Speciation, Transvergence, Allogenesis:

Notes on the Production of the Alien

Marcos Novak has for nearly twenty years been at the cutting edge of 'digital design'. His work is often more thoughtful and more extreme than many who purport to have had the 'digital epiphany'. Indeed he has found it necessary to introduce a new 'adjectival trajectory' into his work to describe the epistemological changes the digital technology has provoked in architectural discourse. He talks in terms of 'liquid architecture', of 'transarchitecture', of 'eversion' and 'invisible architecture'. In this article he sees the notion of 'reflexivity' as not at odds with his ideas of the 'allo' and the 'alien'.

In another and more general manner, new species become superior to their predecessors; for they have to beat in the struggle for life all the older forms, with which they come into close competition ... From these several considerations I think it inevitably follows, that as new species in the course of time are formed through natural selection, others will become rarer and rarer, and finally extinct. The forms which stand in closest competition with those undergoing modification and improvement, will naturally suffer most.[1]
    — Charles Darwin, *The Origin of Species*

God is dead. God remains dead. And we have killed him ... What was holiest and most powerful of all that the world has yet owned has bled to death under our knives: who will wipe this blood off us? ...[2]
   — Friedrich Nietzche, *Die Fröliche Wissenschaft*

Looking on oneself as something alien, forgetting the sight, remembering the gaze.[3]
    — Franz Kafka, *The Blue Octavo Notebooks*

Speciation: Reflexive Alloselves

Reflexive: that which flexes, that which has reflexes, that which enacts relations involving and applying to itself. Though evident, valid and useful, these meanings only hint at a larger implication. The term *reflexive* suggests *self*-reference and, consequently, a notion of *self* either as part of a reflexive pronoun such as 'itself', 'yourself', 'myself', or in the use of 'self~' adjectivally, as a prefix, as in 'self-aware', 'self-knowing', 'self-conscious'. Its introduction into architectural discourse marks yet another milestone in the transition of architecture from inert passivity, to activity, transactivity, life and, eventually, consciousness.

'Reflexive architectures' is an adjectival construct. Adjectival constructs are inherently generative. By placing an unexpected modifier *x* next to an entity *y* that is presumed – but perhaps *only* presumed – to be known, a creative instability is produced, asking, 'How can *y* be *x*?' or, for instance, 'How can architectures be reflexive?' In large part, the question and its answers come from technological and concomitant conceptual developments that demand the consideration of transarchitectures imbued with interactivity, mobility, dual presence in physical and virtual space, the implication of the biological into the architectural, and so on. Technological developments are no longer

separable from cultural ones, however, if ever they were, and so beg questions regarding both the culture that produced them and the culture they, in turn, produce.

My work has long explored these territories, proceeding along its own adjectival trajectories from *liquid architectures*, to *transarchitectures*, to *invisible architectures,* to my present explorations of the idea of the *alien* and its own adjectival modifier *allo~,* suggesting *alien architectures* or *alloarchitectures*. What then is the relationship between the *reflexive* and the *allo~*?

Allo~, the root for *alien*, means other, but not in the trivial sense that everything that is not *self* is *other*, but in an extreme sense of the *other* as belonging to another order entirely. It would thus seem that the impulse towards *self*-referential *reflexive architectures* should be at odds with the impulse towards *allo*-referential *alien architectures*. And yet, this is not so, in at least two ways. First, the granting of reflexive and active self-reference and consciousness to inert architecture is already an *alien* proposition, already an infolding of selfhood with the heretofore inherently selfless. Second, such a granting is consistent with *allogenesis,* the larger pattern of *the production of the alien*, which is a pattern that I argue characterises our developing *transmodern* culture. The *alien*, for all its otherness, may still have a reflexive self, albeit *other*-self or *alloself*. To the extent that we are the authors of the alien, this *alloself* is derived from our own understanding of what self and consciousness may involve, but is of technological necessity radically unlike our own, even at its onset, and only likely to diverge from us as it evolves along its own lines of development. This *alloself,* the *self* of the *alien*, is other to us, and yet of our own production: as we produce the *alien*, so do we produce the *alien self,* and as we produce the *alien self*, so do we begin to modify, reflexively, our present self.

