

VALAQUANTA

OF THE ENERGY OF THE VALAR

by Jenny Coombs and Marc Read

This paper expounds the theory that Conservation of Energy seems to be inherent in Tolkien's world. This fundamental principle states that energy can be neither created nor destroyed, only converted into other forms of energy or mass (which, by relativity, is 'merely' a form of energy). Within practical experience, of course, we "lose" energy all the time, due to air resistance, friction and so on; this is why it took Newton to realise that force is required to *alter* motion, rather than to maintain it. This principle can be applied to the Valar.

Energy is lost by everyone (i.e. transferred to their surroundings) all the time, simply in keeping alive and moving around. So, energy must be taken from our environment, and ultimately from the sun. Whence do the Valar derive their energy? Less it should be objected that the concept of energy cannot legitimately be applied to spiritual beings, it should be pointed out that the Valar perform physical work on a massive scale, raising mountains and rearranging continents, which necessitates the 'expenditure' of tremendous amounts of energy. The hypothesis is proposed by the current authors that the Valar, like us, draw energy from the environment. There was probably enough energy in the earth as it was made to finance the Valar's work, but unfortunately the Second Law of Thermodynamics forbids the efficient conversion of disordered energy into ordered forms, which was what the Valar wanted to do, to transform the "unshaped" chaos (*Ainulindalë* p.21) into a planet with a lower level of entropy. It is therefore suggested that the Valar drew energy from an extraterrestrial source. The Valar existed before the sun, thus this cannot be the source. It cannot reasonably be doubted that the Sun was created during the period of recorded history, since as late as the War of the Ring there are beings such as Galadriel (seemingly a reliable source) who remember the presolar ages.

It is clear that the Sun is not a star, the stars existed before the Valar entered Arda, indeed before Arda was made by Eru. "And amid all the splendours of the World, its vast halls and spaces, and its wheeling fires, Ilúvatar chose a place for *his Children's* habitation in the Deeps of Time and in the midst of the innumerable stars." (*Ainulindalë*, p.19) The Universe, then, was already a vast and practically inexhaustible source of energy, as it is today, and the Ainur who entered into Arda (so this planet) must have drawn energy from the Universe around it. It may be objected that the Ainur are capable of creating stars with their energy, and therefore it is not possible that they derive this energy from the stars. But the stars of Varda are fundamentally different from the pre-Valar celestial bodies. Varda's stars are made of "the silver dew from the vats of Telperion" (*Quenta Silmarillion* ch.3 p.55), and they are much closer to Earth, located within its atmosphere. "...in the mists above the borders of the world" (*ibid.*p.56). The primeval stars, on the other hand, are "faint and far", their light intensity is less by the inverse-square law, but their power is far greater. This distinction between Eru-created and Valar-wrought luminaries goes back to the *Book of Lost Tales*.

However, it must not be assumed that the Valar need to transfer energy to their surroundings merely in order to keep alive and remain still. That qualification is required because the Valar must expend energy when they move; they have precise locations in space, and therefore to move around they must transfer this location, even if it is a point-mass. When a Vala is moving he possesses kinetic energy, so in order to move he must convert energy into kinetic energy, either by drawing energy from his surroundings, so that his net energy increases, or by temporarily converting some of his own energy into kinetic energy.

By "his own energy" is meant to be understood the Rest Energy of a Vala: that quantity of energy associated with him when he is at rest. By the equivalence of mass and energy, this implies a Valarin rest mass. If the Valar had no rest mass, they would have to behave like photons, i.e. move at light-speed in order to exist. This surely cannot be the case, thus our assumption above is justified RAA.

The current authors propose that the Valar can convert their "potential" energy to kinetic energy and back again with 100 per cent efficiency. This means that when a Vala is moving he has less energy available for other purposes, but that he recovers his original energy when he stops. The Vala's total energy is therefore conserved unless he performs work on his environment, or loses it in some other way.

