

University of Chester

**This work has been submitted to ChesterRep – the University of Chester’s
online research repository**

<http://chesterrep.openrepository.com>

Author(s): Lewis, Stephen J

Title: The archipelago of Gizm: Using conceptual Darwin machines (science as a story – life without it being led)

Date: 1998

Originally given at: Chester College of Higher Education for Science Week

Example citation: Lewis, S. J. (1998). The archipelago of Gizm: Using conceptual Darwin machines (science as a story – life without it being led). Presentation at Chester College of Higher Education for Science Week

Version of item: Given at conference

Available at: <http://hdl.handle.net/10034/86922>

The Archipelago of Gizm

Using conceptual Darwin machines
(Science as a story – Life without it being led)

To some, the basic tenets of Darwinian thinking, expressed as it is in purely mechanistic terms, are quite distasteful - especially when applied to human beings. However, knowing that our bodies are but flesh and blood, composed of molecules and atoms and that we are subject to the same physical laws as inanimate objects does not in itself diminish the fact that we each have an individual identity, with each of us experiencing a range of powerful, creative (and destructive) emotions. Similarly, we should not find it problematic that we are subject to biological laws too. This does not diminish our individuality either. Yet all too often, people find it difficult to view human beings simply as animals; they cannot detach themselves from their own condition and adopt what might be described as a "veterinary model" of humankind. Some find it difficult, if not impossible, to divest themselves of the emotional involvement that comes from being a member of the human species and so, for such people, it is also impossible to make a truly objective study of the wider human experience of health and disease.

Because of the use of complex, often abstract, language, many areas of scientific understanding are closed to the general public. Although not devoid of medical jargon, this is not necessarily so for health and disease; everybody experiences health and disease and can talk about their experiences - sometimes at great length - in non-medical, lay person's terms. But this leads to a problem. When coming to think about health and disease, the vagaries of personal experience, which lack rigorous scientific test and the use of non-

technical language, impose themselves upon what should - when taking a scientific perspective - be a dispassionate and rational analysis of observable phenomena. Because one's own experience of a certain disease (or the experience of a member of one's family) took a certain course, it does not mean that that will be the experience of others. Although each individual is of paramount importance to themselves, each is but one member of a larger and more varied phenomenon: the Human Species.

In an effort to understand more of the mechanics of human life as conceived within the Darwinian scheme, we need to study a form of non-human life that behaves almost exactly like it in every way. We need to use what might be called Darwin machines¹ - non-human life that conforms to the same influences that are brought to bear upon human beings yet without any of the emotive baggage that using human examples entails and which can help us to understand and appreciate human life dispassionately.

The first step was to generate an artificial habitat populated by an artificial species that, at least in the first instance, can be represented pictorially so as to aid conceptualization. This requires a certain degree of simplification in that the number of characteristics described is limited to those of known relevance to the problem that one is trying to study. We can assume, for present purposes, that this species has plenty of food and no need for employment, government, money or monarchy. (There are no Tellytubbies, Barbie dolls and certainly no Spice Gizmoids.) Accordingly, the characteristics described are devoid of superfluous detail (although this may not always appear to be the case).

The Darwin machines developed for this purpose are called the Gizmoids and they occupy a habitat known as the Archipelago of Gizm. The word "gizmo" (or "gismo") is a US slang term of unknown

origin meaning a gadget, gimmick or "thingamajig" - for that is all they are.

The Place and Time (and a Use?)

The Archipelago of Gizm was conceived as a place that exists upon Earth with all the physical phenomena that affect human beings also affecting the Gizmoids. However, for simplicity, it is a flat world with just two dimensions of measurement as well as that of time. (Perhaps this is why most people have never noticed it?) The way things are experienced, measured and described on the archipelago differs from our ways. In particular, time is expressed in timewaves (or *tau* - τ) which sweep as a wave instantaneously across the whole archipelago.

Since it is an archipelago, it will come as no surprise that, on each island in the chain, there are different ways of doing things. The mechanics of Gizmoidal function do not differ between islands in the chain although there are varieties of Gizmoid behaviour and society (for example, see *Gizmoidal Bonding Patterns*, below).

