Bioglyphs: Generating images in collaboration with nature’s events

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Bioglyphs: Generating images in collaboration with nature’s events

TEXT
Abstract

Reconstructive postmodernism proposes an alternative to a mechanistic interpretation of the world. The mechanistic model, which assumes that the world consists of discrete objects, has led to a ‘disenchanted’ interpretation of nature. In contrast to this objectification, the reconstructive model interprets nature as being primarily constituted of interacting events.

Since the 1960s ecological artists have developed strategies of representing this reenchanted view of nature through its phenomena or events. A number of these artists have sought to use photography to represent this view. However when such works are presented in photographic form I argue that the use of a camera tends to objectify the event.

In order to avoid the objectifying tendency of photography a number of contemporary artists have developed photographic methods of image-making which dispense with the camera. Bioglyphs, the creative practice of this current research, have been linked to the work of this group because of a shared approach to the use of photographic materials. However, if we assess the role of icon and index within photography, we can see that this approach may not always be sympathetic to the project of these artists.

Three key outcomes are identified. The first is the clarification of the concepts icon and index as applied to photography. Photographic images are shown to be primarily iconic rather than indexical. The thesis argues that iconic images tend to objectify the world whereas indexical images tend to represent the world as being constituted by events. Iconic photographic images therefore contribute to a disenchanted view of the world.

The second is that this reassessment of icon and index highlights a clear distinction between bioglyphs and most of the other camera-less images with which they are associated. In contrast to the iconicity of camera-less photographs bioglyphs are shown to be radically indexical.

The third outcome is to show that, methodologically and interpretationally, bioglyphs have more affiliation with other artworks that are primarily indexical. This realignment of bioglyphs with other indexical art proposes a new category of art practice. This new category of indexical art, which foregrounds nature’s events, suggests a method of art practice that is more supportive of reconstructive postmodern ideas.
Figures

1. Daro Montag, *Down to Earth I, IV, V I, V III.* 33
2. Susan Derges, *Vessel 2.* 43
3. Susan Derges, *The River Taw (New Moon, Ivy).* 44
4. Adam Fuss, *Untitled (Baby).* 45
5. Garry Fabian Miller, *Breath (The Passing Spirit: Thirty days of sunlight).* 46
6. Christopher Bucklow, *Guest.* 47
7. Floris Neusüss, *Flower.* 48
9. Adam Fuss, *Untitled (blue spiral).* 83
10. Garry Fabian Miller, *Son (9th June 1992).* 84
11. Yves Klein, *Untitled (anthropometry).* 85
13. Yves Klein, *Untitled (cosmogeny).* 87
14. Yves Klein, *Untitled (fire painting).* 88
15. Charles Ross, *Solar Burns.* 89
16. Andy Goldsworthy, *work in progress.* 91
17. Andy Goldsworthy, *Snow and Ice Drawing.* 92
20. Alan Smith, *work in progress.* 95
21. Alan Smith, *Untitled (completed canvas).* 95
### Tables

<table>
<thead>
<tr>
<th>Table I.</th>
<th>To identify whether the three aspects of contiguity apply to the different forms of photographic sign.</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table II.</td>
<td>To identify whether the three aspects of contiguity apply to a fully indexical sign.</td>
<td>71</td>
</tr>
<tr>
<td>Table III.</td>
<td>To identify whether the three aspects of contiguity apply to the image made using a pinhole camera.</td>
<td>75</td>
</tr>
<tr>
<td>Table IV.</td>
<td>To identify whether the three aspects of contiguity apply to the different forms of photogram.</td>
<td>77</td>
</tr>
<tr>
<td>Table V.</td>
<td>To identify whether the three aspects of contiguity apply to bioglyphs.</td>
<td>79</td>
</tr>
</tbody>
</table>
Introduction

The thesis of this research project consists of two parts. The two parts, entitled Bioglyphs: Text and Bioglyphs: Images, are bound separately but presented together in one slipcase. This part, Bioglyphs: Text, contains the argument and the contextualisation of the creative practice. The practice employs a method of making images through the biological activities of micro-organisms. The research problem is to define the signification of this art and position it within the cultural matrix of other contemporary art practices that attempt to represent an ecological view of nature. The other part, Bioglyphs: Images, describes the methodology of the practice and details the artefacts that have been produced. These artefacts are generated by the activities of micro-organisms and are referred to as ‘bioglyphs.’ Bioglyphs: Images also contains data outlining the public dissemination of the art through exhibitions, conferences and publications. The thesis is understood to be the combination of these two parts, both are complementary with neither being prioritised. For the purpose of the PhD examination there will also be an exhibition of artefacts.

Chapter one outlines the idea of research through creative practice. It explores some of the issues that relate to the production of doctoral work in art practice. It is argued that art can provide knowledge of the objects and events of the world by revealing previously hidden or masked aspects. This chapter also investigates some recent debates about practice-led research. It concludes by classifying the current project as ‘research through art.’

The theoretical basis that informs this project is outlined in chapter two. Of particular importance to this view is the theoretical model of panexperientialism which is associated with a body of ideas generally referred to as process philosophies. Panexperientialism is directly opposed to the mechanistic model of the universe that has arguably dominated Western scientific thought since the time of the Enlightenment. Mechanism is described as being disenchanted and inadequate for a contemporary understanding of the world. Panexperientialism offers an alternative to this view by proposing a model that is more consistent with many aspects of contemporary scientific knowledge. It does this, in part, by

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1 The idea of process philosophy has roots that extend back to the thought of Heraclitus. Its recent form is usually attributed to the work of Alfred North Whitehead. Whitehead’s philosophy continues to be developed by the Centre for Process Studies, www.ctr4process.org.
suggesting that the natural world is best understood as being constituted by processes and events, rather than discrete objects that respond solely to external forces. It is this notion, the foregrounding of events rather than objects, that is the key philosophical foundation of the current project.

Panexperientialism is one of a cluster of theories which fit within and support a postmodern framework. This postmodern position is often described as constructive or reconstructive postmodernism. The term ‘constructive’ is favoured by David Ray Griffin and others who are developing the ideas of process philosophy to create a synthesis across different fields of knowledge, especially science, art and spirituality. Suzi Gablik, in her criticism of modernist art, favours the term ‘reconstructive.’ She uses it in an artistic context to oppose the self-referential emptiness of much deconstructive postmodern art. I shall therefore use the term reconstructive to describe the type of postmodernism that is supportive of this thesis which refers to contemporary art practice. Reconstructive postmodernism is similar to the ecological model which has been defined by Charlene Spretnak, and both models refer to an understanding of nature that foregrounds the idea of process and interrelationship. The key factor that is central to the current creative practice is that both of these two highlight the notion of interacting events.

Chapter three outlines the relationship of photographic and ecological art to a reconstructive postmodern position. The first section of this chapter reconsiders how a number of artists, in the late 1960s, were influenced by ecological issues. Such artists were also concerned to move away from a modernist idea of art that was perceived to be removed from social considerations. The majority of ecological works, that they created, tended to be large scale or site-specific interactions in an external environment. This work, which is not primarily image based, is often represented in galleries through photographic images. It is argued that this work, which was generally concerned with processes or events, was significantly changed when it was re-presented in a photographic form. The use of photography by such artists is then contrasted with the ‘deconstructive’ uses of photography which were prevalent at the same time. Although the deconstructive form of practice sets out to undermine the

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4 This form of postmodernism, is the subject of a series of publications edited by David Ray Griffin, published by the State University of New York Press (SUNY).
5 See, for example, Gablik, S. 1991. The reenchantment of art. London: Thames and Hudson.
modernist premises of originality and uniqueness, there are some significant problems in such uses of photography. In this thesis it is argued that the critical detachment inherent in this form of practice is unsuitable for the representation of reconstructive or ecological ideas. The third section of chapter three presents an alternative to deconstructive postmodern photography. This reconstructive model is apparent in a group of artists who have developed some non-traditional methods of photographic imaging. The creative practice of the current project has been most closely associated with this group of ‘proto-photographic’ artists.

The fourth chapter identifies two critical concepts that will be used in the analysis of the artefacts under discussion. These tools are the concepts ‘icon’ and ‘index’ which were devised by the American philosopher, Charles Sanders Peirce (1839-1914), as part of his study of signs. Although Peirce originally defined these terms in the nineteenth century their usage has been developed in the last quarter of the twentieth century with the expansion of semiotics. Their revival has been particularly apparent in some postmodern criticism of photography. However, in this area of criticism there has been a lack of consistency in the application of the terms icon and index. One of the contributions of this research project is to clarify and reassess how these concepts can be deployed in the interpretation of photo-based images within a postmodern context. This clarification in usage, and the assertion about the different type of images they refer to, is subsequently used in the evaluation of the art work under discussion.

Chapter five compares the artefacts of the proto-photographic group with the bioglyphs of this project. Utilising the critical tools identified in the previous chapter, the majority of images created by this group are shown to be primarily iconic. In contrast to this bioglyphs are shown to be primarily indexical and therefore quite distinct from proto-photographic images. A second key outcome of this research project is to suggest that bioglyphs should be re-categorised within the context of other indexical art rather than photographic images.

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10 Please refer to separately bound section containing images.
Chapter six discusses a number of artists who have all, at some stage in their work, employed indexical methods to generate images. Although these artists have not previously been linked together there is a consistent theme running through this area of their practice. This theme is the common use of radically indexical methods to represent nature through its events. The ideas represented, and the methods employed, in the work of this group provide a more suitable framework for the interpretation of bioglyphs than a categorisation based on photographic means of production. A third key outcome of this project is therefore that this indexical group of artefacts provides a more appropriate context within which to position bioglyphs than the proto-photographic group defined in chapter three.

Finally, the realignment of bioglyphs with other indexical art proposes a new interpretation of some existing work and thereby suggests a new category of art. This category embodies the representation of nature through its events rather than its objects. By analysing this particular quality of indexicality the current thesis also offers a critique of the methods that can be used for generating images that contribute to the concept of reconstructive postmodern art.
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Research through creative practice

This chapter outlines the idea of research through creative practice. The idea of undertaking a PhD through visual art is still relatively new. Consequently there has been considerable debate as to what actually constitutes a PhD through practice, and what is the method by which knowledge is advanced through art. Drawing on the notion of 'aletheia,' art is shown to provide a form of knowledge. It is argued that aspects of the world can be revealed through artefacts. This chapter continues by exploring models for the different forms of art research. These are classified as research in art, research for art and research through art. The current project is defined as falling into the last category of research through art.

Section I: Art and knowledge

The contribution that the visual arts can make to knowledge has been a key topic of discussion at recent conferences. Many of the debates have centred around an apparent conflict between the different ways that practice and theory advance knowledge. Although it has been possible for students to undertake research through creative practice for a number of years, there are still relatively few examples of doctoral research that are presented primarily through visual artefacts, as opposed to the written thesis. There remains, within the formal structure of academic research in art and design, a tendency to give more weight to written texts than to artistic practice. However the idea of allowing artefacts to be included in the thesis has led an increasing number of university research departments, to rewrite their doctoral regulations. In addition to making an original contribution to knowledge the University of Hertfordshire’s regulations now allow for the interpretation of knowledge. As a result of this growing interest in practice-led research it is becoming increasingly common for the exhibition of visual art to be a significant part of the doctoral examination.

With the incorporation of artefacts into the PhD thesis the question arises of how the artefacts carry or convey knowledge. A view could be taken that equates artworks to field work or experiments from other disciplines. However the finished work of art does not so

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1 For example the conferences organised by the University of Hertfordshire, Research into practice, 7 July 2000 and the University of Plymouth, The relationship of making to writing, 10-11 September 1998.
easily compare with these activities but is better understood as embodying meaning and knowledge in its own right. Benedetto Croce suggested that art embodied a type of knowledge that he referred to as ‘intuitive.’ In contrast to this he defined the more scientific form of knowledge as ‘logical.’ Although the knowledge embodied by visual art may well take a different form to that expressed through a written text, Croce is in no doubt that the artist composes a meaning which an audience attempts to uncover or unravel. This does not imply that such meaning is fixed or singular, but that meanings are drawn out of the artefacts through a process of interrogation and interpretation.

The idea that a work of art may embody knowledge has also been explored by Norman Peterson in his thesis on photography. In this he argued that the most significant works of art do not simply illuminate or map a predetermined world, but provide a genuine form of knowledge or truth through the process of revelation. His model draws on the thought of Martin Heidegger who, in turn, drew the concept of aletheia from ancient Greek philosophy. The term aletheia refers to the notion of ‘unconcealment’ or the ‘uncovering of beings.