FANAR AND FLAT PHOTONS

For example, when a Vala appears in a fána he is expending some of his net energy in some way. There are two alternative explanations of what it is that is happening during this process. (A) The Vala is spontaneously creating photons, giving the impression of light being reflected from a solid object. (B) The Valar manipulate the brains of their observers so that the observers experience a signal from the optic nerve identical to that which would be produced by light reflected from an existent body and incident upon the retina, although no response would be registered by a photon-detector in the vicinity. Similarly a Vala could simulate the experience of hearing or touching his "body" by (A) using some of his energy to set the air molecules in oscillation and to produce the particles which cause the sensation of touch on the pressure-sensors in the skin of the observer, or (B) causing these sensations directly in the observer's brain.

The alternative idea that in order to produce the sensation of sight, the Valar do not actually produce photons, but use their energy to alter the path of existent photons, is unfeasible. This theory suggests that the photons would ordinarily have continued on their path, since there is no material body to deflect them, the Vala adjusts them, sending them in the directions and with

the frequencies which would have been produced had they really been reflected from a material body of the shape, colour etc. of the fána. (The process is analogous to a mirror, which alters the paths of photons incident upon it in such a way as to give the impression that the photons have been reflected from a real body behind the mirror.) However, the Vala would have to produce his own photons in situations where the photon density was insufficient, i.e. it was too dark, and so the principle of Occam's Razor may be used to assert that the Valar create new photons whenever they manifest themselves in fánar. This has a further advantage. The fánar of the Valar are consistently described as "bright", "radiant". (There appears, doubtless because of this effect, to be some confusion between the stem SPAN- "white", which yields Quenya *fána* "cloud", thus "the 'veil' of a Vala", and stem FHAY- "radiate, send out rays of light", whence Quenya *fáin* "to emit light" (*Lost Road and Other Writings* p.381,387).) This must be due to the way the Valar manifest themselves. Incident upon the observer's retina are the photons which the Vala has created to trick the observer into thinking he is looking at a material body, but incident also are the photons from behind the Vala's fána. There is no material object in the way to bar their progress, so they continue as before to the observer's eye. However, the Vala must scatter them, so as not to allow the background to be visible through his fána. More photons therefore appear to emanate from the fána than from the surrounding material objects, so the fána appears to be suffused with light. Doubtless the Valar could have suppressed this effect had they wished, by reversing the direction of the extra photons, but the radiant effect was probably regarded as not undesirable.

Alternatively, this effect could be explained in a similar manner under the theory that the perception of fánar is not the result of actual photons at all, but of manipulation of electric impulses in the observer's brain. Then the radiance is caused by the real photons incident on the retina, with their effect on the optic nerve suitably altered to produce only enhanced light intensity rather than overlapping images.

One remarkable point is that the most gifted of the Eldar are also able to create fánar, for others as well as for themselves. Lúthien is exceptional,

but even Finrod is able to change the forms and faces of his eleven companions into the likenesses of Orcs, which must include absorbing the previously existing photons in order to avoid making rather conspicuous luminous Orcs. This must be the same process as that by which "the Elf-musicians...can make the things of which they sing appear before the eyes of those that listen" (*Return of the King* App.A v). It may be objected that it would be a complex process to produce the impression of a whole scene by creating and manipulating particles so that they produce a certain effect on the five senses of the spectator. The calculations would be complex because of the sheer number of quanta involved. However, it must be remembered that the everyday processes of the human body - running, writing, the workings of the brain - are similarly complicated when viewed mechanically. It is possible that the gifted among the Quendi could carry out the quantum mechanics outlined above with the concentration of, say, a violin player engaged in a complicated, but possible, piece of music.

The Quendi, as well as the Valar, also have the ability to distinguish such manufactured experiences from real matter, in the same way as Sauron is not taken in by Finrod's orc-disguise. "*The Elves* at any rate are not themselves deluded. This is for them a form of Art.2 Enchantment produces a Secondary World into which both designer and spectator can enter, to the satisfaction of their senses while they are inside." (*Tree and Leaf: On Fairy Stories*, "Fantasy" p.54). Orcs, apparently, have not this ability, since Finrod produces the fánar to deceive them.