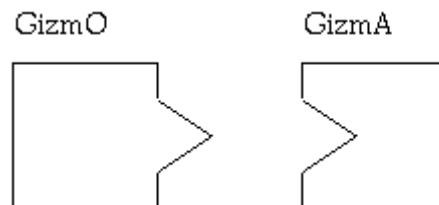
This approach parallels and enters partially the relatively new science of Artificial Life (or Alife) from which it borrows unashamedly. In this respect, the idea behind and uses for the Gizmoids may be developed further for the investigation of, what might be described as, artificial health (or Ahealth - pronounced "A-Health") and artificial disease (Adisease - pronounced "A-Disease").

Properties of the Gizmoids

The Gizmoids are a population of individuals each with their own life story - past, present and future. But each Gizmoid is just a gadget ordered by rational mechanistic rules and never by non-rational feelings such as emotions etc. The life cycle of a Gizmoid begins at

"initiation", undergoes "differentiation" later on and ends at "demise" which can occur at any stage following initiation.

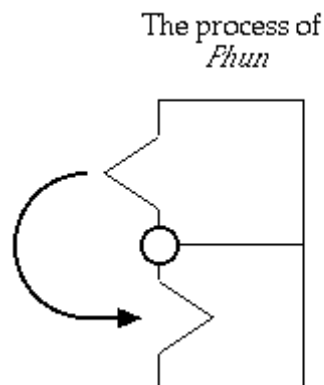
Visually, Gizmoids are essentially square but come in two forms or polarities (or $\rho\hat{i}$), the GizmO and the GizmA. The capitals at the ends of their names are deliberate because these represent a feature called posterity and take two forms: *omega-pi* or *alpha-pi* which GizmOs and GizmAs possess, respectively. GizmOs have a projecting structure called a "trigger", and GizmAs have a "receptor" that complements the GizmO's trigger.



Initiating new Gizmoids

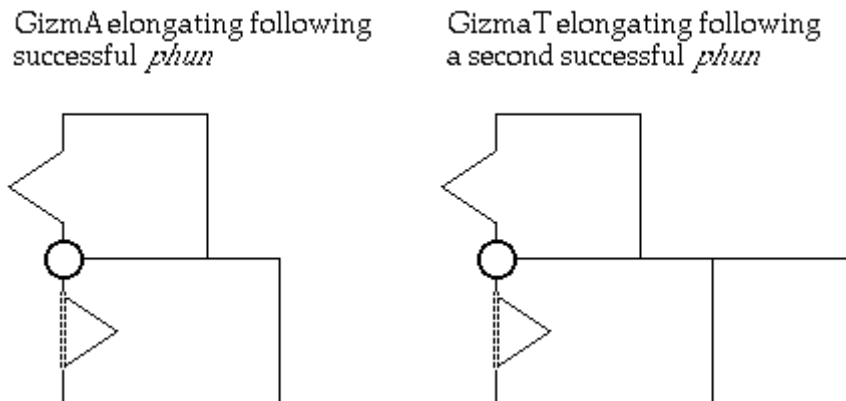
(or The "Ballad of GizmO and GizmA")

To produce new Gizmoids, a GizmO and a GizmA join together in a process called *phun*. During *phun* a GizmA may be stimulated to close off its receptor and elongate. When this occurs, *phun* is said to have been "successful". *Phun* does not always succeed; it may take a lot of *phun* to produce new Gizmoids.



Once a GizmA has elongated into a rectangle twice as long as it was previously, it partitions into two square Gizmoids - one representing

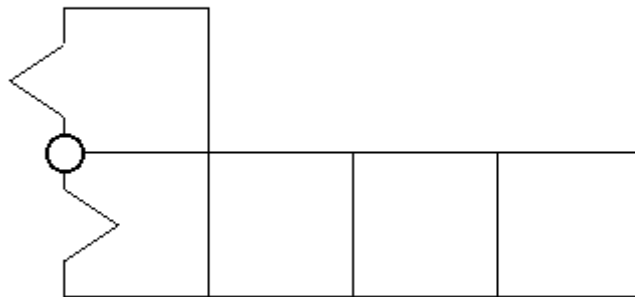
the original GizmA, which is now known as a GizmAt; the other representing a new Gizmoid which has yet to differentiate into a GizmO or a GizmA.



After partitioning, the GizmAt's receptor eventually re-establishes itself but when this occurs tends to vary depending upon a number of external factors. When the receptor does reappear, GizmOs and GizmAts may undertake *phun* once again with the same consequences as before. Even though the receptor has reappeared, the new Gizmoid is still attached to it's GizmAt.