The aletheic model suggests that our concepts and works, which need not necessarily be verbal, can disclose or reveal aspects of the world to us. Peterson in discussing the means by which art discloses the being of the world suggests that:

According to the concept of artistic revelation the artist provides in the work of art a vehicle for the exhibition of the unnoticed, the unknown, or the unimagined. Something unprecedented or unusual is displayed in the work of art. Through revelation human experience is not only communicated or expressed but in some way is enriched or expanded.

His work on photographic art highlights the way in which photographs disclose aspects of the world that were not previously noticed or apparent.

The concept of aletheia, and its relationship to knowledge, has more recently been explored within the context of academic research by Clive Cazeaux. He also maintains that artefacts

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do not simply define or represent a pre-existing world but also reveal or disclose aspects of the world that would otherwise remain hidden.

The metaphor of ‘purchase,’ I think, best characterises the aletheic view of the concept. In applying concepts to experience, we are trying ‘to get to grips with the world.’ When describing something in a way which unwittingly and inadvertently brings to light a new seam of associations, as with discovery in science, then we know we are bumping up against reality. The forms which rise, grow and stand-out are our hand- and foot-holds on the world.

Artefacts, which bring forth previously unnoticed or unknown aspects of the world, provide new insights which help to shape our perceptions and experience. Cazeaux argues that art provides a ‘purchase’ which allows us ‘to get to grips with the world.’ In providing a purchase art offers novel ways of perceiving and understanding both the objects in the world and the events through which these objects interact and connect. Art thus provides a form of knowledge which gives us a renewed ‘purchase on reality.’

A similar line of thought was pursued by Nelson Goodman who asserted that artistic images participate in the ‘formation and characterisation’ of the world by interacting with ‘each other and with perception and knowledge.’

In representation, the artist must make use of old habits when he wants to elicit novel objects and connections. If his picture is recognised as almost but not quite referring to the commonplace furniture of the everyday world, or if it calls for and yet resists assignment to a usual kind of picture, it may bring out neglected likenesses and differences, force unaccustomed associations, and in some measure remake our world. And if the point of the picture is not only successfully made but is also well-taken, if the realignments it directly and indirectly effects are interesting and important, the picture – like a crucial experiment – makes a genuine contribution to knowledge.

According to this line of thought the act of creating a picture need not simply depict or represent, in a different form, that which is already known. Instead, the work of art can actually help to shape that knowing. The artefact is therefore not a passive portrayal of the world but actively contributes to the process of classification and sorting. As Goodman underlines, ‘the making of a picture commonly participates in making what is to be pictured.’ Our knowledge of objects and events is shaped by our representations of them. This point, that our representations help us shape the world, is an important one. In differentiating between representation and expression Goodman offers a distinction:

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7 Ibid. 30.
8 Ibid. 30.
10 Ibid. 33.
11 Ibid. 31-32.
One tentative characteristic difference, then, between representation and expression is
that representation is of objects or events, while expression is of feelings or other
properties.\footnote{12}

In creating this distinction between representation and expression, Goodman suggests that
the former refers to, or denotes, either objects or events. It is the ability of visual
representations to refer to either objects or events that is central to this thesis and one that
will be returned to.

According to the theoretical position outlined above, the work of art can make a significant
contribution to knowledge. This raises the question of how the route from art to
knowledge might best be accommodated by the formal requirements of doctoral research.

Section II: Research through practice

The production of art can be seen to require a level of ‘research.’ New materials and
processes are constantly being developed to resolve technical or aesthetic problems.
Similarly, an artist will generally undertake some type of enquiry into the subject matter being
represented and the work of peers. There are, arguably, examples of these types of research
from all artistic periods. However, the creation of art designed explicitly to advance
knowledge at doctoral level is a relatively new form of activity. The small number of
established examples in this area of academic research has led to a variety of different
opinions about what qualifies.

Some recent conferences on the subject have generated much discussion and some
disagreement about the balance between written texts and visual artefacts.\footnote{13} The
disagreement is largely the result of having relatively few completed projects to refer to when
discussing methodologies. However there is, amongst the universities, an acknowledgement
that doctoral research involves ‘a systematic enquiry whose goal is communicable
knowledge.’\footnote{14} Whilst this remains a very general definition for all types of research, it does
serve as a useful starting point for discussion on research through creative practice. It also
helps to differentiate between creative practices that are undertaken as research from those
that pursue different objectives, such as social or commercial ones.

\footnotetext[12]{Ibid. 46.}
\footnotetext[13]{The conference organised by the University of Plymouth (10-11 September 1998), entitled, The
relationship of making to writing dealt explicitly with this subject.}
\footnotetext[14]{Bruce Archer, cited by Frayling, C. 1996. Nourishing the Academy. In Drawing Fire. No.3. 16-22.}
Professor Christopher Frayling, in a research paper for the Royal College of Art, offers some thoughts on what can be considered as research within art practice. In this paper he expanded on his understanding of research by adapting Herbert Read’s concept in Education through Art. Frayling’s paper divides art and design research into three categories. These are research through art, research for art and research into art. Despite the inevitable overlap between these three categories they do highlight some distinct differences between types of research.

Research into art is the most established and still the most common type of work being undertaken at doctorate level. There are many precedents for this type of scholarly work which looks closely at some specific area of art practice. Such research, which is often historical, usually employs a method of critical investigation to evaluate and interpret a specific body of art and its signification. Frayling lists three main categories of this type of research:

- Historical research
- Aesthetic or perceptual research
- Research into a variety of theoretical perspectives on art and design - social, economic, political, ethical, cultural, iconographic, technical, material, structural...

The researcher is unlikely to also be the artist who generated the work in question. The theoretical perspective taken is generally from a position external to the work being investigated. By reflecting on existing art from outside of the art-making process, the researcher is able to take a more objective view. In this case the researcher is not using art to generate knowledge but is using art as a subject about which knowledge is generated. This knowledge gains in significance partly because of the presumed detachment employed in its generation. A similar methodology can be found in many other disciplines including, anthropology, history, psychology, sociology, etc. Here the key point is that the knowledge gained is in histories or interpretations of them. There are many precedents for this type of study where the outcome or resulting piece of work takes the form of a written thesis. The ‘original contribution to knowledge,’ essential for the qualification of PhD, is argued primarily through the text.

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16 Read, H. 1943. Education through art. London: Faber and Faber.
The second category, of research for art, is more contested. This category does not, in Frayling’s view, qualify for doctoral research. In the three years that passed from his original paper to his interview in Drawing Fire, Frayling has changed the term used to distinguish this category from research for art to research as art. This shift in emphasis is likely to be due to the rapid pace of discussion and a number of papers claiming that making art is, in itself, a process of research. Whichever term is chosen matters little, since both refer to the idea that the outcomes of the research are, in some way, embodied entirely in the artefacts. The research is likely to involve the gathering and testing of ideas, materials and techniques required to make the artefacts. Whilst research of this type is vital to the production of some original artworks, it does not necessarily imply that the artefact makes an ‘original contribution to knowledge’.

In this second category the artist, who is the researcher, is operating almost entirely within the field of interest. The artefacts are unlikely to be interpreted from an external, objective position. As a result the category of research as art does not qualify for PhD status in the majority of universities. Artistic originality alone is insufficient to meet the criteria for doctoral research, there must also be communicable knowledge. Original art may lack explicit transferability to the work of other researchers which is also a defining characteristic of research.

This leads on to Frayling’s third category, research through art. This category opens up doctoral research for the creative disciplines and is an area arousing great interest and debate in academe. Despite the growth in practice-led research there are still relatively few completed PhDs to serve as models and provide guidelines for methodology. Frayling distinguishes research through practice as the taking of something outside of the art and translating it through the artistic medium. Such work, which will often be interdisciplinary could range from an idea or concept to a new material or process. In this case the researcher will be engaged in making work within a field of interest as well as reflecting on it and contextualising it. This reflective method engenders a viewpoint that is both internal and external to the subject of the research.

There are a number of precedents for this method in the practice of fine art. In the interview conducted by Drawing Fire Frayling refers to the work of Bridget Riley as an

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19 Artefacts used in this context could refer to performances and concepts as well as actual objects.
example of this type of research. Her ‘Op-art’ paintings of the 1950s and 60s were created, in part, through reflection on the new ideas concerning perception which were emerging from scientific research at that time. He also cites the artistic work of John Ruskin who used a reflective approach to his drawings in the landscape in order to further his studies in geology. It is this type of art that reflects upon, and adds to, a knowledge outside of the actual practice that Frayling considers to be the best method for conducting research through a creative practice. In these examples the new knowledge is generated by a combination of artefacts and reflection that they engender. It is the combination of artwork and reflection that gives us, to use Cazeaux’s phrase, ‘a purchase on reality’. In this type of research the ‘original contribution’ of the thesis will be contained in the nexus between written text and artefacts.

Research through practice is also explored in the collection of papers prepared by Darren Newbury of the Birmingham Institute of Art and Design. The RTI guide no.3 suggests that, ‘the research problems generated by art and design practice are likely to demand an open and creative approach to research methodology.’

Although the RTI paper suggests that there are many, often conflicting, theories of knowledge which hinder the rationalisation of methodologies it does point to four, key criteria essential for all doctoral research. Research through creative practice, in common with other doctoral research, should be:

- Systematic
- Rigorous
- Critical and reflective
- Communicable

Although there are other criteria that are often used in the criticism of fine art, such as ‘expressive’ or ‘aesthetic’ criteria, these four terms provide more measurable benchmarks by which the research of an art project might be judged. This is in keeping with both undergraduate and postgraduate art and design education which frequently uses variations of these four criteria for the assessment of student work.

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23 Ibid. 8-9.
Summary

The current project of practice-led research draws on the model of aletheia. This suggests that art and its interpretation can provide a form of knowledge which advances thought about the objects and events of the world. Such art does not simply illustrate a set of ideas from a different discipline but translates them from one form of expression to another giving access to a rich vein of experience. Art can therefore give the interpreter an increased purchase on reality.

Section II described three categories of art-based research. It identified that the current practice-led project falls into the category of research through art. This project draws on ideas outside of the art-making which are then reflected in the creation of the artefacts. It is intended that the findings of the current research, which reflect on an area of knowledge beyond the merely artistic, should communicate between disciplines. The next chapter outlines the reconstructive postmodern interpretation of nature that informs the current project.
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Reconstructive postmodern science

This chapter outlines the understanding of nature that informs the current project. It describes how a set of theories that took hold during the Enlightenment created a particular worldview that have arguably dominated Western scientific thought. This set of theories, in particular the notion of 'mechanism,' is shown to be inadequate for a contemporary interpretation of nature. In contrast to this framework a number of alternative models have emerged. These organistic or process philosophies present a model which is more consistent with contemporary scientific knowledge. Finally the chapter describes a key feature of process philosophy. This is the idea that nature, rather than consisting of objects, is more accurately described as being constituted by events.

Section I: The disenchantment of nature

The notion of a disenchanted nature has expanded from a scientific premise into a view that permeates much of contemporary Western culture. The phrase, die Entzauberung der Welt, was coined by the sociologist Max Weber (1864-1920) who used it to refer to the gradual removal of mind, or spirit, from the natural world. Prior to this the poet Friedrich Schiller (1759-1805) had devised a similar phrase, die Entgötterung der Natur, to describe what he perceived as the gradual removal of spirit or divinity from nature. The concept of disenchantment has been most thoroughly explored, in recent times, by Morris Berman. His study offers a critique of the way the world has become disenchanted and also offers some proposals for its reenchantment.

A disenchanted world is one in which the fundamental entities of nature are taken to be objects that are devoid of all internal experience. It is a view that ‘recognises no element of mind in the so-called inert objects that surround us.’ The disenchantment of nature refers to the idea that all objects, living and non-living, are defined as being constituted of smaller entities which, in turn, are totally devoid of any sense of purpose or internal action.

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2 These two examples are cited by Berman, M. 1981. The reenchantment of the world. New York: Cornell University Press. 69.
3 Ibid. 69.
This view was arguably in direct opposition to a pre-Enlightenment understanding of nature. The disenchanted view undermined ‘animistic’ notions in which nature was, quite literally, animated by spirits and deities. In early forms of animism both animate and inanimate objects were presumed to possess perception, experience and self-determination. The disenchanted view challenged animism by arguing that there was no evidence of internal experience in inanimate objects such as rocks and minerals. It also claimed that even animate objects, such as humans and animals, consisted of smaller, inert objects that similarly possessed no experience or purposeful activity.