The potential conflict of the reflexive self and the formation of the *alien* is thus resolved in the recognition of the rise of this *alloself,* brought about by the forces that press our already permeable identities to become pantopically distributed, at the very same time as we seek to imbue all space and form with sense, autonomy, self-awareness, intelligence and life. So too, then, with architecture: *reflexive architectures* are *alien architectures*, expressions of a great rewriting system that has provisions for freeing its outgrowths from the outmoded identities of its terra-bound roots as they branch across the n-dimensional terrain of unexplored variables and unexpected but inevitable combinations.

In all this, the *reflexive* also suggests the reflective, the speculative and the conjectural, and thus implies the presence of symmetries, sometimes perfect, often

Opposite
Polytopes to Allotopes.
The Allotopes project builds on the Polytopes of Xenakis. Between 1968 and 1978, at Cluny, Perspepolis, Beaubourg, Mycenae and other spatially potent places, Xenakis created a number of Polytopes, events combining architecture, stochastic electronic music, coordinated, computer-controlled light and dramatic performance.

not. In the discussion that follows, I will describe a sequence of explorations that track the reflections and refractions of questions along various planes of symmetry, always seeking the specular counterimage on another mirror, in halls of mirrors, in mirror worlds.

Transvergence

From architecture: To invent new instruments is to invent new spaces. To venture into new spaces is to surpass existing maps and risk becoming lost. As technology opens new or previously inaccessible spatial domains to traversal, inhabitation and dwelling, the scope of investigation of architecture and the spatial arts is expanded far beyond the purview of ordinary theories and practices. New transgressions demand new architectures. Although such expansion challenges typical categories and definitions to the rapture of rupture, the necessary discomfort of this strain does not negate or invalidate the positive interest of the newly arisen possibilities. Inevitably and rapidly, time metabolises the unfamiliar into the familiar, making the shock of yesterday the rule of today, urging those of us in the present to consider even the strangest prospects of the future as if they had already come to pass.

Beyond architecture: The encounter with change, especially rapid, technologically driven change of the kind that fractures conceptions and definitions, has become constant, pervasive and relentless. It extends far beyond architecture to encompass all aspects of culture. In my writings, as mentioned above, I have proposed that this change is sufficiently widespread and deep to warrant naming this period of culture *transmodernity*, stating that ours is a global *transmodern* culture directed towards the condition of *virtuality*, in both a technological and a philosophical sense. *Transmodernity*, I argue, is characterised by the extensive and deliberate production of an extreme form of the *other*, for which I have appropriated the term *alien*, derived from the Greek root *allos*. The choice of this word focuses attention on the cultural production of the *alien* as a philosophical and critical notion, useful in shedding light on the global investment of interest, effort and resources to diverse projects such as human cloning, transgenic art, the Mars mission and beyond, but also calling attention to *alienation* as a corollary of *globalisation*. Conjoined with the prefix *trans~*, which I use to direct attention to the combination of incessant intellectual restlessness and conceptual mobility that characterises our current epistemological attitudes, bent as these combined aspects are on breaking not only all taxonomic barriers but even emerging and future ones, the *alien* and its production form an alchemical and kaleidoscopic perpetual-motion machine, one whose epoch-altering output is endless *allogenetic transvergence*.

