flows through the heart to the lungs. The red arrow shows the direction in which oxygen-rich blood flows from the lungs into the heart and then out to the body. The two upper chambers of your heart are called the atria. They receive and collect blood. The two lower chambers of your heart are called ventricles. The ventricles pump blood out of your heart to other parts of your body. The Septum An internal wall of tissue divides the right and left sides of your heart. This wall is called the septum. The area of the septum that divides the atria is called the atrial or interatrial septum. The area of the septum that divides the ventricles is called the ventricular or interventricular septum. Shown counterclockwise in the picture, the valves include the aortic ay-OR-tik valve, the tricuspid tri-CUSS-pid valve, the pulmonary valve, and the mitral MI-trul valve. Blood Flow The arrows in figure B show the direction that blood flows through your heart. The light blue arrow shows that blood enters the right

atrium of your heart from the superior and inferior vena cavae. From the right atrium, blood is pumped into the right ventricle. From the right ventricle, blood is pumped to your lungs through the pulmonary arteries. From the left atrium, the blood is pumped into the left ventricle. The left ventricle pumps the blood to the rest of your body through the aorta. For the heart to work well, your blood must flow in only one direction. Each valve has a set of flaps called leaflets or cusps that seal or open the valve. This allows blood to pass through the chambers and into your arteries without backing up or flowing backward. Heart Contraction and Blood Flow Heartbeat Almost everyone has heard the real or recorded sound of a heartbeat. When your heart beats, it makes a "lub-DUB" sound. Between the time you hear "lub" and "DUB," blood is pumped through your heart and circulatory system. A heartbeat may seem like a simple, repeated event. These events take place inside and around your heart. Each side of your heart uses an inlet valve to help move blood between the atrium and ventricle. The tricuspid valve does this between the right atrium and ventricle. The mitral valve does this between the left atrium and ventricle. The "lub" is the sound of the tricuspid and mitral valves closing. The right ventricle uses the pulmonary valve to help move blood into the pulmonary arteries. The left ventricle uses the aortic valve to do the same for the aorta. The "DUB" is the sound of the aortic and pulmonary valves closing. Each heartbeat has two basic parts: During diastole, the atria and ventricles of your heart relax and begin to fill with blood. The atria then begin to relax. Pumping Action Your heart uses its four valves to ensure your blood flows in only one direction. The cusps allow pumped blood to pass through the chambers and into your blood vessels without backing up or flowing backward. The atrium contracts atrial systole. The tricuspid valve located between the right atrium and ventricle opens for a short time and then shuts. This allows blood to enter the right ventricle without flowing back into the right atrium. The pulmonary valve located between your right ventricle and pulmonary artery opens and closes quickly. This allows blood to enter into your pulmonary arteries without flowing back into the right ventricle. This is important because the right ventricle begins to refill with more blood through the tricuspid valve. Blood travels through the pulmonary arteries to your lungs to pick up oxygen. This event is called atrial systole. The mitral valve located between the left atrium and left ventricle opens and closes quickly. This allows blood to pass from the left atrium into the left ventricle without flowing backward. As the left ventricle fills with blood, it contracts. This event is called ventricular systole. The aortic valve located between the left ventricle and aorta opens and closes quickly. This allows blood to flow into the aorta. The aorta is the main artery that carries blood from your heart to the rest of your body. The aortic valve closes quickly to prevent blood from flowing back into the left ventricle, which already is filling up with new blood. For example, you can feel the pulse on the artery inside of your wrist, below your thumb. You can count how many times your heart beats by taking your pulse. You will need a watch with a second hand. To find your pulse, gently place your index and middle fingers on the artery located on the inner wrist of either arm, below your thumb. You should feel a pulsing or tapping against your fingers. Watch the second hand and count the number of pulses you feel in 30 seconds. Double that number to find out your heart rate or pulse for 1 minute. The usual resting pulse for an adult is 60 to beats per minute.