Berman claims that the process of disenchantment was directly linked to the birth of Western consciousness. The concept rapidly gained momentum with the development of science in the seventeenth century. He suggests that the project of rationalist philosophy, that is associated with the French philosopher and mathematician, René Descartes (1596-1650) significantly advanced this view. Rationalist philosophy, which emphasised an epistemology based upon observation and reason, forced a distinction between two basic substances, mind and matter. In separating mental activity from mere matter, Rationalist philosophy assumed that the basic units of nature had to be understood from an entirely objective point of view. Such objectivity led to the dismissal of the idea that individual units of nature, such as an atom or a tree, could act purposefully. The Cartesian approach found no evidence that these objects had consciousness or experience; nor did it assume there would be any benefit in attributing such qualities to objects. The reduction of the natural world to ever simpler objects that were devoid of subjectivity thus made the Aristotelian notion of purpose unnecessary.

The Cartesian hypothesis assumed that the entities of the world should be considered as discrete substances or objects. In order to do this the assumption is made that such objects can be separated from the flow of time in which they are enmeshed. In making such an assumption this philosophy suggested that things could be understood independently from their environment or context. This idea was deemed important to a scientific method that was concerned with prediction. It was important that scientific findings could be applied regardless of the place or time. This emphasis on separable things that could be understood

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4 Ibid. 343.
5 Ibid. 70.
6 Descartes mechanistic philosophy is outlined in his Principles of Philosophy (1644).
7 Reductionism takes this further by suggesting that objects can be reduced into further discrete objects, and that the whole system can be understood from a study of its parts.
in isolation strengthened ‘the ideal commitment to the objective and the object.’ It reinforced the idea that the workings of the universe were machine-like and were not influenced by the subjective or internal mind. It is an approach that removes objects from the fluxion of the world and the events in which they participate.

The technological advances made possible by an objective science have undoubtedly offered benefits to humanity. Many developments made since the period of the Enlightenment have indeed been a direct result of this philosophical framework. As a result of technological success, across a range of applications, the mechanistic view is seen by many to be essential to our understanding of nature and applicable to all branches of science. The French biologist, Jacques Monod, states that,

The cornerstone of the scientific method is the postulate that nature is objective. In other words, the systematic denial that ‘true’ knowledge can be got at by interpreting phenomena in terms of final causes - that is to say, of ‘purpose’... The postulate of objectivity is consubstantial with science... There is no way to be rid of it, even tentatively or in a limited area, without departing from the domain of science itself.

Although Monod acknowledges that the objectivist approach does not accommodate the notions of experience and value he insists that we must accept it because the animist notion of purpose in nature is ‘fundamentally hostile to science.’

However, this denial of the organism in favour of mechanism, which is thoroughly counterintuitive, became institutionalised into a worldview about the way things actually are. According to David Ray Griffin the disenchanted, mechanistic view of nature was not based on empirical evidence but led by social and political objectives and the desire for technological control; the new metaphysical idea was that the ultimate units of nature are completely devoid of both experience and self-motion. And this metaphysical idea, rather than being derived from empirical evidence, as propaganda would have it, was based primarily upon theological and sociological motives. It was used, for example, to support belief in God, miracles, and immortality, and to justify the exploitation of (nonhuman) nature.

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10 Ibid. 171-173.
One of the core assumptions of the mechanistic model was that mind was in some way separate from the physical stuff of the universe. However this philosophy, known as Cartesian dualism, has arguably generated a number of serious contradictions. In creating a division between mind and matter, Descartes generated the ‘mind-body problem,’ which is still one of the major philosophical issues. There are a number of aspects to the mind-body problem which a mechanistic model is unable to solve. For example, the separation of the mind from the physical body poses the question of how these two different types of entity are able to interact or influence each other. There seems no way for such distinct entities to interact. This problem was side-stepped by a number of supernaturalistic theists, including Descartes himself, who simply suggested that an omnipotent God could achieve that which we could not understand. Since this argument is no longer generally held, the problem remains.

Another major problem in assuming that matter is distinct from mind relates to the point at which mind emerges in the living world. Descartes drew a line dividing the human soul from the rest of nature. However with the acceptance of evolutionary theory, and the explanation of our biological development, it became harder to maintain the belief that mind only resides in humans and does not feature anywhere else in nature. The notion that a dog or a chimpanzee is simply an animated machine seems, to contemporary thought, a preposterous and arbitrary idea. The assumption that sentience comes with the development of the central nervous system or any other particular organ is equally arbitrary. There is, in contemporary biology, no agreed point at which experience and self motivation emerge. This raises the question of where to draw the line between that which is sentient and that which is not.

Equally perplexing is the distinction between living and nonliving matter. These have become harder to distinguish as the tools have been developed for investigating the natural world more and more closely. Although it is presumed that there is a distinction between the biological and the purely chemical, any distinction between these two sciences on the grounds of living and non-living remains arbitrary. Evolutionary theory remains unable to define at what point mind appears in nature or to suggest a method by which it emerges from inanimate chemicals. Despite the rapid growth of theoretical biology the mind-body problem remains unsolved.

Whilst objectivism provides a successful model in those fields of science where mechanical forces predominate, it has a limited range of applicability. A philosophy founded on mechanistic principles breaks down when a complex system is studied. The notion of unpredictability has re-emerged in contemporary science and, at a fundamental level, the universe can no longer be assumed to operate as though it were a machine. As Charles Jencks has observed:

... mechanistic things like the two-body experiment of the sun and earth's rotation, and ballistics, can be explained by linear equations, the rest of nature cannot.14

A universe that operates as though it were a machine implies a form of determinism. The problem arises because a complex system, such as an animal, exhibits a level of internal experience and decision making. Here experience and decision clearly play a prominent role in the behaviour studied. These activities, which are essentially internal, do not conform to a deterministic interpretation that is implied by mechanistic philosophy. The mechanistic model has thus met with little success in many aspects of the biological sciences. It is therefore an inadequate philosophy for explaining the behaviour of living systems.

In claiming that the activities of discrete objects can be understood solely through the external forces that act upon them, such a philosophy suggests that these objects have no internal purpose or self-motivation. A disenchanted, mechanistic model removes the role of experience, decision and creativity from the natural world. Following the disenchanted view towards its conclusion results in a world in which there is no place for purpose and meaning. The disenchanted view does not fit with the understanding of an organic world in which we live, that is a physical world in which experience, purpose, decision and creativity all take place. This contradiction is largely ignored or glossed over in contemporary Western societies, perhaps because of the material benefits supplied by a mechanistic technology and the freedom from individual responsibility that this model implies.

It could be argued that these contradictions, that stem from a particular method of science devised nearly four hundred years ago, are no longer relevant in some aspects of a postmodern culture. This could well be true if mechanistic science was no longer practised or was confined to those areas in which a disenchanted model is sufficient. However the mechanistic model, which set out to overturn an organic worldview, is still the dominant model in the natural sciences. The disenchantment engendered by modern science informs the contemporary model of life in biology which is, even today, strictly mechanistic and

Lewis Mumford, a critic of technology, affirms that the mechanistic view has traded the:

... totality of human experience... for that minute portion which can be observed within a limited timespan and interpreted in terms of mass and motion.

As well as providing the framework for our interpretation of the natural world, the notion of mechanism also permeates many of our social, political and cultural structures. Rupert Sheldrake suggests that:

We are all influenced by mechanistic habits of thought that shape our lives, usually unconsciously...

... Through the successes of technology, the mechanistic theory of nature is now triumphant on a global scale; it is built into the official orthodoxy of economic progress. It has become a kind of religion. And it has led us to our present crisis.

It could also be argued that the benefits gained from the application of a mechanistic method outweighs the inherent philosophical contradictions. However the problems that arise as a direct result of this model are increasingly implicated in our environmental and social situations. With varying degrees of emphasis the majority of ecological thinkers argue that the mechanistic misconception of the world has had disastrous consequences. By separating us, as experiencing subjects, from our physical bodies and from the rest of nature, it is a view that has laid the groundwork for a disintegrated relationship between humanity and the non-human world. Our current ecological crisis is attributed by many to a technology based on this philosophy. In losing sight of 'the significance of nature and the nature of significance' the founders of modern science created a philosophy that has precipitated an ecological crisis. As a result of these consequences many, within the field of science itself, are now questioning the core assumptions of this paradigm and are working towards a genuinely postmodern view of nature.

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Section II: The reenchantment of nature

In contrast to the disenchantment engendered by a knowledge founded on mechanistic assumptions there are a number of scientific models emerging which propose a radically different set of assumptions. These theories attempt to formulate an understanding of nature which eradicates some of the philosophical problems caused by a disenchanted worldview. The general thrust of these theoretical positions is to create a reenchanted view of nature. There are a number of significant advantages to a reenchanted model. Firstly, it does not generate philosophical problems by separating out mind and matter as two distinct types of substance. Instead the reenchanted model brings the two together by defining mind and matter as two attributes of the same basic stuff. Secondly, reenchantment is more supportive of current ecological and environmental thinking. Thirdly it provides a model that is more adequate to our lived experience. For example, the organic constituents of the world do not behave as if they are machines incapable of growth and evolution.

Reenchantment does not make a retrogressive step by reverting to a pre-modern form of animism, nor does it reject the benefits that a modern science has been able to deliver. Instead it involves a critical revision of both modern and pre-modern thought and seeks to develop a constructive postmodern paradigm. The postmodern, reenchanted view of nature suggests that a mechanistic science, which is entirely adequate for a machine-based technology, should not be applied universally in the study of the world.

The most coherent argument for a reenchanted view of nature has been proposed by a group of thinkers who have contributed to the project known as ‘Constructive Postmodernism’. This project, which is largely based in America, draws heavily upon the Process Philosophies of Alfred North Whitehead and Charles Hartshorne. David Ray Griffin, in particular, has developed the notion of a ‘postmodern organicism’ which, for him, offers the most promising route to a reenchanted interpretation of nature.

22 For example the physicists David Bohm and Henry Stapp have both developed ideas around the concept of enfoldment. Bohm in his notion of the ‘implicate order’ postulates that each enduring thing is not separate from each other but is enfolded within each other. See Bohm, D. 1980. Wholeness and the implicate order. London: Routledge. Stapp similarly regards each event as a process of enfoldment where each event enfolds previous events within itself. See Stapp, H. Einstein time and process time. In Physics and the ultimate significance of time. Bohn, Prigogine, and process philosophy Edited by D. R. Griffin. New York: SUNY Press.
23 The term ‘constructive’ is used to distinguish this form of postmodernism from the deconstructive form. See Griffin, D.R. 1993. Constructive postmodern philosophy. In Founders of constructive postmodern philosophy. Edited by Griffin, D.R. New York: SUNY Press. 1-42.
Whereas modern science has led to the disenchantment of the world and itself, a number of factors today are converging toward a postmodern organicism in which science and the world are reenchanted. Besides providing a basis for overcoming the distinctive problems of modernity that are due primarily to disenchantment, this postmodern organicism gives science a better basis than it has heretofore had for understanding its own unity.\[24\]

Postmodern organicism holds that ‘all primary individuals are organisms who exercise at least some iota of purposive causation.’ \[25\] David Ray Griffin has developed the philosophy of organicism, and refers to it as panexperientialism. Panexperientialism differs from a mechanistic philosophy in a number of ways. Perhaps the most significant is in the terms it uses to describe the basic units of nature. The mechanistic model assumes that nature can be understood by separating it into basic units or objects, and crediting these with no internal experience or self-movement (see previous section). The model of panexperientialism is diametrically opposed to this position. Instead of assuming that the basic units of nature are objects that are devoid of any internal experience it starts with the hypothesis that nature is, at a fundamental level, comprised of ‘creative, experiential events.’ This phrase, with its three important components, highlights how a panexperientalist interpretation of nature radically differs from a mechanistic one.

For the purposes of the current project, the term ‘events’ is the most significant and will therefore be considered first. In contrast to the idea of separable objects, the concept of events highlights another way of referring to the entities of the world. Panexperientialism points out that the term ‘objects’ reflects a particular way of viewing the world that abstracts things from the flow of time. In describing the world as fundamentally consisting of events, panexperientialism highlights the concept that everything is related to this flux. This view is supported by those aspects of modern physics that show how space and time are inextricably linked in a space-time continuum. Similarly, as Hartshorne points out, sub-atomic physics shows that the ultimate particles of nature can no longer be interpreted as enduring substances or particles. Instead, the basic entities of nature can be more coherently interpreted as a complex of events that unfold through time. The removal of time from a study of nature is thus an abstraction that limits our understanding, and hinders a coherent knowledge. This notion of process, which is an important principle in the philosophies of both Whitehead and Hartshorne, is central to the panexperientialism of Griffin;

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Each enduring thing, such as an electron, an atom, a cell, or a psyche, is a temporal society, comprised of a series of momentary events, each of which incorporates the previous events of that enduring individual. Cobb elaborates on this by focusing on the events, or activities, of nature rather than separate entities. He claims that the entities of nature cannot be considered in separation from their events, or activities. He suggests that it is a mistake to refer to nature as consisting of substances that act upon other substances:

To think of an agent that acts is to move back to the idea of substance. The agent would have to exist first apart from the activity and to be essentially unaffected by the activity. There is no evidence of such agents in nature. The activity itself constitutes nature.