Let us examine these terms, beginning with *transvergence* which I propose in contradistinction to the usual *convergence* and *divergence*. There is widespread discussion of *convergence,* digital and otherwise. From there, in as restless a world as ours, it is a fairly straightforward extrapolation to suggest and anticipate *divergence*. Vectors that converge have no reason to stop at their focal point and must surely deviate, at least in any relatively local frame of reference. Still, useful though they are within a near horizon, these terms fail to prepare us for the strangeness of what we are certain to encounter – because we are sure to produce it. While *convergence* and *divergence* are simple linear extrapolations that proceed by strategies of alignment, *transvergence* advances translinearly, by tactics of derailment. While *convergence* and *divergence* are allied to epistemologies of continuity and consistency such as those of David Hilbert,[4] Bertrand Russell and Alfred North Whitehead,[5] *transvergence* is epistemologically closer to Kurt Gödel's incompleteness theorem[6] – which states that for any well-formed theory there will be valid propositions that are not derivable within the theory – and to complexity, chaos and catastrophe theories, dynamical systems, emergence and artificial life. While *convergence* and *divergence* contain the hidden assumption that the *true*, in either a cultural or an objective sense, is a continuous landmass, *transvergence* recognises true statements to be islands in an alien archipelago, sometimes only accessible by leaps, flights, and voyages on vessels of artifice.

Allogenesis

In biological terms, our growing attention to the *alien* indicates an epistemological shift of interest from linear modes of evolution to branching ones. Even though Darwin named his book *The Origin of Species*, indicating a clear interest in the mechanisms of discontinuity by which diversity is produced, the idea of evolution is largely taken to signify gradual and continuous development. After a long period of concentration on evolution through *fitness*, our focus is shifting to *speciation*, the study of the mechanisms responsible for the emergence of new species: new species of theories, of practices, of disciplines and even, in the end, new species of ourselves. *Speciation* assumes *fitness*, but exceeds it by considering the question of the emergence of *diversity*. Biology distinguishes between linear and branching evolution

as *anagenesis* and *cladogenesis* (from the Greek *ana* 'again' and *clados* 'branch') respectively. To say that we are a *transmodern* culture is thus to say that we have placed ourselves into a period of rapid and intentional *cladogenesis*. To say that *transmodernity* is characterised by *the production of the alien* is to say that our *cladogenesis* is directed towards what I term *allogenesis*. *Allogenesis* differs from *xenogenesis*, whose root is *xeno~*, meaning 'stranger' or 'foreigner'. While *xenogenesis* implies a fertile encounter with an initially alien species, the *alien-from-without*, *allogenesis* suggests the production of an alien species from initially genetically compatible lineages, or the *alien-from-within*. While the *xenogeneic* is that which is derived from another species, the *allogeneic* is that which is formed from within a species as that species evolves to become alien to its origins. And yet, *allogenesis*, as it s forming, is even more discontinuous than *cladogenesis,* where at least the materials that lead to the branching are relatively contiguous. Our technologically driven and intentional *allogenesis* obeys no restriction to draw upon immediate contexts. To paraphrase and revise Ernst Haeckel,[7] *allo~ontogeny* is under no compulsion to recapitulate *allo~phylogeny*. All materials, genetic and *allogenetic,* are fair game.

In a physical universe as large as we know this one to be, it is arrogant to presume that ours is the only form of life. In a combinatorial space of symbols, digits, nucleotide sequences, atomic orbital clouds and electron valence shells, swarms of interacting elementary particles and colliding extradimensional *m-* branes forming a permutational library far more extensive than Borges' Library of Babel[8] it is arrogant to presume that what we have said and written since the beginning of time is all that can be known. Recognising this, we have created and deployed technologies for the systematic exploration of the space of possibilities, knowing full well that even more possibilities exist, beyond systematic derivation. So, while the likelihood that we may encounter the external alien may be small, it is nearly certain that we will put forward the alien as the fruit of our own efforts.

Interestingly, *anagenesis*, meaning 'rebirth', is the Greek name for the Renaissance. Renaissance humanism, the anthropocentric production of the philosophical notion of Man, followed an era preoccupied with the theocentric production of the philosophical notion of God.