It is debatable how the Quendi distinguish the primary and secondary worlds. Under the theory that fánar and all secondary² sub-creations are produced by the actual production of "artificial" photons, gravitons, etc., there must be some way in which these photons differ from "natural" photons. A difference in spin is a faint possibility - or is there a fifth quantum number? One rather appealing idea is that the artificial photons are only three-dimensional, whereas the natural photons exist in all dimensions. Valar, and perhaps Quendi as well, are able to perceive all dimensions and hence see the artificial photons as "flat"; Men can only perceive three spatial dimensions

anyway, so are not aware of the difference.

Under the theory that fánar are produced directly in the observer's brains, then there must be some way that Quendi can perceive a difference between electric impulses (from the optic nerve, sensory nerves etc.) Doubt is cast on this in the *Valaquenta* ("Of the Maiar"). "And *[the Eldar]* did not know whence came the fair visions or the promptings of wisdom that *[Olorin]* put into their hearts." This provides evidence for favouring the "flat photon" theory.

It is hard to imagine how the Valar could have been able to recover the energy they expended in producing visible, tangible and audible fánar. Compared to the energy they might expend in shaping galaxies this energy is in any case negligible.

INCARNATING THE DISCARNATE

The Valar (and Maiar) are capable of incarnating themselves in bodies identical to those of kelvar and of adapting the forms of olvar (e.g. Ents). Manifestation in fánar seemed complicated enough, but incarnation is clearly regarded as a more significant step.

The current authors propose that the process of incarnation involves knitting together molecules and atoms to form a working physical body. Once again, the molecules might come from the surroundings; the Vala would then combine them suitably to build up the body. He might rearrange the atomic numbers of available atoms to make up those in short supply: taking a proton off here, adding an electron there. Or the Vala might use energy to bring the fundamental particles into existence - perhaps from the cloud of virtual particles which fill the "vacuum". Either way, the task would be one of considerable complexity and difficulty, even for a Vala - though the greater Maiar are capable of it too, indeed, with the exception of Melkor, the only recorded examples of incarnation are such (the Istar), Melian, Sauron etc.). In this section, references to "the Valar" apply equally to the Maiar.

A tremendous amount of energy must have been expended on the completed organism. However, it appears that the Vala suffers no

diminution because of this; his net energy remains constant, as it does when he moves discarnate. However, while kinetic energy can be completely and easily reconverted by a Vala, the evidence suggests that the reconversion of so-called "somatic energy" is a slow and difficult process, though essential if the Vala is not to lose a large amount of energy.

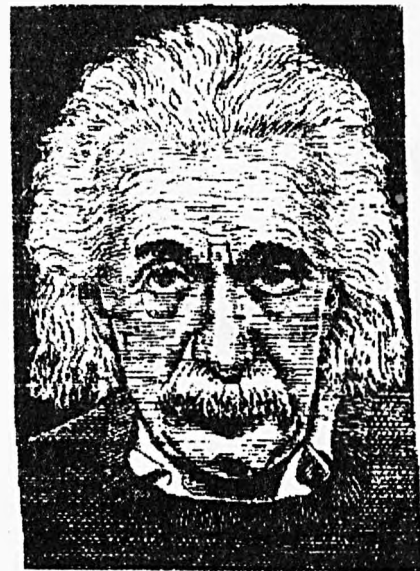
It appears that there is a limit to the amount of energy a Vala can draw from his environment. If a sufficiently large amount of energy is dissipated, the Vala is permanently diminished, his capacity to perform work is seriously reduced. Hence when Sauron loses his first body in the Akallabêth he is "diminished", when his second is destroyed by Gil-galad, Elendil and Isildur he suffers a further loss. There is therefore always the danger for an incarnate Vala that he will be killed, as an Eruhin can be killed, and will thereby lose a considerable amount of energy (though it is possible for the somatic energy to be recovered from the cadaver, before it is dissipated by decomposition. Sauron did not get the chance to do this.)

Incarnation places severe restrictions on the activities available to the Valar. However, they are not entirely limited to the range of Eruhini; for example, they can rearrange their physiognomy. Sauron is incarnate in roughly Eldarin form when Finrod *et al.* encounter him, but nevertheless "took upon himself the form of a werewolf" to challenge Húan, and once overcome "shifted shape, from wolf to serpent, and from monster to his own accustomed form" (*Quendi Silmarillion* ch.19 p.210). He also created photons ("and his flaming eyes he on them bent" (*Lay of Leithian* l.2168)) in order to intimidate prisoners and thralls (although to the Quendi, though not to the Orcs or Seron, these photons would appear flat).