In the panexperiential interpretation the ultimate units of nature are described as being ‘something for themselves in the sense of having experience, however slight.’ This is not to suggest that all things are conscious of themselves as individual entities but that there is a degree of internal experience in all things. Although ‘thinking,’ as we experience it, may occur only in more highly evolved animals it seems that internal experience of some sort may be regarded as taking place in much lower, or less evolved forms of life. Donald Griffin is amongst a number of scientists to suggest that, in order to understand the behaviour of both bats and bees, the notions of memory and internal imaging seem necessary. Although these parts of the natural world will experience differently, the panexperientialist view claims that these differences are more a matter of degree that type. Whilst it is easier to accept the idea of thought within a mammal than an insect there is no reason to believe that the former makes decisions whereas the latter does not. The science of biology continues to extend downwards its search for the lowest organism that exhibits some degree of experience.

There is evidence that this notion can be extended all the way down to the earliest and simplest forms of life. According to some contemporary research there appears to be a rudimentary form of ‘memory’ and ‘decision’ in bacteria.

The panexperientialist theory however extends the concept of experience beyond what we would currently consider as living organisms. It assumes that even less complex entities, such as molecules and atoms have some degree of experience. As the Australian biologist, Charles Birch states,

The idea of internal relations is that a human being, let us say, is not the same person independent of his or her environment. The human being is a subject and not simply an object pushed around by external relations. To be a subject is to be responsive, to constitute oneself purposefully in response to one's environment. The postmodern view that makes most sense to me is the one that takes human experience as a high-level exemplification of entities in general, be they cells or atoms or electrons. All are subjects. All have internal relations.

The idea that molecules and atoms have some level of internal relations is perhaps the most difficult notion of this philosophy to accept as it is completely contrary to a view that is steeped in mechanism. However, there is no evidence that refutes this aspect of panexperientialism. On the contrary there are a number of reasons in support of this philosophy which offers a coherent understanding of nature. For example, this philosophy has the advantage of eradicating the perceived split between mind and body created by Cartesian dualism. It does this by not accepting that mind and body are two distinct types of entity. Instead it forges these two concepts together by insisting that they are two qualities of the same basic stuff If mind and body are interpreted as two aspects of the same basic stuff then the question of how they interact ceases to be such a problem. The related questions of where and how mind emerges on an evolutionary scale also ceases to be a problem.

The term 'creative,' within the panexperiential context, focuses on one particular aspect of internal experience. It is used to describe the ability of nature's events to respond internally to experiences and make, in human terms, what would be called decisions or choices. It is thus opposed to a view that describes any aspect of nature as behaving in a totally mechanistic or pre-determined way. Although all events are influenced by previous events, no event is completely determined by the past. Griffin makes the point that:

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35 An analogy to this is provided the model for light. Light can manifest itself in the two apparently contradictory ways. Depending on the apparatus used to detect it, light can appear to be either a particle or a wave.
Every event exercises at least some iota of self-determination or self-creation, and then some power to exert creative influence on the future. This use of the word ‘creative,’ in this context, does not segregate between different parts of nature. It does not suggest, for example, that it is only the higher organisms that are capable of making choices and decisions. Whilst it acknowledges that mammals, and humans in particular, exhibit a very high-degree of self-determination it does not claim that such a quality only resides in a specific sector of nature, but is inherent in all of nature’s events.

Although panexperientialism is considerably closer to animism than a mechanistic philosophy, it differs from the pre-Cartesian form of animism. In order to grasp what differentiates this model from earlier forms of animism it is necessary to distinguish between what Hartshorne has termed ‘compound individuals’ and ‘mere aggregates.’ Although others, including Alfred North Whitehead, have distinguished between aggregates and true individuals it was Hartshorne who has explained the distinction most clearly. In this interpretation all the fundamental entities of nature possess some degree of internal experience, although not necessarily self-consciousness. Even subatomic events, the smallest entities detectable, possess internal experience. Such events can be constituted into more complex forms of event. These are compound individuals and mere aggregates. In this model a compound individual, as well as consisting of very many individual, lower level experiences, has a degree of cohering experience – a mind or soul. This enables it to act as a whole and express a unity of feeling or purpose. A compound individual can be ‘high-grade,’ such as an animal or ‘low-grade,’ such as a molecule. In contrast to a compound individual, a mere aggregate has no cohering experience. Although a mere aggregate is fundamentally constituted of subatomic events that individually possess a low level of experience it has no overriding unity of feeling. It is merely a gathering of individual entities that collectively do not possess a unity of feeling or purpose. Mere aggregates are generally constituted from a large number of similar entities that are typically arranged in repetitive or rigid patterns. An example of a mere aggregate is a rock. The highest centres of experience in a rock, according to the theory of panexperientialism, are the molecules of which it consists.

Compound individuals and mere aggregates are two ways in which fundamental events may be grouped together rather than two distinct types of entity. This view is therefore

38 Gottfried Wilhelm Leibniz (1646-1716), the German philosopher and mathematician paved the way for this philosophy with his belief that the ultimate elements of reality are indivisible, mind-like substances called ‘monads’. In his system it was only the dominant monads that could perceive consciously.
different from an early form of animism which would credit all entities, including rocks, with an overriding sense of feeling or purpose.

The theory of panexperientialism is opposed to the notion of distinct objects. Instead it interprets nature as being constituted of events which possess an internal experience and a degree of self-determination. It therefore directly contradicts a mechanistic model which denies much of nature any self-determination or internal experience. In defining nature as being constituted of ‘creative, experiential events,’ the panexperientialist model challenges the disenchanted view of nature and provides a reenchanted interpretation.

Summary

In a modern and postmodern culture there are various interpretations or models of nature. Two of the opposing models have been discussed. Firstly, this chapter considered a mechanistic model, which is largely derived from Cartesian rationalism. Despite being formulated over three centuries ago this model can be seen to inform the contemporary scientific worldview and our understanding of nature. In this model the universe is described in purely objective, mechanistic terms. At a fundamental level this model defines the basic constituents of nature as objects that are devoid of all internal experience, decision and purpose. It separates mind from physical matter. Because of its separation of mind from matter the mechanistic worldview serves to disenchant nature.

An alternative to the disenchanted view of nature is proposed by a group philosophies which have emerged within a constructive postmodern framework. These philosophies do not divide the world into the separate entities of mind and matter. Without resorting to a naïve form of animism, a worldview is proposed in which nature is, at a fundamental level, reanimated, or reenchanted. The process philosophy discussed in this chapter, panexperientialism, provides a coherent interpretation of nature that overcomes many of the problems inherent to a disenchanted model.

The key factor drawn from panexperientialism is that nature is better understood as a series of creative, experiential events rather than discrete objects responding solely to external forces. It is this shift from an understanding based on objects to one based on events that is central to the creative practice of this research. The panexperientialist view of nature, in
particular the prioritising the notion of events over objects, is therefore more appropriate as a worldview for the present enquiry.

The current creative practice, which uses micro-organisms in the production of art (as discussed in Bioglyphs: Images), draws on the panexperientialist interpretation of the world. The proposal of this process philosophy, that the world is primarily constituted of events, is taken as a theoretical model that can be represented through art. This idea provides a theoretical framework that informs both the current practice and the reconstructive postmodern art discussed in chapter three.
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Reconstructive postmodern art

This chapter describes some of the key points about art forms that explore ecological issues and questions. Section one describes how some areas of art practice, that began in the 1960s, incorporated photographic images in the representation of ecological ideas. This coincided with, and contributed to, the increasing acceptance of photography as an appropriate medium for postmodern art practice. Section two looks at how photographic images, since this period, gained significance within postmodern art practice. However, the majority of this critically acclaimed photographic work supports a deconstructive model. It is argued that although photography is a suitable medium for deconstructive art such practice does not support an ecological position and is an unsuitable medium for the reconstructive model. Section three identifies a group of artists who have been using photography to represent an ecological postmodern position. It is within this group of proto-photographic artists that the work of the current project has been categorised.

Section I: Ecological art

Since the 1960s there has been an increasing awareness of ecology and concern for the emerging environmental crisis. A number of artists and critics have responded to this situation by attempting to define the problem and seek artistic methods of tackling it. One of the most vocal critics of art’s imperative to respond has been Suzi Gablik. Much of her writing has been concerned with drawing attention to the failure of mainstream twentieth century art to engage positively with our social and environmental predicament. She contends that the roots of the problem can be traced back through the twentieth century and what she defines as the ‘failure of modernism’.

Modernism so embraced notions of freedom and autonomy - and of art needing to answer only to its own logic, its own laws, the pure aesthetic without a function - that

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2 The examples provided in the work of Alan Sonfist and the partnership of Helen Mayer and Newton Harrison are discussed later in this chapter.
we now have whole generations of artists who doubt that it was ever meant to be organically integrated with society in the first place.4

According to Gablik, the archetypal artist of the modernist period was disengaged from society. Many artists also felt the sense of disempowerment. As a result they were either unwilling or unable to play an active role in shaping that society. Although many twentieth century artists were openly hostile to the contemporary political, social or technological situations, they were generally unable to make a significant impact in these areas. She suggests that the model of the avant-garde artist, who was opposed to society, was self-defeating. By assuming a position outside society the artist became marginalised.5 The ability of art to exert an influence on issues outside its domain was subsequently reduced. Gablik recommends that the adversarial relationship between art and society will need to be revised if the artist is to be able to have a more direct influence on social or environmental issues. She has, on a number of occasions, called for an:

- art that speaks to the power of interconnectedness and establishes bonds,
- art that develops an active and practical dialogue with the environment,
- art that offers more vivid ways of understanding the universe, and thus addresses our culture's failure to grasp what it means to be actively related to the cosmos.6

Gablik links our current ecological crisis with the philosophical tradition of the Enlightenment that was set in place in the mid-seventeenth century (see chapter two). She identifies the 'whole objectifying consciousness of the Enlightenment'7 as being significantly responsible for many of the ecological and environmental problems currently facing the world:

The philosophies of the Cartesian era carried us away from a sense of wholeness by focusing only on individual experience. Ultimately this individualistic focus narrowed our aesthetic perspectives as well, due to its noninteractive, nonrelational, and nonparticipatory orientation.8

She believes that such problems are the direct result of a paradigm that was informed by mechanism, rationalism and materialism.9 These philosophical positions have, in Gablik's view, led directly to the loss of social cohesion and created a culture of consumption that together have precipitated ecological destruction.10

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4 Ibid. 119.
5 Ibid. 20-35.
8 Ibid. 7.
9 Ibid. 11.
10 Ibid. 3.
The notion of participatory ecological art has been explored by Suzi Gablik throughout her writings. The specific question of how the non-human world is represented is raised in her conversation with Christopher Manes. Manes reiterates that the ecological crisis is intimately linked with the way that the non-human world is prejudicially represented. He suggests that humanity is separated out from other organisms on the assumption that:

Only we have language, only we are subjects. The rest of the world is a universe of “not-saids” called nature...  

He suggests that our art often serves to separate us from the rest of nature which is represented as a ‘silent other’. Nature becomes the object of representation rather than an active participant in the process. Manes goes on to suggest that artists have a vital role in relocating humanity back into the realm of biological communities. As a way of healing this rift between humanity and the rest of nature he suggests that new forms of ecological representation should be devised that give a voice to the non-human. He believes we need to change the subject from the ‘homocentric fiction’ and generate images of the ‘other kingdom’.

Although such forms of representation characterise much pre-historic and non-Western art it was not a major concern for the majority of Western artists associated with the period of modernism. It was not until the late 1960s that an art which supported an ecological view of nature was first developed. This was a period when interest and concern for ecological issues significantly increased. Ecological artists have attempted to address some of the most pressing environmental issues in their work. Many have defined themselves explicitly in terms of social relatedness and ecological healing.