The birth of Man eventually led to the collapse of theocentrism, which Nietzsche characterised as the 'Death of God', thus, I suggest, beginning a series: the production of God (PoG) is followed by the production of Man (PoM); the production of Man leads to the death of God (DoG); the production of Man is followed by the production of the Alien (PoA), which, in turn leads to the death of Man (DoM). More concisely:

... PoG; PoG-→PoM; PoM-→DoG; PoM-→PoA; PoA-→DoM-→ ...

In other words, centrifugal *allocentrism* is now displacing *anthropocentrism*, just as *anthropocentrism* displaced *theocentrism*, with the *alien* taking the place of the Nietzschean *overman,* and extending itself past all human limits to encompass all aspects of our constructed reality.

There is justifiable suspicion of totalising centrisms and the abuses they can be put to. A safeguard against these abuses is already implied within the idea of the *alien*. Even at its most reflexive the prefix *allo~*, like *trans~*, is restless and always pointing away from itself. *Allocentrism* is a centrifugal notion, one in which the centre is an absence only implied by the dynamics of tangential and transvergent vectors. It is totalising only in that it escapes all totalisations.

This schematisation lends some critical clarity to developments such as those of biotechnology, sensory substitution, genetic engineering, human cloning – in fact, everything from nanotechnology to space missions, from *panspermia* as a scientific hypothesis to the *X-Files* as timely entertainment – and to the great global investment of resources that these command, as well as to the present parallel discourses on monsters, hybrids, mutants, cyborgs, avatars, angels and, of course, aliens. The death of Man does not suggest some sort of literal, alarmist and paranoid apocalyptic fear. Rather, it implies that Man is an ongoing project and, moreover, that the *cladogenetic speciation* of Man necessarily leads to cladogenetic speciation of all of Man's categories and taxonomies. It is here that we finally see that adjectival constructs such as *reflexive architectures* or *alloarchitectures* act as both causes and symptoms of massive cultural and philosophic re-evaluations.

Wittgenstein suggested that if a lion could speak, we would not be able to understand it.[9] By the same token, if the alien of our own construction could speak, we would not understand it either. And yet, here we are, our tendrils cantilevering into futures we are unlikely to recognise, and it is exactly those futures which *transverge* from our extrapolations that we are most interested in. Thus, of all the projects we might undertake, it is those that initially appear the most *alien* that might be the most important, making potency for *allogenetic transvergence* a measure of the potential

relevance of a project or proposition. And so we are faced with this problem: how can we learn to modulate the centrifugal and reflexive production of the alien so as to allow it to carry us as far as possible, while still implying – but never occupying – a centre that is humanely desirable and never oppressive?

The word *experiment* comes from the Latin *ex-periri*; *periri* comes from *periculum*, which means 'attempt', as might be expected, but is also the root of words signifying danger, such as the Italian *pericolo* and the Spanish *peligro*. The connection to danger is deep: both *periculum* and *fear* come from the Greek *peiran*, meaning 'experience' in the sense of the tactile and finite. *Peiran* is also a component of *empirical*, a word nearly synonymous with scientific research. The empirical is that which is finite and can thus be experienced, and is juxtaposed to the *apeiron*, the infinite, which obviously cannot be, at least not by beings finite and mortal. Thus, to experiment means to purposefully engage in finite but potentially dangerous and frightening attempts, to initiate investigations that involve risk and confront fear. Obversely, to investigate without an engagement of risk and confrontation of fear is not to experiment at all.
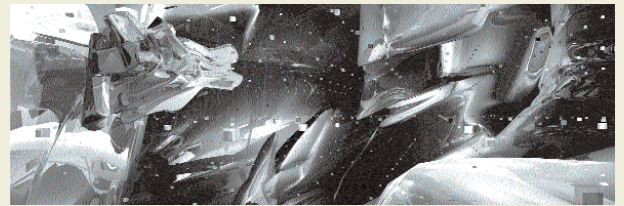
Framed in such a way, the following series of theoretical and experimental projects explores the limits of architecture by considering several manners in which our definitions of space, inhabitation and culture are becoming *alien*. At the core of these investigations is the persistent strange attractor of architecture, simultaneously absent and augmented, around which spin vectors pointing to and from actual and virtual space, immersive and *eversive* space, effective and affective space, objective and performative space, conventional construction and construction only possible with advanced, computer-controlled means of fabrication, the spaces of nanotechnology and biotechnology and the spaces of consciousness, always considered bidirectionally and on several parallel registers: as arts and architectures, as *transarchitectures*, as formations as yet unnamed, *trans~, reflexive,* and *allo~*. ⌁