When he heard that Húan was in the vicinity, he rearranged his "own accustomed form" into that of a werewolf. This would be a complicated operation, though not to be compared with the work of creating the Eldarin form itself.

Vanquished by Húan, Sauron then produced a rapid succession of fânar in a vain attempt to confuse him into loosening his grip on Sauron's throat. "[Sauron] could not elude the grip of Húan without forsaking his body

utterly. Ere his foul spirit left its dark house, Lúthien came to him, and said that he should be stripped of his raiment of flesh... 'unless thou yield to me'. This passage raises the question: why did Sauron not "forsake his body utterly" and make his escape? The answer must be that if he had left his body suddenly, he would have lost all the somatic energy bound up in it. This would have been a disaster for Sauron, probably greater than the loss of both his later Eruhinic bodies put together: those were of roughly human size, and cannot have had as much somatic energy as the huge wolf-form. However, the process of reclaiming that somatic energy, by the gradual disintegration of the body, would have taken a few minutes - and it is likely that, had Húan perceived what Sauron was doing, he would have ripped his throat out. Frenziedly exorcised, Sauron would then have lost all of his somatic energy, and would in addition have experienced great pain, the physical pain of being killed, and the "spiritual pain" of being thus torn from his raiment of flesh. So "lest he be forced from the body unwillingly, which is a dire pain to such spirits, he yielded himself" (*Lost Road and Other Writings* p.300), i.e. converted his somatic energy back into potential energy, assumed the fâna of a vampire and flitted off.



$$A = mc^2 ?$$

The Valar seem to have enjoyed assuming *fānar*. It is possible that this was due to a sentimental attachment to spacetime. Incarnation, though, is a very different matter. For a start, biological organisms must seem inefficient to these beings of pure energy. They constantly dribble energy, radiating heat to their surroundings, and have to make good this haemorrhage by eating food and converting it eventually, after a tedious chain of molecular reactions, back to energy.

Furthermore, the process of building an organic body consumes large quantities of energy. That energy can be recovered in time, but until this has been achieved the Vala would be left with much less "potential to perform work", as energy is defined. Note that the Quendi can keep their bodies in good working order, continually renewing their continually dying cells, so that senescing and dying are avoided. Their immune systems can be completely effective, unlike the Engwaron. However, it is impossible altogether to avoid the perils and dangers of the world, as long as a being is incarnate it is susceptible to the risk of serious injury or death, and with it the loss of large quantities of somatic energy. It must be assumed that this last consideration also concerns the Valar.

"Incarnation" would imperil them, dimming their wisdom and knowledge, and confusing them with fears, cares and weaknesses coming from the flesh" (*Unfinished Tales*, "The Istari", p.393). This brings to mind the fact that being subject to physical pain, hunger, thirst, fatigue and the weight of gravity will be all the more bitter to those who have been free of them.

It is not surprising that when Manwë calls a council and brightly announces that he wants three volunteers to clothe themselves in flesh, and go to Middle-earth where irrational Noldor and Men behave in a socially unacceptable manner, in order that they may persuade everyone to be considerate, there is not an appreciably favourable reaction. Advised by Oromë, Alatar allows his name to be proposed; Aulë chooses Kurumo, who is less unwilling. Upon being questioned, Olórin states that he is too weak and he is afraid.