During the 1960s a number of artistic movements sprang up which moved away from focusing on the art object. The critic Dieter Ronte observes this affinity between a number of art movements that sprang up at the time:

... such movements as Art Informel, Fluxus, Land Art, Art Povera and so on, have been characterised by the sensation of the irretrievable loss of the natural world. A result of this is that a new, open artistic canon no longer seeks to elaborate models of the world that merely contemplate the object.
In shifting the focus away from finished objects these art forms generally stressed the idea of process. The notion of process has, as Barbara Matilsky has pointed out, been key to ecological art. Artists creating this type of work, which utilised processes and natural phenomena, were less interested in the formal appearance of their materials than how their materials behaved under environmental conditions. In their work the emphasis was shifted from the finished product to natural acts and events. This shift in emphasis was explored in the writings of Gyorgy Kepes which frequently drew connections between art and ecology:

These artistic attempts signify a fundamental reorientation. The dominant matrix of nineteenth-century attitudes was the use of Marx's term 'reification;' relationships were interpreted in terms of things, objects or commodity values. Today a reversal of this attitude has begun to appear; there is a steadily increasing movement in science and in art towards processes and systems that dematerialise the object world... Artists have liberated their images and forms from the inhibiting world of object... Through the innovations of a number of contemporary architects and engineers, buildings are also losing their object solidity and opacity to become light and transparent, 'thingless' events.

By working with natural processes and activities, and locating these within their environment or ecological context, artists from this period began to represent nature through its set of relations rather than its objects or appearances. Such art was less concerned with producing an artistic object than with revealing the underlying forces at play in nature. This type of direct engagement with the natural world is one aspect that the majority of ecological art works have in common. It is an art that is concerned with working alongside natural events and phenomena. Rather than simply using nature as a source of materials this art participates with natural processes and represents the natural world through its network of interactions. It is fully in keeping with the scholar John Cobb's description of ecological interdependence:

A very simple idea impressed on us by ecology is that things cannot be abstracted from relations to other things. They may be moved from a natural set of relations to an artificial one, such as in a laboratory, but when these relations are changed, the things themselves are changed. The effort to study things in abstraction from their relations is based on a misunderstanding. This misunderstanding is that things exist as independent entities and only incidentally are related to one another.

In foregrounding interconnections and relationships, rather than individual entities or objects ecological art aligns itself with the reenchanted model of nature outlined in chapter two. It

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supports the idea that the natural world is more accurately described as a dynamic and complex web of interacting events, than as one that consists of discrete, individuated objects.

Amongst the earliest examples of this type of ecological art was the work of Alan Sonfist. As well as producing a number of works and proposals, he was responsible for editing one of the key texts on the subject. The majority of his early works re-present natural processes with minimal intervention. His main concern was to exhibit nature largely as he found it rather than radically alter it. This is reflected in a statement from 1971, which describes his working method:

My art presents nature. I isolate certain aspects of nature to gain emphasis, to make clear its power to affect us, to give the viewer an awareness that can be translated into a total unravelling of the cosmos.

An example of his work that incorporated and re-presented natural events was an early series entitled, *Ageing Canvases* (1967-68). These recorded the growth of mildew over stretched canvases that were primed with water. The canvas provided both the support and nutrient for micro-organic fungi which are naturally present in the air. The mildew slowly grew to create abstract images. These works, in which the mould stands in for paint, derive their aesthetic form from natural phenomena.

Another of Sonfist’s works which discloses the workings of nature is his *Abandoned Animal Hole* (1971). This sculpture is simply a plaster cast of an abandoned hole left by a burrowing animal. It has been described by Jeffrey Wechsler as, ‘... a natural wonder of engineering brought to light.’ *Abandoned Animal Hole* exemplifies Sonfist’s method which isolates features of nature and brings unnoticed aspects of it to our attention.

Sonfist’s creative practice developed through a range of materials selected specifically to disclose organic events. His methods, which employ the minimum of artifice, were described by Horvitz as ‘literal presentations’:

By isolating a material so as to accentuate its distinctive infrastructure, he enables matter to ‘inform us of itself.’ He is entrepreneur rather than performer and his work has utilized an encyclopaedic range of substances, from minerals to water fleas, from human crowd flows to forest debris.

As well as creating artefacts which could be presented in traditional galleries, he is probably better known for his larger projects and proposals. Time Landscape (1965-78), created in New York, was one of the more ambitious projects from that period. Time Landscape is the re-creation of a native, pre-Columbian forest in a 20,000 square foot plot in the centre of Manhattan. The art of this particular project is contained as much in the protracted negotiations and documentation as with the simulated, ‘natural’ environment.

Another artist, from this period, who has worked to draw attention to the idea of connection and our position in relation to natural events is Charles Ross. His Star Axis (1971) is designed to make visible the relationship between Polaris and the earth’s axis. Polaris is viewed from the end of a 200 foot long steel tube embedded in an eleven storey high observatory built in the desert of New Mexico. In common with much ecological art the work is completed by natural phenomena, in this case the wobble of the earth on its axis. The overall aim of the work is to reorientate the observer into the natural order.

The artistic partnership of Helen Mayer and Newton Harrison also played a significant part in the development of ecological art. The Harrisons have consistently worked with fragile ecosystems, especially those damaged or threatened by human pollution. Their Lagoon Cycle (1972-82) makes links between the life of a small crustacean and the result of the greenhouse effect on the Pacific Ocean. Their work, which often takes years to complete and can cover hundreds of square miles, is brought to the gallery in the form of photographs, maps and texts.

Many of these ecological art projects were created in inaccessible or ecologically sensitive locations. Others were not fixed works and were subject to temporal change. Artists deliberately rejected the existing structures of commercial galleries because such spaces were inappropriate for this type of work. The move away from the confines of the gallery was also inspired by an opposition to the over-commodification of art. However, despite this move into the natural environment, ecological artists still found it necessary to reach an audience. In order to present these ecological works to a wider public the artists discussed have all documented their work through text and lens-based media. Photography, in particular, was considered an ideal medium with which to document and make accessible.

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projects that existed outside the gallery space. Photography therefore became one of the main ways that such art could be viewed by an audience. The gallery remained a useful place to exhibit documents relating to external projects.

The use of photography to document external, site-specific artefacts coincided with a more general reappraisal of the medium. Photographic media appeared to be a particularly appropriate choice for artists exploring territories outside the traditional ‘fine art’ realm of painting and sculpture. Up until this period, photography was accorded a relatively low status as a fine art medium. There were a number of reasons for this. For example, the unlimited reproducibility of the negative undermined the notion of uniqueness that was central to an art market based on a limited supply of masterpieces. The originality of the masterpiece was further undermined by a means of production that was considered mechanical as opposed to hand crafted. Photography was also perceived as belonging to popular culture and therefore not worthy of serious consideration within ‘high culture.’

Ecological and process forms of art played a key role in redefining the status of photography. Such applications of photography, which record temporal or inaccessible works of art, were instrumental in moving the medium into the territory of more traditional fine art. However, this transition between the site-specific work and its photographic representation has been problematic. The interpretation of the photograph became flexible because it was often unclear or ambiguous whether the photographic print was to be viewed as a mere document or an actual work of art. With the acceptance of photographs into fine art galleries the photographic image moved from being a mere document of a performance or site-specific sculpture to become the artistic work in its own right. As a result of this transition the photographic print, which initially represented the artistic work, became identified with, and as valued as, the work itself. There was, in fine art practice, a merging between the object or event recorded and the photographic representation of it.

Different artists exhibited photographs in entirely different ways. In the case of the Harrisons, who work with extremely large eco-systems, photographs are produced to

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provide evidence and documentation which supports an ecological action. In contrast, much of the photographic work of Richard Long or Hamish Fulton is presented as equivalent to the work in the landscape. For these two artists, the photograph is often the only visible trace of the event such as a walk. The photographic document makes visible the work of art which is, in both of these examples, an event. My own photographic practice, prior to the current project, is similar in that a camera was used to record natural processes as they unfolded. For example a series was made, in 1993, using earthworms (fig. 1).

Fig. 1. Daro Montag. Down to Earth i, iv, vi, viii. 1993. Series of toned silver gelatin prints.
Earthworms were selected because their activities, which are vital to soil maintenance, are largely concealed from view. To make the artwork a number were gathered together and then released on the soil. The worms then disentangled themselves and burrowed back into the earth. The camera was used at repeated intervals to record their progress. The images were intended to provide an objective record and reveal a natural process that is not usually observed.

It is this presumption, that photographic images can represent an event, that led to its use by so many ecological artists. In documenting ecological events or actions, the apparatus and processes of photography were generally employed by such artists in an uncritical manner that assumed objectivity. However, the very objectivity of the photograph suggests another, more significant, reason why the use of photography to represent an ecological view is potentially problematic. When the artefact is primarily intended to be an ecological event or action its meaning is subtly shifted when it is documented as a photograph. Whilst photographs are particularly successful at resolving the detailed appearance of objects this is achieved at the expense of their being abstracted from the flow of events. The uncritical application of photographic images has therefore led to the production of artefacts which undermine the ecological intent by objectifying the work. This tendency of photographs to objectify the world was also noticed by Susan Sontag in her influential work, On Photography:

The camera makes reality atomic, manageable and opaque. It is a view of the world which denies interconnectedness, continuity... 29

Despite these problems the critic Jacques Leenhardt believes that ‘modern image production techniques,’ particularly the photographic media, remain central to the contemporary representation of nature. He claims that photographic media are well placed to question the relationship that humans have with their ecological environment and represent the non-human world. In writing about art and nature he stresses that photo-media are particularly suitable for reconfiguring this relationship because photography supports, ‘the analytical dimension of sensory and cognitive relationships with nature.’ 30

Leenhardt goes on to identify both still and video cameras as extensions of our eyes which equip us with a potential for distancing ourselves and thus aiding a critical reflection. He claims that artists have seized on these media ‘to produce a finely detailed examination of nature’ that undermines the ‘prefabricated and stereotyped’ image that is represented in

Through the application of contemporary methods of photographic reproduction and manipulation a number of artists have, according to Leenhardt, dedicated themselves to the ‘deconstruction’ of existing representations of nature:

The aim is not to produce critical images for their own sake, but – through the mediation of these images – to restore to the spectator of nature a relationship with it that is more original, more personal and more sensitive to the environment.

Although he is correct to assume that deconstructive methods of photography could be employed to undermine our mediated experience of the environment, this does not necessarily lead to the restoration of our relationship with nature. Leenhardt offers no examples of artists who use such techniques to question preconceived notions of nature. The artists cited by him as examples that represent a ‘more sensitive approach to the environment’ include the British artists Andy Goldsworthy and Richard Long. Whilst the ecological sensitivity of these artists is not in doubt neither of them are usually considered as employing critical photographic methods. Photography is generally used by these artists to document the visual and aesthetic appearance of sculpture created in the natural environment and to commodify it. Both use uncritical approaches to photography which do not question the photographic means of representation, but fit very comfortably within a tradition of picturing the landscape. Photography is used to make this work visible and available to a gallery audience, not to reconfigure our preconceived notions of nature.

Section II: Deconstructive photography

The very elements that had given photography a relatively low status in modernist art, were used to redeem its position within deconstructive postmodern practice. This notion of deconstruction has contributed greatly to the increased profile of the photographic medium over the last thirty years. The deconstructive method has been employed to unmask the means by which photographs are created and consumed within society. An increasing number of artists began to use mechanically reproduced images combined with the notion of appropriation, specifically to undermine the concept of ‘originality.’ One of the most significant artists who characterises this position is the American, Sherrie Levine.

Levine is perhaps best known for her appropriation of existing photographs. These works

31 Ibid. 41.
32 Ibid. 41-42.
are direct copies made by re-photographing images from art books. As if to underline her attack on the position of photography within the modernist canon she has chosen to represent well known images by such photographers as Edward Weston and Walker Evans. The work of Levine is often cited as leading the attack on the modernist quest for originality.

Another reason that photographs became increasingly central to postmodern art was that a growing number of artists were intent on making work that reflected contemporary popular culture. This was done largely to erode the hierarchical division between ‘high’ and ‘popular’ culture. In contrast to Levine, whose works are appropriated from high culture, Richard Prince has selected images from magazines and advertisements in his critique of popular culture. In reproducing sections of these images he exposes the languages used in photography and advertising. His deconstructive approach implies ‘the exhaustion of the image universe.’ It suggests that the modernist belief in limitless progress has drawn to a close.

The position of photography in this reconsideration of contemporary critical practice has been explored by Rosalind Krauss in a series of influential essays. Krauss states that:

It is, in fact, from within the perspective of postmodernist production that issues of copy and repetition, the reproducibility of the sign (most obviously in its photographic form), the textual production of the subject, are newly brought to light within modernism itself – revealed as the matter that a euphoric modernism sought both to signal and to repress. Postmodernist art enters this terrain... openly. And it is this phenomenon, born of the last two decades, that in turn has opened critical practice, overtly, onto method.