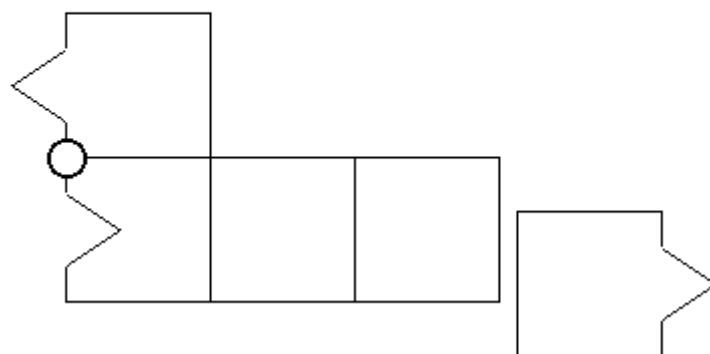
If subsequent *phun* results in a GizmAt's receptor closing off again and elongation occurring, none of this involves any previously formed, attached Gizmoids. Once again, when the GizmAt has elongated to twice its length, it partitions into two squares: one, the GizmAt, ultimately with a re-established receptor. Thus, a GizmAt can obtain a string of attached Gizmoids.

GizmaT with three Gizmoidal attachments



After a certain number of timewaves, Gizmooids detach from their GizmaT and become completely independent of it, at which stage they differentiate into a GizmoO or a GizmaA depending upon an attribute which was conveyed by the GizmoO during the *phun* that initiated them. The polarities conveyed are *omega-pi* and *alpha-pi* which cause a Gizmooid to differentiate into a GizmoO or a GizmaA respectively.

New Gizmooid (a GizmoO) differentiating from a GizmaT with remaining attachments



"Sad Ballads"

Some Gizmooids do not reach detachment and atrophy before it can take place. This occurs quickly and takes the form of rapid shrinkage which does not affect whatever may be beside it - joining

together instead as if the atrophied Gizmoid had never been present. Furthermore, when stimulated by *phun* to elongate, a GizmA (or GizmAt) may fail to reach full elongation and shrink back to its former shape and size. It is also possible during elongation for a GizmA (or GizmAt) to atrophy. Should this happen to a GizmA, it simply ceases to exist. However, should this happen to a GizmAt, any remaining attachments it may have are not necessarily affected. After it has experienced a certain number of timewaves, a Gizmoid will be able to survive even without being attached to its supporting GizmAt. Thus, it may continue as an independent, undifferentiated Gizmoid until such time as it differentiates.

There are other possibilities that may follow a GizmAt's demise. These largely depend upon which part of the archipelago a set of Gizmooids inhabits and is tied in with Gizmoidal bonding patterns.

Gizmoidal Bonding Patterns

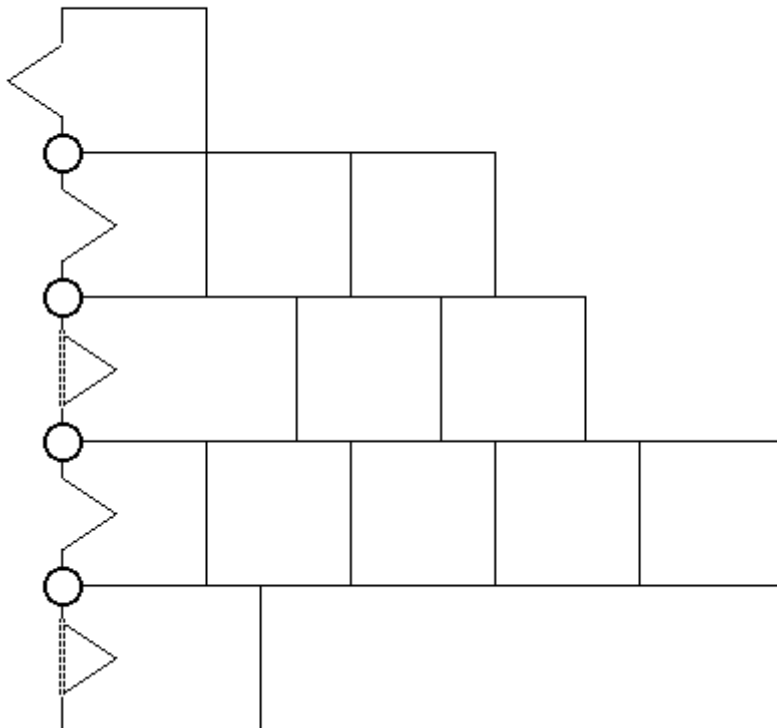
The "Ballad of GizmO and GizmA" is a purely mechanical process - if Gizmooids could think emotionally, what GizmOs and GizmAs thought of each other would be of no consequence. However, the ballad is played out in different ways depending upon which part of the archipelago one visits and the different rules prevailing there at any one time. On one island, a GizmO will bond with just one GizmA and neither will bond or have *phun* with any other. On another island, much the same pattern is adopted except that occasionally, a GizmO or a GizmA will have *phun* with another outside of their bonding, unknown to its bondee. (This, in turn, may lead to elongation of a GizmA.) On yet another island, one GizmO may bond with any number of GizmAs it wishes, whereas on another there is no bonding, only *phun*.