Notes
1. Charles Darwin, *The Origin of Species.*
2. Friedrich Nietzche, *Die Fröliche Wissenschaft*, 1882; second edition 1887 with addition of Preface, Book V and appendix of 'Songs of Prince Vogelfrei'. Excerpts from *The Gay Science*, trans Walter Kaufmann, Vintage (London), 1974.
3. Franz Kafka, 'The Third Notebook, December 6 1917', *The Blue Octavo Notebooks*, ed Max Brod, trans Ernst Kaiser and Eithne Wilkins, Exact Change (Cambridge, Mass), 1991.
4. David Hilbert and W Ackermann, *Grundzüge der theoretischen Logik*, Springer-Verlag , 1928; Hilbert and F Bernays, *Grundlagen der Mathematik I, II*, Springer-Verlag, 1934, 1939.
5. Bertrand Russell and Alfred North Whitehead, *Principia Mathematica*, Cambridge University Press, second edition, 1927.
6. Kurt Gödel, *On Formally Undecidable Propositions*, Basic Books (New York), 1962.
7. Ernst Haeckel, *Art Forms in Nature*, Dover Publications (New York), second edition, 1974; Haeckel, *Die Radiolarien (RHIZOPODA RADIARIA)*, Druck Und Verlag Von Georg Reimer (Berlin), 1862.
8. Jorge Luis Borges, 'Library of Babel'.
9. Ludwig Wittgenstein, sec. 206, *Philosophical Investigations*, trans GEM Anscombe, Blackwell (Oxford), 1963.
10. Justin Khoury, Burt A Ovrut, Paul J Steinhardt, Neil Turok, 'The Ekpyrotic Universe: Colliding branes and the origin of the hot big bang', *Phys. Rev.*, D64 (month 2001).
11. Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction' in Hannah Arendt (ed), *Illuminations: Essays and Reflections*, Schocken Books (New York), 1969, page refs.
12. Manfred Clynes, *Sentics: The Touch of Emotions*, Doubleday (New York), 1977.

Projects and Projections

The following projects constitute an ongoing series of investigations into an extended and transvergent understanding of architecture. I am presently practising as global nomad, shifting contexts widely and frequently. The arc of efforts presented here draws upon ideas and influences gathered from many intellectual and physical contexts in my travels around the world.

Below

Transvergence Diagrams
Convergence, divergence, *transvergence*: in the face of exponential change, *transvergence* is proposed as a tactic of corrective derailment of simple extrapolations into *elsewhere,* the territory of the *allo~*. Note the resemblance to the Minkowski diagram for space-time, where light cones describe the extent of the *knowable*, beyond which lies *elsewhere* (recall that *allo~* is the root of 'else'), and the similarity to the *m~*theoretic diagram for the ekpyrotic universe, which describes big bang cosmology as the outcome of the collision of higher dimensional *m~*branes.[10] Also note the discursive relationship of the idea of the *allo~* with Stephen Jay Gould's notions of *punctuated equilibrium* and *exaptation* in evolution, with the critical recognition that we, through technology, are causing the punctuation in our own evolutionary development.

V4D_Visio4D

Invisible Architectures, the interactive installation with which
I represented Greece at the Venice Biennale 2000, explored various ways
of connecting deep virtuality to actual spaces and physical objects by
means of invisible infrared sensor-field forms. Investigating the invisible
in a broader sense, the components of the installation were all derived
from inherently invisible higher dimensional geometries.