Krauss claims that photography is particularly well positioned to launch a ‘critical attack’ on the modernist tradition. She is confident that ‘deconstructive’ art short-circuits the basic assumptions and propositions of modernism, particularly these notions of uniqueness and originality.

33 The appropriated nature of Sherrie Levine’s work is signalled by the titles she gives as in a work of 1979, Untitled (After Edward Weston). Levine’s ‘rephotograph’ is simply a copy of the famous image by Edward Weston made in 1926, Torso of Neil. For further discussion of Levine’s work see: Solomon-Godeau, A. 1985. Winning the game when the rules have been changed: Art photography and postmodernism. In Illuminations. Edited by L. Heron & V. Williams. London: I.B.Tauris.

34 The use of popular culture as source material, and the practice of appropriation, was clearly related to the use of photography by ‘Pop’ artists of the 1960s such as Robert Rauschenberg and Andy Warhol.


37 Ibid. 170.
Whilst it is true that the tactics of appropriation do undermine the notion of originality this does not necessarily mean that the whole modernist paradigm is itself undermined. As stated previously, many readings of twentieth century art give priority to an avant-garde. One of the central avant-garde tactics was to react against existing practice and challenge it. The avant-garde artist was frequently defined as being engaged in an assault on the previous forms of art. However this gesture has time and again proved futile as the avant-garde is rapidly absorbed into a mainstream that thrives on novelty and its voice of dissent is silenced by commercial pressures. The acceptance of the avant-garde is signalled by its replacement at the cutting edge. The use of appropriation to attack one of the key elements of modernist art can therefore be seen as the continuation of an avant-garde methodology.

It is also difficult to understand how the sensitive approach to nature, that Leenhardt calls for, is arrived at through methods aimed to disrupt our ‘prefabricated and stereotyped’ view of nature. The critical use of existing images may well aid reflection but that reflection will be focused on the processes of image making and representation, rather than the ‘finely detailed examination of nature’. The increase in critical distance between an object or event and its representation is unlikely to lead to an increased sensitivity or to restore a genuine sense of relationship and connectivity. It is this very act of distancing that diminished our relationship with the natural environment in the first place. The creation of a ‘critical distance’ will take us even further from the natural world, and will increase our sense of separation from it. The deconstructive application of an image making medium thus contributes significantly to the disenchanted view of nature.

Suzi Gablik has been one of the most vociferous critics of this type of art and its inability to make any direct impact in society. She has discussed at length how art’s failure to bring about a modernist, utopian vision has led to the loss of faith in art itself. As a result of this ‘failure of modernism’ she is totally opposed to art that has, in her view, produced only a series of self-referential games and parodies. Using the methods of irony and pastiche this form of postmodernism is self-consciously superficial and divorced from social issues.

Gablik does acknowledge that deconstructive art sets out to undermine the modernist myths

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39 Ibid. 41.
40 Ibid. 41.
of 'stylistic innovation, change, originality, and uniqueness.' However she goes on to suggest that such art does little to challenge the underlying philosophical tradition upon which these 'myths' are based. Such art is caught in a spiral of self-reference which reinforces the idea that the content of art should be itself or other art. In her view, this form of art represents the belief that positive action is,

... doomed either to impotence or co-optation by an economic system that has become virtually uncontrollable. In this circumstance, art can no longer present itself as the hope of a better civilisation; it can only iterate the certainty that such a hope is no longer possible.

Deconstructive art does not propose an alternative to the existing situation but merely attempts to reflect it and transform it into a 'hollow parody' of itself. According to Gablik this type of art is unwilling to reflect critically on any content outside of art and is thus unable to effect any significant change in society. Such art can make reference to our ecological situation but is powerless to do anything about it. As a result of this inability to deal with issues outside of the artistic domain Gablik refers to this art as being disenchanted. She states that deconstructive art is:

... playing out the Weberian process of disenchantment with medicinal forms of nihilism not meant to ward off an otherwise irredeemable reality but to come to terms with it.

Another critic opposed to the disenchantment of much contemporary art is Michael Tucker. However, in his interpretation of much twentieth century art he disagrees explicitly with Gablik. His reading of art from the last hundred years, and his diagnosis of the problem, is quite distinct. Tucker believes that Gablik has exaggerated the problem and 'simply misses the point about an enormous amount of artistic endeavour this century.' Tucker's thesis offers an alternative to the typical modernist interpretation, which defines a series of antagonistic art movements progressing through the avant-garde. Instead he witnesses a thread of connection that runs through many of the major works of the twentieth century. He cites a number of artists who have, for many years been 'revisioning' the world.

Although Tucker's diagnosis of the situation is clearly different to Gablik's, he does agree with her views on the way the deconstructive method is applied by a number of...

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42 Ibid. 179.
43 Ibid. 179.
44 Ibid. 178.
46 Ibid. 23.
contemporary artists. Tucker suggests that Gablik’s attack on huge swathes of contemporary art is influenced by her exposure to;

The artistic and moral vacuity of much of the art from New York which has flooded the international art market and the magazines in recent years.47

Like Gablik, Tucker believes that it is necessary to develop a new philosophical framework in order to shift from mechanistic, rationalistic modes of thought. Although Tucker favours a model based on the ancient practice of shamanism, a new philosophical framework is also provided by reconstructive or ecological postmodernism. David Ray Griffin describes how the constructive version contrasts with the deconstructive one in his introduction to a series of publications on constructive postmodern thought.48 Although Griffin acknowledges that deconstruction attempts to eradicate an overarching worldview held dear by modernism, he claims that it does this by ‘carrying modern premises to their logical conclusions’ rather than presenting an alternative paradigm.49 As a result he insists that the deconstructive method should be described as ‘ultramodern’ rather than postmodern. This view is supported by the architect and postmodern critic, Charles Jencks.

Jencks, who has made a significant contribution to the debate on the different forms of postmodernism, is credited with placing the term in the public domain in the 1970s.50 He draws a significant distinction between ‘late-modernism’ and ‘post-modernism’ and argues that art which uses the method of deconstruction alone should be considered as a late-modern phenomenon. This is because it is still committed to the new, ‘tends to be self-referential and involved with its art specific language.’51 This art does not fit his criteria for postmodernism because it does not have either:

...a complex relation to the past, or pluralism, or the transformation of Western culture, or a concern with meaning, continuity and symbolism.52

Clearly the techniques of deconstructive photography are unable to fulfil these criteria for postmodernism. In order to represent a reconstructive postmodern view a group of artists have taken photography back to its essentials and questioned the objectifying apparatus of the medium. These artists who have employed proto-photographic techniques to represent a more interconnected view of nature are discussed in the next section.

47 Ibid. 23.
48 Published by State University of New York Press. See http:// www.sunypress.edu.
50 His book, Jencks, C. 1977. The language of post-modern architecture. London: Academy Editions., was the first to include the term in its title.
52 Ibid. 46.
Section III: Reconstructive photography

As mentioned in the previous section, the increased use of photography in the 1970s coincided with a growth in awareness of the medium’s critical potential. For much of this decade such debates centred around the photograph’s ability to render the visible appearances of the world. There was little professional interest in reviving antiquated methods of ‘cameraless’ photography. The potential of photograms, pinhole cameras and other proto-photographic methods remained largely unexplored. Such images, which were generally black and white, negative prints with a high level of abstraction were not seen as a suitable medium for recording the conceptual, performance or environmental art that was receiving most critical attention at that time.

It was not until the late 1980s that a revival of interest in the possibilities of proto-photographic photography took place. This was prompted in part by the development of colour reversal paper – especially Cibachrome. This paper allowed artists to generate direct, permanent colour photograms that were positives, as opposed to negatives. That is, the tones and colours of the image were designed to correspond closely to those perceived by the human eye.

In the 1990s, there emerged a group of artists who became associated with such proto-photographic methods. As well as a shared experimental approach to photography, the common factor linking these artists was their concern with an ecological or reconstructive postmodern view of nature. Since 1995 bioglyphs, the creative practice of this project, have been exhibited alongside the work of this group. The group consists of Susan Derges, Garry Fabian Miller, Adam Fuss, Christopher Bucklow and Floris Neusüss. Whilst this group should not be perceived as a formal association or artistic movement as such, all the artists, with the exception of the German, Floris Neusüss, are well known to each other. One of the curatorial aims of categorising a group is to make links and draw comparisons between the artists. Such categorisation does help to illuminate a number of ideas and is generally

53 Although some exhibitions have highlighted the lack of a traditional camera in the production of the images, the term proto-photographic seems more appropriate for this group since some of the works are created with adapted or invented cameras.
54 Although Cibachrome paper first became available in 1974, it was marketed for hobbyists who wished to make prints from slides. It was a number of years before the paper was widely used. It is now marketed in Britain under the name, Ilfochrome.
supportive to both artists and curators. However in highlighting formal similarities significant differences in method have, in this case, been overlooked. (These are the subject of analysis in chapter five.)

The first exhibition to link work from the current project with the proto-photographic group was Heaven’s Embroidered Cloths (see Bioglyphs: Images fig.61). This was held at the National Museum of Photography, Film and Television in Bradford in 1995. It brought together, for the first time, the work of Susan Derges, Adam Fuss, Garry Fabian Miller and Daro Montag. The rationale for this exhibition was the promotion of ‘camerless’ photography. Its aim was to question over dependence upon photographic apparatus at the expense of photography’s essential raw ingredient – light.

Heaven’s Embroidered Cloths brings together the work of a group of contemporary photographers who debunk traditional notions of photography. Combining extraordinary, imaginative innovation with light and chemistry, they produce intensely beautiful images – without the camera.\[55\]

The second exhibition to make this link occurred in the same year. This exhibition, entitled Possibilities of Extension, was held at Aspex Gallery in Portsmouth (see Bioglyphs: Images fig.62). Although this exhibition also drew attention to the camerless origin of the images its main aim was to forge a link between artistic method and notions of spirituality:

Artists in this show each observe and record natural phenomena, which cannot be seen directly with the eye, using a photographic process. Often without the use of a camera, they examine the relationship between nature and science, recording directly with light onto chemically prepared photographic paper. Their use of light within the photographic process infers a wide aesthetic, referring to science and spirituality. The results are beautiful, abstract and ethereal photographic images which question our way of seeing and understanding the world.\[56\]

Exhibiting artists included Christopher Bucklow, Susan Derges, Adam Fuss, Garry Fabian Miller and Daro Montag.

In 1999 the Friends of Photography, in San Francisco staged Phenomena: The poetics of science (see Bioglyphs: Images fig.72). This exhibition explored the scientific representation of nature through proto-photographic means. Exhibiting artists included Christopher Bucklow, Susan Derges and Daro Montag.

Also in America in the same year was the exhibition, This is not a photograph (see Bioglyphs:

\[55\] From publicity material, National Museum of Photography, Film and Television, Bradford, Summer 1995.
Images (fig.72). The exhibition, which aimed to question the boundary with which we define photography was held at Pace University Gallery, New York. An expanded, touring version of the exhibition is planned for 2001. Artists featured include Christopher Bucklow, Adam Fuss and Daro Montag.

The final exhibition to link this group was Revelation (see Bioglyphs: Images fig.71). This was initially curated in 1999 by Purdy Hicks Gallery, in London. It then travelled to Carlisle City Museum and Gallery in 2000. Revelation set out explore the natural world through process rather than object by highlighting the element of time in the image making process:

Each of the artists in this exhibition, in their different ways, seeks to recoup for photography a potential to image the world in ways which acknowledge the flow of time... which photography so often denies or ignores.

This show features the work of six artists including Garry Fabian Miller, Daro Montag and Floris Neusüss.

The link between Derges, Miller and Montag was also reinforced by the 1996 photography lecture series at the Museum of Modern Art, Oxford, entitled The Essential Image (see Bioglyphs: Images fig.65). These lectures were expressly designed to look at how three different artists used similar methods in their representation of the natural world. Since the art of Derges and Miller has been most closely associated with my practice examples of their working methods are considered in greater detail.

There are two main criteria that have been used to delineate this group. The first, and the most immediate characteristic, is their use of proto-photographic techniques to produce formally similar results. In contrast to much contemporary, deconstructive photography, which tends to embrace technological developments and the digitisation of images, this group have revived and developed some of the earliest photographic methods. These have included various developments of both photograms and pinhole photography. Unlike previous versions of such images, contemporary cameraless photographs often exploit the permanently vibrant qualities of Cibachrome paper. The images produced by these artists appear more direct and less-mediated than camera images or the self-conscious images produced by deconstructive methods. It is this apparent lack of mediation that has led curators to links the artists together.