Pictorially, bonding is denoted by the respective GizmO and GizmA being figured in parallel with a ring which is the axis around which either or both may rotate at will to instigate *phun*.

There are also different practices regarding with whom *phun* is performed. One general rule seems to be that *phun* does not occur between a Gizmoid and one which produced it or which it produced. This requires that each Gizmoid can register who produced it and who it produced. However, this can be problematic on the island where there is no bonding (only *phun*) and when there is *phun* other than with one's bondee as it is impossible for a Gizmoid initiated in these ways to know with whom it should refrain from having *phun*.

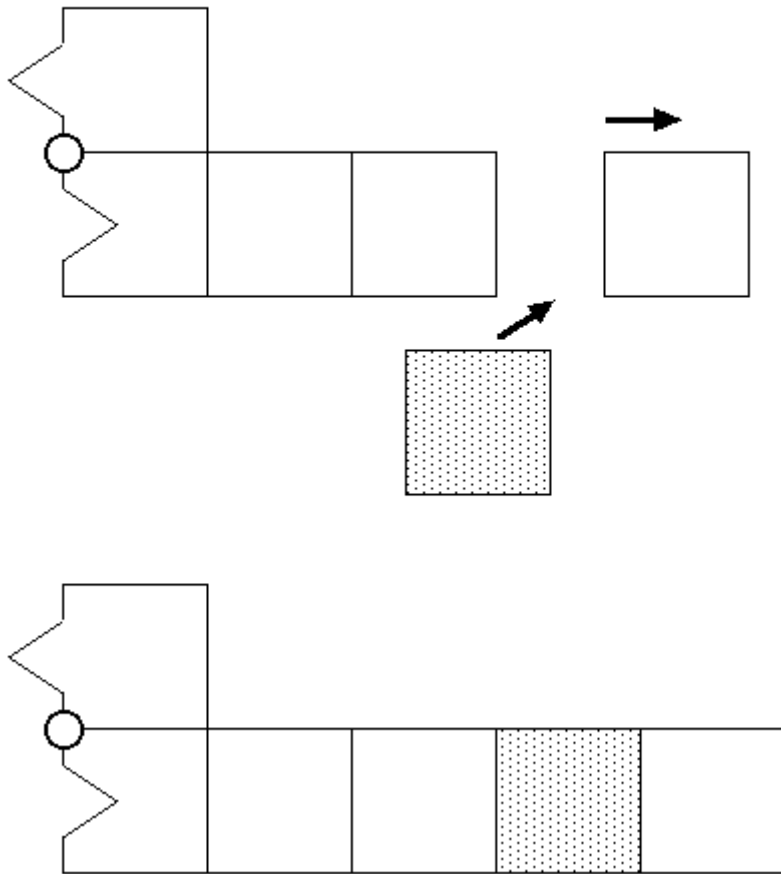
On yet another island, it is known for GizmOs to bond with more than one GizmA/GizmAt to the exclusion of other GizmOs.