A mathematically generated, liquid, three-dimensional form was
extruded and modified in four spatial dimensions, and then *everted* in
several distinct ways: as physical, rapid-prototyped form (as four three-
dimensional orthographic projections of the original four-dimensional
form), as invisible infrared sensor-field form (at two scales, constituting
invisible sculptures and the namesake *invisible architectures*), in the
form of virtual environments and as spatialised sound, all algorithmically
cross-correlated. Acting as interfaces, the invisible sensor-field forms
controlled the generative sound and light projections. Their invisible
hypertactility alludes to Duchamp's *infrathin*. These images show the
orthographic projections of the four-dimensional forms as virtual
environments.

V4D_TransAura

Together, the various aspects of actualisation of higher-dimensional form
augment our understanding of architecture. Here, the orthographic
projections of the four-dimensional forms, previously shown as virtual
environments, are presented as large-scale sculptures. What the images
cannot properly show is that the forms are each to be punctuated by
sensors and thus surrounded by an invisible sensor-aura of the kind
demonstrated in the Venice installation. The allusion to Walter Benjamin's
aura[11] is intentional: the proposition is that the loss of the aura of the
original can be addressed by the technological generation of auras of
transactivity, both literally and conceptually, whereby the loss of static
authenticity is compensated for, and indeed surpassed, by the multiple
and dynamic aura of signature behaviours.
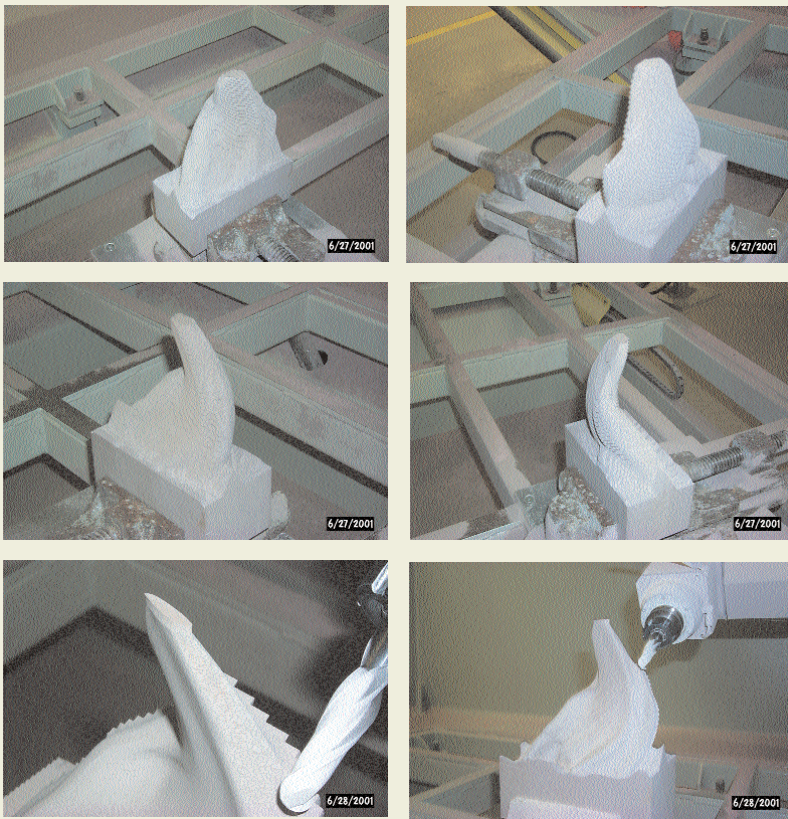
Above

V4D_CMS

The physical forms in the Venice installation were built using LOM, or laminated object manufacturing, a rapid-prototyping technique suitable for creating small to medium-sized objects. These forms anticipate formal explorations at much larger sculptural and architectonic scales. For this, other techniques are necessary. Here, a portion of a form from the Venice Biennale installation is being fabricated using a five-axis milling machine, courtesy of CMS, in Zogno, Italy. Once the tooling and paths are worked out in foam, the forms can be manufactured at full size using any millable material, from wood to plastic to metal to stone to glass.

in San Giovanni, a 1,000-year-old church in Erice, a medieval town in Sicily.