The second feature that is used to link the work of these artists is their shared use of organic materials and the interaction of these with light. For example Susan Derges has worked extensively with frog-spawn, bees and tadpoles (fig.2).

![Image of Vessel 2: Susan Derges. Vessel 2. 1995. Ilfochrome print.](image)

The series illustrated was made by placing a glass vessel, which contained tadpoles, into a photographic enlarger. They were used in place of a negative, and the print was made through traditional means of exposure, followed by processing.

Derges has also received considerable critical attention for her studies of naturally flowing river and sea water (fig.3). These are created by laying large sheets of photographic paper directly in the river or sea, in the darkness of night. The paper is then exposed with a flash of light, and processed normally.

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Fig. 3. Susan Derges. The River Taw (New Moon, Ivy). 28 March 1998. Ilfochrome print.
Adam Fuss has also experimented with creating photograms using water. One of his early series of images recorded a baby in a tray of water (fig.4). In this work the photographic paper was placed under the surface of the water. Once the baby was in the tray the paper would have been simply exposed with a flash of light. His work has also involved the use of animals as well as the creation of direct images with no intermediary materials (these are discussed in chapter six).

Fig.4. Adam Fuss. Untitled (Baby). 1992. Ilfochrome print.
Garry Fabian Miller has over a number of years refined a body of work which deals explicitly with the nature of light. Prior to this he produced a large number of images by positioning leaves and plant materials in the enlarger, using them in place of the negative (fig.5). His interest in their ability to transform solar light into matter has influenced his more recent depictions of light itself. These are discussed in chapter six.

Fig.5. Garry Fabian Miller. Breath. 1-30 May 1989, leaf, light, Cibachrome print.
Christopher Bucklow, who has previously created art by grafting plants, is best known for his multiple pinhole images created using the solar light (fig.6). Bucklow pierces thousands of pinholes, in the shape of a figure, in a sheet of metal. The sheet is positioned in a purpose built camera into which he has placed a large sheet of photographic paper. The camera is then pointed towards the sun, and the paper exposed. Each dot of light, that makes up the silhouette, is therefore a small image of the sun.

Fig.6. Christopher Bucklow. Guest. 1995. Unique Cibachrome print.
The final member of this proto-photographic group is Floris Neusüss. He has produced an extensive series of photograms of plants. Although many are traditional photograms made in the darkroom, he has also experimented by exposing paper outside in the darkness of night. The exposures are made with a combination of lightning and artificial flash (fig.7).

In rejecting more manipulated media (e.g. drawing and painting) which are perceived as emphasising the human subjective experience, these artists have, each in their own way, been drawn towards the photographic medium. Photography is appropriated as a more suitable method of generating images because of the apparent directness in its engagement with the world. Photographs are perceived to provide the opportunity for natural events to have some input into the creation of the art. This shift towards the photographic media and away
from painting is described by Chris Titterington as a, ‘desire for the presence of the artist to be limited to the role of the facilitator or ‘channel.’

Despite their use of photography and interest in photographic images, the group are generally critical of the traditional apparatus of the medium. Of particular concern is the camera’s tendency to privilege the view or ‘gaze’ of the photographer. Conventional photographic images made with a camera emphasise the gaze. The gaze contributes to the idea of a separate and passive object being observed by an active subject. In the case of images that represent nature this view privileges humans by prioritising their position over the object of representation. Such a position is antipathetic with a reconstructive ecological stance.

Most of the above artists have at some time expressed a dissatisfaction with the dominating view of the camera and, with all of the group, lenses themselves have at some time been disregarded. The technical apparatus of photography, especially the lens, is seen as separating and distancing the photographer from that which is being photographed. Garry Fabian Miller is very aware of the camera’s tendency to objectify the world. He perceives the photographic apparatus, and the perspectival view it provides, as being inextricably linked with attitudes towards the environment that lead to exploitation. His argument against the camera is, in part, inspired by feminist thinking which challenges traditional, Western representation of landscape and nature through painting and photography. The perspective or ‘prospect’ view over the land is linked to its possession by the human – usually male – subject. He goes on to state that deep understanding of nature only comes through a ‘kind of engagement that the possession of a camera seems to preclude.’ As a result he, and others of this group who are not content with representing a distanced, or disenchanted view, have developed strategies that attempt to engage more directly with the phenomena of nature.

The photogram technique would appear to offer an alternative to the objectifying tendency of the photographic lens. One of the key differences between photograms and conventional photographs is the different viewpoint from which the images are made. Photograms take a view that is quite distinct from the perspectival gaze of the camera. Photogram images are

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not made by gazing out at the world and recording that view, but by looking underneath it. Rather than using a camera’s viewfinder to frame the scene the artist physically places objects onto the paper. The images recorded are the view from underneath. Titterington, who has an extensive knowledge of this group suggests that the use of the photogram presents nature:

...on equal terms with the observer, as something that we must understand in the sense of its etymological meaning to step under; in a sense, to submerge into, as participants rather than overseers.

Artists who are abandoning the camera are doing so out of a belief that lens-less photography offers a more sympathetic and ecological representation of nature's events. Titterington points out that:

the impulse to make the work in this way has its foundations in a desire for unmediated imagery born from immediate experience of the particulars of the landscape.

To these artists the phenomena of nature are understood to be deeply interrelated events that unfold through time rather than discrete objects. Although they use materials gathered from the natural environment their concerns are as much to do with change and flux as with the objects themselves. Both Derges and Miller have an understanding of the connectedness and interrelationship between different parts of the natural world. Their ecological perspective is expressed through a concern for the rhythms and cycles of nature:

Over the last two decades the emergence of new theories about the origin of the universe has gone hand in hand with a new scientific understanding of the physical laws and bio-chemical processes that govern our world. New insights into the cycles, patterns and interconnections found in nature now raise questions about our own place and function in the natural order and present a challenge to the traditional division between the concepts of ‘nature’ and ‘culture’. Susan Derges and Garry Fabian Miller are two British artists whose work over the last ten years has been informed by these developing ideas.

In the works of Miller, entitled Breath (1989) and Distillation (1988), leaves are gathered and positioned in the enlarger in place of a negative. The resulting prints, mounted as a grid, are used to explore the changes that take place as one season moves into another. The colour changes within the leaves are used to emphasise the gradual and inexorable changing seasons. These works present the viewer with both leaf as object and leaf as embedded within the seasonal event. Over the years Miller has refined his methods and no longer uses plant materials to filter the enlarger’s light. His most recent body of work is created by recording the imprint on film of light that has been filtered through coloured oils. Some of

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63 Ibid. 19.
64 Ibid. 19.
the resulting works, such as Son (9 June 1992) (see Bioglyphs: Text fig 9), take on a circular
glow which is dictated by the oil’s container. Other works, such as Crown (16 July 1993),
have no visible container and are completely formless. In these latter works the oil ceases to
be an object represented and the viewer is only aware of glowing colored light. Miller
underlines this point by cataloguing light as one of the materials used in the creation of the
work.

Susan Derges takes a similar approach in her series of works that depict the development of
tadpoles. These series represent both the individual organisms and the growth event that
connects the spawn to the adult animal. Like Miller, she is concerned with looking beyond
the object and at the event or phenomenon of nature that moves through time. In setting
out to study and represent the intricacies of nature, she has also been aware of her presence
within it. Chris Titterington describes Derges attempt to balance:

... a need to allow the phenomena of the world to come into existence without the
intrusion of the self... (with the) need for the self to be 'of' the world – securely in the
world; part of the all inclusive concept 'Nature.'

In much of her earlier work Derges acknowledges the position of the human observer. In
these images she places herself both in nature and, at the same time, observing it from the
outside. The theme of the relationship and interaction between the observer and the
observed was continued in her series Full Circle. David Chandler, from the Photographers’
Gallery, draws specific attention to this,

Here, with light as a simple metaphor for the observer, Full Circle proposes the
interaction of observer and observed, where the way of seeing affects what is seen,
where how we see determines what exists. Our relationship to the world around us
thus appears in a state of radical interchange. Not separate, but tightly interwoven.

More recently her work demonstrates her ambition to allow the trace of the events to be
recorded on the photographic paper. Mark Haworth-Booth, keeper of photographs at the
Victoria and Albert Museum, refers explicitly to this when describing the series, Full Circle
(1992), ‘...as an alternative way of observing the unfolding of the event’ and her method being
conscemed with ‘traces’ and ‘movement.’

As well as being concerned with ecology Derges has also been consistently interested in a
reconstructive scientific interpretation of nature. This has been expressed through her

66 Ibid.
67 An example of this would be series entitled, The observer and the observed. 1991.
prolonged engagement with ideas that stem from the science of physics. In a statement cited by Haworth-Booth, Derges states:

A growing preoccupation in my understanding of the possibilities of the plastic media has been that phenomena are no longer seen as static entities in time and space but as dynamic and interrelated, with specific structural laws and principles.70

For Derges, as with the other members of this group, images are intended to reveal nature as a process, as a series of events, rather than a collection of objects.

Summary

Since the late 1960s the expanding ecological and environmental knowledge has led an increasing number of artists to create work that addressed these issues. Most of this work involved highlighting natural events and processes. Photography is frequently used by such artists to document or represent these art works. However, photography has a tendency to portray what it represents as an object. The uncritical use of photography generated the problem that the ecological work lost many of its characteristic features which defined it as an event or series of events.

In contrast to this the self-reflective and critical approach of deconstruction appeared to undermine this objectification of events by photography. Although the methods of deconstruction help to reconfigure our assumptions about the photographic image and its means of representation they are unable to support an ecological interpretation of nature. Such methods do not readily lend themselves to the representation of interconnections or natural processes.

There are however a group of artists using proto-photographic methods to represent an ecological view of nature. These artists have revived and developed some proto-photographic methods of creating images which appear to be supportive of a reconstructive postmodern position. In contrast to conventional photographic representations of nature which privilege the human view, or ‘gaze,’ this group of cameraless artists have developed methods of imaging in their desire to represent nature from a less objectified position.

Bioglyphs have been consistently linked with this group through a number of exhibitions outlined in Section III. By representing the non-human world more on its own terms, this group appears to contribute to a reenchanted view of nature.
Retracing the index

The previous discussion identified a potential problem with the way photographic images were used in the representation of ecological art. Their tendency to objectify that which is represented goes against ecological thought which prioritises the notion of events. In order to clarify this relationship between an ecological work and its representation into two dimensional form some analytical concepts need to be defined. The most fruitful ones for the purpose of this research are drawn from the writings of the American philosopher, Charles Sanders Peirce (1839-1914).\(^1\) These concepts are defined by the terms ‘icon’ and ‘index.’ These two terms, which were originally used with ‘symbol’ as part of a triad to differentiate between three kinds of signs, are selected for closer attention because they have been used in much recent photographic criticism.\(^1\) In particular, the claim that photographs are primarily indexical has been used to underline the postmodern status of the photographic media. I disagree with this claim and argue that the photographic sign should be understood as primarily iconic rather than indexical. The current project therefore aims to make a contribution to this debate that surrounds the relationship of the photograph with its subject.

Section I: Iconic objects and indexical events

Although the concepts ‘icon’ and ‘index,’ along with ‘symbol,’ are useful in the analysis of visual signs, there has been some confusion, amongst critics of photography, concerning their usage. This confusion can be traced back to the writings of Peirce himself.\(^1\) Throughout his writings there is evidence that he developed and refined his thinking on a number of occasions. Although initially devised as quite distinct categories with which to describe signs, his earlier definitions were amended to accommodate differences of degree. Peirce soon realised that signs did not fall neatly into three distinct categories. Instead there

\(^{1}\) It is interesting to note that Charles Hartshorne, who edited Peirce’s writings, also contributed significantly to the process philosophies discussed in chapter two.

\(^{2}\) There are a number of instances when these terms are defined by Peirce. See, for example, Hartshorne, C. & P. Weiss, eds. 1931. The collected papers of Charles Sanders Peirce. Cambridge, Mass.: The Belknap Press of Harvard University Press. §1.369.

\(^{3}\) Peirce draws attention to the iconicity of photographs but then refers to this as the result of their indexicality: Hartshorne, C. & P. Weiss, eds. 1931. The collected papers of Charles Sanders Peirce. Cambridge Mass.: The Belknap Press of Harvard University Press. §2.201.
were overlaps where a sign could be defined by more than one term from his triad. Many
signs potentially exhibited all three properties and moved between the roles of index, icon or
symbol. The interpretation of the sign depended upon the usage and the context within
which the sign was being deciphered. Peirce came to appreciate and acknowledge this
dynamic relationship:

... it would be difficult if not impossible, to instance an absolutely pure index, or to
find any sign absolutely devoid of the indexical quality.