WIZARDS AND THE GLORFINDEL QUESTION

There is a clear reason for the incarnation of the Istari: they are not to come as supermen from the West, but are to "forego might, and clothe themselves in flesh so as to treat on equality and win the trust of Elves and Men" (*Ibid.*). Additional restrictions appear to be placed on their activities. For instance, they may not influence matter so as to prevent an Eruhin from exercising his free will, except by purely physical means available to any Eruhin. Thus Gandalf kindles fire (by concentrating energy so as to raise a piece of wood to its ignition temperature, and then letting it burn naturally), he uses his staff as a low-intensity light-source, he makes fireworks for the hobbits' amusement. He does not exercise any Maiarin powers against an Eruhin until after the destruction of his first body and his return in a second. This can be explained by the hypothesis that the Valar have supplied him with somatic energy to build his second form (a sort of energy transfusion, collectively the Valar could replenish the energy from the stars, and it would not involve a major loss for any individual. In contrast Sauron in the Second Age is without peers to help him, the energy he loses cannot be replaced. Thus Gandalf is not diminished by his experience (though he has undergone the pain of forcible exarnation, over and above that of being killed rather unpleasantly: this adds a new element to his self-sacrifice at Khazad Dûm), on the contrary, he appears to have been invested with, or authorized to use, more power. Gandalf the White is much more self-confident and in control than Gandalf the Grey, and much more masterful. One cannot imagine the old Gandalf, for instance, disarming Denethor by wrenching the sword from his hand at a distance of twenty feet (*Return of the King* 5 viii), that would have been using unfair force against an Eruhin. Such limitations were imposed upon the Istari partly to achieve parity with Eruhini, and partly to restrict the damage the Istari could do; the Valar must have been aware of the dangers of unleashing five powerful Maiar on Middle-earth, subject to earthly temptations, and all too likely to follow the devices and desires of their organic hearts. They evidently considered that Olórin had proved himself worthy; he therefore returns

wielding new powers, and under orders to dislodge the rebel Kurumo. Having the White Rider to pit against the Nazgûl is doubtless an advantage for the West; and yet there are drawbacks. Denethor's death is very convenient for Aragorn and everyone else, but on the level of personal morality Gandalf does not conduct himself in a manner becoming to a gentleman.

There seem to be two main factors governing the amount of somatic energy inherent in an incarnate form, and the latter one seems also to apply to *fânar*. The first is obvious: the mass, complexity, entropy, etc. of the body. A large body requires more energy than a small. Probably also it would take a Vala less energy to build a lump of iron (an element readily available and very stable) than a lump of neptunium-239.⁴ An amoeba takes less energy than a dolphin, etc.

In addition, the somatic energy depends on the closeness of the incarnate form to the Valo image in the Unseen. This vague sentence can be clarified with an example: Gandalf. "*Elf-lords* do not fear the Ringwraiths, for those who have dwelt in the Blessed Realm live at once in both worlds, and against both the Seen and the Unseen they have great power." Frodo: "I thought I saw a white figure that shone and did not grow dim like the others. Was that Glorfindel then?" Gandalf: "Yes, you saw him for a moment as he is upon the other side: one of the mighty of the Firstborn." (*Fellowship of the Ring* 2 i.)

Such shifts of vision occur at various places in the *Lord of the Rings*, associated always with the Ring. For example: "Then suddenly, as before under the eaves of the Emyn Muil, Sam saw these two rivals with other vision. A crouching shape, scarcely more than the shadow of a living thing...and before it...untouchable now by pity, a figure robed in white, but at its breast it held a wheel of fire... Then the vision passed, and Sam saw Frodo standing, hand on breast, his breath coming in great gasps, and Gollum at his feet" (*Return of the King* 6 iii).

These passages are attempts to represent, in comprehensible, metaphorical language, experiences for which the Westron and English have no words. It appears reasonable to consider the Unseen as the world of the

mind, of the spirit, familiar to the Eldar, who can communicate directly mind to mind, and accessible to mortals via devices such as the Ring. Frodo describes Glorfindel as a "white figure that shone" because the effect that experiencing Glorfindel's mind in contact with his own produced on Frodo was nearest to that which would have been produced had Frodo actually seen a shining white figure. Clearly Frodo did not perceive Glorfindel and the Nazgûl with sight, but, having no other words, he translates the experience in visual terms in order to describe it.

Whatever the Unseen is, then, Valar have forms in it that can be roughly translated into visual terms. The lowest-energy *fânar* or body that a Vala can manufacture is the visual/audial/tactile equivalent of this form. To move away from this form requires more somatic energy. Thus Sauron is able originally, as Annatar, to appear beautiful, but after Annatar's body is destroyed, Sauron cannot afford to expend such a large amount of somatic energy again. He becomes incarnate as a demon-creature, which has its own advantages in terms of intimidation (Sauron pays close attention to appearances, with a view to the fear they will cause to his enemies. Consider how much less effective the Nazgûl would have been had they been mounted on a motley band of bay, chestnut, piebald, dun and roan horses.)