This event occurred under the auspices of the Secondo Convegno Internazionale sul tema 'Media Digitali e Psicotecnologie: Viaggi della Mente nei Mondi Virtuali', an international conference of psychiatrists and psychologists conducting research on the topic of psychotechnology, digital media and the spaces of the mind.

Eduction is to hypnotic *induction* as *eversion* is to *immersion*. During the performances, volunteers were first hypnotised via *induction* and then, while still hypnotised, allowed to navigate through a series of virtual environments, seeking to *educe*, or *draw out* the *alien-within*. Given the conference topic, the worlds of *AlienWithin* are constructed by combining elements of neurophysiological research on the 'neural correlates of consciousness', individuals' subjective phenomenological accounts of their own spaces of consciousness, and live sensor-data capturing their modulations of sensor-controlled sound generators while under hypnosis. Because neither the collection of experimental data nor the elicitation of subjective accounts alone can suffice to explain how the brain produces the mind, *AlienWithin* proposes that a constructive approach may enhance the analytical, empirical and phenomenological methods presently in use. Therefore, the worlds of *AlienWithin* aim not only to expand architecture into *esospace*, but also to suggest that we may learn about consciousness itself by building *Rosetta Worlds* that, by analogy to the Rosetta Stone, act as intermediaries, allowing us to translate between otherwise incommensurable and individually inadequate descriptions. Thus while one aspect of Allotopes proposes that real-time performance is a necessary aspect of a space–time architecture, reanimating spatial architecture through the temporal architecture of living ritual, another aspect of Allotopes presents the problem of consciousness itself as an architectural problem in virtual and everted space.
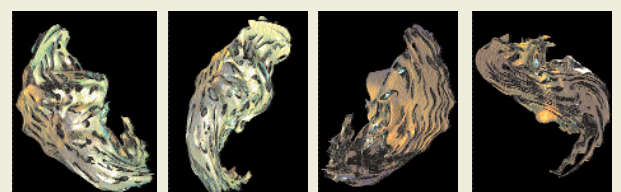

Above (left to right)

Polytopes to Allotopes

The Allotopes project builds on the Polytopes of Xenakis. Between 1968 and 1978, at Cluny, Perspepolis, Beaubourg, Mycenae and other spatially potent places, Xenakis created a number of Polytopes, events combining architecture, stochastic electronic music, coordinated, computer-controlled light and dramatic performance. Allotopes accepts this admixture as an architectural proposition and, using the technologies of virtuality, extends it into the present theoretical consideration of the *alien*.

Allotopes reanimates existing but perhaps neglected architectural spaces by combining spatialised and generative sound and video, projections of virtual worlds, navigable music, sensor-driven dramatics and performance art into a potent alien amalgam. These additional elements are not seen as superfluous additions superimposed upon conventional architecture, but as elements constitutive of an expanded and transvergent conception of architecture, open to external influences and alien permutations.

Eduction: AlienWithin, a sequence of performances done in collaboration with performance artist/hypnotist Marcos Lutyens, in Venice, Florence and Erice in June 2001, opened the Allotopes series. These images depict the virtual spaces of *AlienWithinErice*, the performance that took place

AlloBioExo

The *Echinoderm* experiments test the limits of present manufacturability, but are too spatially complex for most practical purposes. Gathering the lessons of all the previous steps, the AlloBio project proposes, and begins to explore, a more accessible form of architectural expression that embraces the *alien*.