A GizmO with multiple bonds

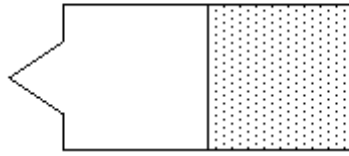


As mentioned above, following a GizmAt's demise, there are other fates for an undifferentiated Gizmoid which largely depend upon Gizmoidal bonding patterns. These include, transferring Gizmoidal attachments from the demised GizmAt to it's GizmO bondee, or transfer to a new GizmA or GizmAt to which that GizmO next bonds, or transfer of Gizmoidal attachments to a GizmA or GizmAt without involvement of a GizmO. It is also possible that some or all Gizmoidal attachments may also disappear in the wake of their GizmAt's demise.

GizmaT with three Gizmoidal attachments accomodating a Gizmoid whose GizmaT has atrophied



GizmO accomodating a Gizmoid
whose GizmaT has atrophied



Other qualities of being a Gizmoid

The Gizmoidal experience of time

Time is a wave that sweeps instantaneously over the entire Archipelago of Gizm and its inhabitants. It takes different numbers of timewaves for different things to happen. For example:

It takes three timewaves ($3\tau - 3\tau$) for elongation (*epsilon*) to reach partition (*pi*).

It takes 4τ (4τ) for a Gizmoid to age by one aging unit ($1\upsilon - 1\upsilon$).

It takes between 12υ (12υ) and 16υ (16υ) for a Gizmoid to detach and differentiate (*delta* - δ) into a GizmO or a GizmA. On average, a GizmA reaches *delta* (δ) earlier than a GizmO.

***Sigma* Σ : Span**

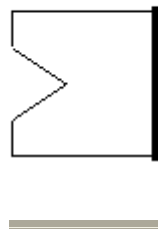
Gizmooids do not exist indefinitely. As they accrue more aging units, Gizmooids experience a certain loss of vitality and become increasingly more likely to reach their demise. The number of aging units (*upsilon* - υ) experienced before a Gizmooid reaches its demise varies but there appears to be a maximum number of aging units for which a Gizmooid can exist. Exactly how close it gets to this figure is influenced by numerous factors, many of which remain unknown. It is noticeable that, on average, GizmAs exist longer than GizmOs. Again, why this should be is not known. Gizmooids

may reach their demise at any time and, needless to say, cannot be returned to existence.

***Gamma* Γ: Gizmen**

Gizmoids do not experience successful *phun* indefinitely. After a certain number of aging units, a GizmA or GizmAt loses the capability to elongate, no matter how much *phun* it is exposed to, even though its receptor remains operative and the desire for *phun* is not lost. The exact number of aging units varies between Gizmoids (and has also been shown to vary with time and place). GizmOs do not have an equivalent of gizmen - although some have suggested that such a phenomenon might exist.

GizmA or GizmAt
following gizmen



Dear Reader (*Don't read on until you've read above*)

If you have been following the description of the Gizmoids carefully, you may have noticed that you have been developing a mental picture of what they are like and entering into their world - which you will remember is our own. You started, in effect, with a blank sheet - an open mind - and slowly sketched out an impression of what it was like to be a Gizmoid. But, if you now think back to the start of this piece, you will recall that the aim was to create an artificial species exactly like the human species but lacking one vitally important thing - the emotive baggage that ensues when humans study themselves. "Exactly" was written in italics above; the Gizmoids were not, of course, exactly like humans. For

example, humans do not differentiate into males and females when they leave their mothers; human chromosomal sex is determined at conception whereas for a Gizmoid, polarity becomes apparent when detaching from its GizmAt. But the inclusion of such modifications to the human pattern of life serves, perhaps, three purposes. It demonstrates that the same ends may be achieved via different means; it demonstrates that the human system is not intrinsically special and it helps (I hope) the reader to forget that this was really about humans after all. One can feel no emotion for a Gizmoid, yet they are mechanically (or one could say biologically) doing the same as humans. In imagining what life is like for a Gizmoid, we are imagining what biological life is like for humans using what we called earlier the "veterinary model".

The word "Gizmoid" has been used in two senses here, generically to refer to all that belong to this particular species of Darwin machine and, more specifically, to refer to the non-differentiated pre-GizmO/pre-GizmA form. On the Archipelago of Gizm, there is a difference of emphasis as to which stage of life is deemed to have the greatest importance. This provides a thought-provoking alternative to the way we tend to think.

You may be asking "What are Gizmooids made of?" That is, of course, an excellent question upon which to end.

¹ The term "Darwin machine" is attributable to the American neurobiologist, William Calvin.

^{NB} Where Greek letters have been written out in English, single letters are normally used.