This factor in determining somatic energy may sometimes enhance the effect of the first factor; for example, Sauron's wolf-form must have needed a very great deal of somatic energy, since not only was it of great mass, it was also different from his basic "Unseen" form, to which presumably his "own accustomed form" approximated. Sometimes the two factors have opposite effect, for example, an amoeba has very small mass, but diverges greatly from the base-form.

SPLINTERED LIGHT AND FLAGGING ENERGY

The present authors have assumed that the Valar are sustained by energy derived from cosmic radiation: those that favour poetic and vague imagery might conceivably say that they eat starlight. Perhaps they return from time to time to the upper

atmosphere to absorb high-energy, high-frequency photons, before the ozone layer and the rest of the atmosphere filter out the ultra-violet rays. This could explain passages like the following: "But...Tulkas [was] weary; for...the strength of Tulkas had been at the service of all without ceasing in the days of their labour... Then Tulkas slept, being weary" (*Quenta Silmarillion* I p.40). This could be interpreted: "But Tulkas's energy state was low, for he had maintained a high power output for a considerable time in order to perform work upon the planet. Then Tulkas withdrew to the stratosphere, in order to absorb valaquanta until he had again achieved optimum energy."

However, an alternative assumption, which might fit some aspects of the facts better, is that the Valar *cannot* replenish their energy from any source, and that therefore any work they do causes them permanent loss. This would explain the "splintered light, splintered darkness" effect, whereby the influence of precosmic beings decreases as a function of time. This would explain the fact that when Earth is young the Valar are of crucial importance to the planet, their wars determining its topography, their protection enabling the development of intelligent organic life; but by the Fourth Age there are virtually *no* Ainur at large on the planet, and certainly none who will have a significant influence upon its future development. Freed from contact with either devils or angels, Man is left to work out his own destiny.

NOTES

1. There are problems in interpreting the necessarily highly metaphorical language of the *Ainulindalë*. For example, Melkor "had gone often alone into the void places" (*Ainulindalë* p.16), which might imply that he ventured deep into interstellar space. However, the term "the Void" seems to be used to describe whatever is outside space-time.

2. "Art" in Quenya is *Karma* (*Unfinished Tales* p.396). The word comes from KAR- "to make, do",

and means "building, structure". It occurs in the compound *sundatarma* (*Lost Road and Other Writings* p.343), "base-structure", the name Tolkien gave to the system in the Eldarin languages of constructing words from the primitive stems by adding appropriate morphemes. There is thus, as often, a linguistic representation of Tolkien's philosophical ideas: his sub-creation of the Eldarin languages (*sundatarma*), aspires to the supreme Eldarin art (*karma*) of sub-creating a sensible secondary world.

3. Sc. secondary to the Quendi and Valar, etc.; it would be tertiary to us humans.

4. This isotope is unstable, having a half-life of 2.3 days, so the Vala would undergo the unpleasant experience of having its incarnate form gradually decay. However, just as the Vala renews cells in a human form, so he would be perfectly capable of preventing the decay of the neptunium atoms. The Vala simply looks at all the atoms all the time (after all, he doesn't have much else to fill his time; there is a limit to the wild partying in which one can indulge when one is a lump of radioactive metal). He is thus the perfect observer, collapsing the wave functions for all his component atoms, so that, by the Quantum Zeno effect, they never decay. Then when he tires of life as a trans-uranium element, he simply shuts his metaphysical eyes and allows his body to start decaying. But now comes the clever bit - he catches each alpha-particle as it is ejected, and converts its kinetic energy and mass to Valarin potential energy (v.p.e.). Thus he avoids any net loss of energy.

AFTERNOTES

Both of the authors delight in bad puns and it was with a heavy heart that these were removed from the article for the sake of a more accurate parody of the Scientific Style.

This paper was first delivered to Taruithorn Smial in an extended version sometime during Michaelmas Term 1991.

Any similar papers would be welcomed by The Michel Delving Journal of Pseudoscience, c/o MBA Read, Balliol College, Oxford OX1 3BJ