These images show the AlloBio project in axonometric form, making visible its construction as a series of concentric skins, shells and skeletons, topologically clear but warped by affective fields. Rather than expecting such forms to be built using conventional construction techniques, AlloBio anticipates that advanced fabrication techniques allowing fully generalised formal expression, at present only available to rapid prototyping, will soon become available at the scale of building. Responding to the challenge of the Metapolis Smart House project, it proposes that information, energy, utility and structure are all provided by dermal means, by a skin that carries all services to all locations just as living skin carries nerve endings (information) and nutrients (energy) to the surface of the body. More than this, AlloBio anticipates the convergence, crossing, divergence and eventual *transvergence* of the biological and the architectural, the psychological and the cybernetic, into the formation of quasi-living *allo~architectures*.

Bottom right
AlloBioCities
Although the AlloBio project contains elements of the exploration of deep virtuality that are embedded in its history, it in no way dismisses the actual and physical. Here it is presented as an architectural proposition in a schematised urban space. One of the intentional aspects of this presentation is the exploration

Opposite bottom right
Echinoderm

AlienWithinErice involved gathering sensor-data from a series of subjects, in a process modelled after Manfred Clynes' idea of 'sentics',[12] seeking to correlate modulations of sensor-data with fluctuations of affective state. Later, in Barcelona, in response to the Metapolis Smart House project, which aimed to provide information, utilities, energy and structure on a one-metre grid, and in the vivid presence of Gaudí, I became curious about living membranes and skins as architecture. Modelled on the structure of the skeleton and the circulatory and nervous systems, most architecture is based on hierarchies of lines leading to nodes, a system which is ill-suited to provide ubiquitous services. By contrast, as surfaces rather than lines and nodes skins distribute their services across their entire extent. Studying capillaries after Malpighi, radiolaria after Haeckel, the bioluminescent chromatophores of cephalopods and the skins and exoskeletons of echinoderms, crustaceans, brittle-stars, insects and various other instances of living habitats and enclosures, I decided to experiment with the combination of *infoskin*, *exoskeleton* and *esoexpression*. The data collected as part of the *AlienWithin* project was used to create affectively driven warp-fields that then modified various concentric topologies. In the spirit of the rapid-prototyping and milling experiments outlined above, the forms were always kept within the limits of manufacturability. These images show ray-tracings of *Echinoderm,* an affectively modified form based on three concentric perforated shells, held apart by a system of radial struts. The resemblance to biological form is at once evident and *alien*.
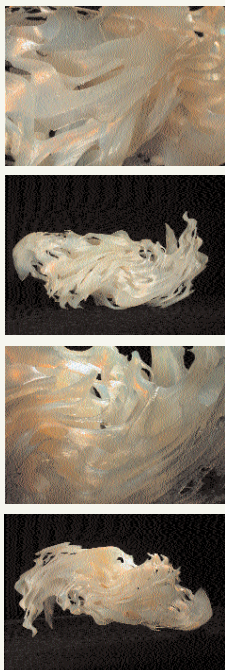
Above
Echinoderm_RP

At the Santa Fe Art Institute I was afforded the opportunity to build these forms using stereolithography. These images show the resulting rapid-prototyped *Echinoderm*. Later, in Perth, in discussion with Symbiotica, an art-and-science collaborative housed within the human biology department at the University of Western Australia, three options arose: first, that if such a form were made of biodegradable material, cell-cultures of living bone or cartilage tissue could replace it, in effect creating an artificial skeleton; second, the form could instead be used as a substrate, upon which living skin could be grown; and, third, a combination of the previous two was possible, whereby the form would be both skeletal or cartiligenous and dermal. Considering that these forms originated in architectural and psychological explorations, this opened the most surprising possibilities: quasi-living architectures, made of *skin and bone*, existing in actual space but derived from *esospace*, intrinsically connected to multiuser virtual environments in cyberspace via sensor arrangements implementing *invisible architectures*.

of architectural form in a manner that has been inaccessible since Gaudí, and a cross-fertilisation of art and science that has not been seen since the Baroque and certain moments in early modernism. As with Gaudí, technique is necessary for the realisation of ideas, but requires a richness of resources to match. The *AlloBio* proposition is part of an ever-expanding augmentation of what is understood to be architectural in the age of the *alien*. Δ