Peirce defined the icon as a sign that exhibits a similarity to the object it represents; this can
be through ‘analogy’ or through a ‘community in some quality.’ This aspect of similarity
was illustrated by his initial use of the term ‘likenesses’ which was only later replaced by
‘icons.’ The use of the term icon, in this context is therefore usually taken to refer to a sign
that, in some way, resembles the object being represented. Images that are generally
described as ‘realistic’ clearly possess iconicity.

However the notion of similarity extends beyond simple mimesis. An icon may, for example:

... share certain properties which that object possesses; or it may duplicate the
principles according to which that object is organised.

For example diagrams and graphs, in which corresponding relationships are represented
visually, are also considered iconic. Although the idea of mimesis can be extended beyond
visual similarities – there are similarities of touch or smell – iconicity generally refers to visual
qualities.

In a purely iconic sign there would be no link between the sign and the signified beyond its
resemblance. To denote something through an iconic sign highlights and prioritises the
visual appearance of whatever is represented. The visually mimetic image separates out one
specific view of the object from an infinite number of possible views. By concentrating
attention on one specific visual aspect, it does so at the expense of all the other potential
viewpoints as well as non-visual qualities. Iconic representations, in concentrating on
appearance, add weight to the abstract notion that objects can be viewed in isolation from
their context or environment. In isolating objects from the flux of time, icons help to
promote the idea of separable objects.

4 Ibid. §2.306.
5 Ibid. §1.369.
6 Ibid. §1.558.
7 Ibid. §1.558.
In contrast to concentrating on mimetic appearance, the index ‘forces the attention to the particular object intended without describing it.’ Instead of mimesis or visual similarity the index is identified through some form of causal relationship or contact. Peirce proposes that there is a physical, even intimate, connection between the sign and the thing signified:

...the index is physically connected with its object; they make an organic pair, but the interpreting mind has nothing to do with this connection, except remarking it, after it is established.

This linking between the sign and its object by some ‘correspondence in fact’ is further underlined by Peirce’s subsequent description of the index as a:

... sign which refers to the Object that it denotes by virtue of being really affected by that Object.

Although instances of iconic signs in nature can be cited, indexical signs are far more common. The notion of indexicality, if not the actual concept, has long been observed in nature. The idea that there can be a physical connection between the sign and the signified has consequences for human survival and development. For example the ability to read and discriminate between the tracks and marks of different animals would have been vital to a hunting community. The natural sciences are also indebted to indexical signs. A scientific method that depends on observation assumes an indexical relationship between the observation and the events that preceded it. Thomas Sebeok, in citing the crystallographer Alan Mackay, suggests that the natural sciences share a belief, ‘that nature is written in a kind of code.’ This coding rests on the idea of physical connection between the sign and the event to which it points. It is, according to Sebeok, largely through the decoding and interpretation of these indexical signs that the sciences develop models of the world.

Although the relationship between natural signs and the events that caused them were already well established, it was Peirce who defined this relationship as indexical and expanded most upon the concept. Sebeok claims that through defining the index, Peirce made his greatest contribution to semiotics. Whereas the icon merely restates Plato’s idea

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10 Ibid. §2.299.
11 Ibid. §1.558.
12 Ibid. §2.248.
13 A number of animals and plants bear visual resemblance to other animal or plant features. For example the eye markings on butterfly wings are presumed to mimic more predatory animals.
15 Ibid. 61.
of the sign imitating the signified it is with the notion of the index that ‘Peirce is at once novel and fruitful.’ Through the concept of indexicality Peirce drew attention to the way that, ‘nature (the world, the universe, the cosmos, true reality, etc.) discloses itself through sign processes, or semioses.’

In order to define the indexical relationship Peirce offers a number of examples. As well as the more familiar examples of animal tracks and finger prints, Peirce’s examples include such artefacts as a barometer, a weathercock and a spirit-level. Each of these indexical devices is designed specifically to respond to natural events. This is an important point, and one that is easily overlooked. They all work by responding to changes in the immediate environment. The barometer works by responding to changes in atmospheric pressure, the weathercock to the changing direction of the wind and the spirit-level to the change in its level. Such devices do not signify objects but events.

Peirce is usually understood to have been firmly of the belief that photographs are indexical. There are a number of instances in his writings where he does indeed make such an assertion. In separating out a category of signs that are distinct from icons because they relate to ‘actual existence’ he cites two examples. As well as the weathercock, with its veering in response to the wind, there is the example of a photograph. He goes on to state that:

... the fact that the latter is known to be the effect of the radiations from the object renders it an index and highly informative.

In this instance, and others, he refers to the image being generated by light radiating or being projected from the object. In the same section he notes the iconicity of photographs but then reasserts that photographs are primarily indexical:

Photographs, especially instantaneous photographs, are very instructive, because we know that they are in certain respects exactly like the objects they represent. But this resemblance is due to the photographs having been produced under such circumstances that they were physically forced to correspond point by point to nature. In that aspect then, they belong to the second class of signs, those by physical connection.

16 Ibid. 62.
17 Ibid. 78.
19 Ibid. §2.250.
20 Ibid. §2.265.
21 Ibid. §2.281.
In discussing indexicality Peirce often states that the relationship between the object and its sign should be real, existential, or physical. He also uses a less familiar word to describe this connection - contiguity. This suggests a proximity, contact or abrasion. It is this term that is usually used to justify the indexicality of photographs. Since this is central to the indexical argument Göran Sonesson, the semiotician, explores it in some depth:

When photographs are said to be indexical, contiguity is always meant, and a particular kind of contiguity at that: a contiguity close enough for the referent to rub off on the expression plane of the sign, albeit not contemporaneous with the semiotical functioning of the sign, but more or less anterior to it. Inspired by the parallel between Peirce’s conception of indexicality and abduction, and Sherlock Holmes’ famous method, which has been explored by Sebeok, Eco, and others, we have suggested elsewhere to term abrasion an indexical relationship resulting from the fact of what is to become the referent having entered into contact with, on some prior moment of time, and then detached itself from, what later is to become the expression plane of the sign, leaving on the surface of the latter some visible trace, however inconspicuous, of the event.

The distinction between icon and index can be illustrated using the example of a horse’s hoof-print. Hoof-prints, as Sonesson observed, do have iconic aspects as well as indexical ones. The iconic aspect of this sign tells the interpreter something about the size and shape of the animal’s hoof, even what type of animal it belongs to. It concentrates on visual qualities and emphasises the hoof as an object that possesses similar visual qualities. However, by focusing on these qualities the hoof-object is separated out from the event that caused the sign to come into being. The indexical aspect, on the other hand, informs an interpreter that a horse passed this way and in what direction it was heading. An experienced interpreter would also be able to ascertain further information about the event such as the speed at which the horse was travelling and how long ago the passing happened.

Another example of a sign that could potentially have both iconic and indexical aspects is provided by a circular mark on a wall. On observing this sign the interpreter deduces that it was caused by a wet tennis ball that was thrown at it. It is feasible that the print bears a visual resemblance to the wet ball, perhaps through its roundness or distinguishing markings. Such a reading of the sign would be an iconic one. It would signify ‘ball’ as object. On the other hand if the sign was read as a trace that was caused by the momentary contiguous relationship between the ball and the wall, it is read as an index: not an index of the ball as object but of the event which may be described as ‘ball/wall collision.’

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22 Ibid. §1.558, §3.361, §8.335.
The iconic reading of the sign highlights a visual relationship between the sign and something external. This is not a contiguous relationship but simply one of mimesis. What is represented is separated out from its place in time and defined as an object. By subordinating the element of time to that of space, iconic images reinforce an objectified view of the world. In this form of representation the world is perceived as consisting of objects. Although such objects may well be involved in some type of activity or event these only exist beyond the frame of the representation. The iconic image is particularly ill-suited to capture such activity.

Peirce mistakenly suggests, on a number of occasions, that indexical signs also refer to objects even though the examples he gives are clearly events. By contrast, Sonesson is clearer on this point than Peirce. He locates the indexical sign within its context and introduces the term ‘event’ as the thing at which the index points. By describing which that is signified as an event, Sonesson draws attention to the key feature of indexical signs. This type of sign, which is defined by a direct physical relationship involves, and refers to, some kind of action or activity that brought about the sign. In relating to an activity, the index that is contiguous is not abstracted from time, but occurs after, and refers back to, a previous event. An indexical sign is therefore the residue or trace of an event. This is a crucial difference and one that is generally overlooked in semiotic analysis.

The analysis of the two previous quotations from Peirce and Sonesson highlights the central argument of this thesis. Peirce and Sonesson use different terms to describe what the index represents. In discussing both icons and indicies Peirce continually refers to the ‘object’ represented by the sign. However, unlike the iconic sign, the indexical one does not focus attention onto visual appearances that are abstracted from the fluxion of time. Instead the notion of indexicality points to the trace or residue of something that has taken place in time. As a result, indexicality refers back to, and prioritises the event that caused the sign to come into being rather than an object. In contrast to Peirce’s terminology Sonesson draws attention to this by referring to the ‘event’ that caused the trace. Therefore Sonesson’s reworking of the nature and significance of the index is more relevant for a reconstructive analysis of the role of photography.

Section II: The confusion regarding photography’s status as icon or index

The collected writings of Peirce, which were edited and published posthumously, have often been cited to suggest that photographs are primarily indexical signs. Many recent
interpretations of photographs suggest that Peirce understood their indexical aspect to be their main sign value. However, his views may not have been as clear as some subsequent interpretations would suggest. Although he unambiguously states in his writing that photographs are indexical signs they are also, by his own definition, iconic ones. As stated previously Peirce understood that photographs are iconic and attributed this to their indexicality. Sonesson contends that Peirce:

... actually only claims that the photograph is an index in one respect, which apparently permits it to remain an icon when considered from other points of view.

The vast majority of photographs bear a striking resemblance to what they depict. It would therefore appear that photographs are in most respects iconic and, in others, indexical. This is in keeping with Peirce’s idea of a categorisation with blurred boundaries where the sign can exhibit more than one aspect of his triad. However, there has in recent times, been a thrust to prioritise the indexicality of photographs. I intend to show that this view is mistaken and that photographs are primarily iconic. In order to explore such interpretations of photography it is necessary to consider the development of the medium and some of its practitioners and critics who prioritise its indexicality.

Although photography is generally considered to have been invented in the 1830s the principles of image formation had been known for some time prior to that. The camera obscura, for example, had been used by Western artists since the time of the Renaissance as an aid to drawing. Prior to the successful fixing of a picture, the images obtained by the camera obscura greatly influenced the striving for visual similitude in much painting. The drawings and paintings made by this means of image projection took a form that we would generally describe as ‘realistic.’ The notion of recording the visual appearance of the world in as fine detail as possible is a common preoccupation of many artists.

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27 Daguerre and Fox Talbot are both credited with inventing significant aspects of the photographic process around 1836. Recent research however suggests that the artefact known as the Turin Shroud could in fact be the earliest photograph. Rather than being the indexical trace of Jesus some now consider it to be a photographic forgery made in the 1300s. See www.petech.ac.za/shroud/ for further information.
28 For information regarding the widespread use and significance of the camera obscura see: Renner, E. 1995. Pinhole photography. USA: Focal Press.
The notion of similitude is particularly apparent in much Dutch art of the seventeenth century. Svetlana Alpers links the mimetic tendency of such painting to the widespread use of the camera obscura and a particular way of viewing the world that was influenced by it.29

The camera obscura provided a view which concentrated on visual appearances. Centuries before the means by which such fleeting images could be fixed, Western art was dominated by iconic, visually realistic, images. André Bazin claims that a large proportion of the visual arts has been concerned with similitude:

... in the fifteenth century Western painting began to turn from its age old concern with spiritual realities expressed in the form proper to it, towards an effort to combine this spiritual expression with as complete an imitation as possible of the outside world.30

According to Bazin the invention of the photographic process stems from the desire to permanently render the view through the camera and record the visual appearance of objects. The process can be understood as the culmination of that branch of artistic practice that aimed to produce, ‘as complete an imitation as possible of the outside world.’ He goes on to contend that:

... painting is, after all an inferior way of making likenesses, an ersatz of the process of reproduction. Only a photographic lens can give us the kind of image of the object that is capable of satisfying the deep need man has to substitute for something more than a mere approximation... 31

Bazin contends that the photograph provides an image that is a satisfactory substitute for the object of representation. He goes on to suggest that the invention of photography was instrumental in freeing painters from mimetic representation.32 It was able to do this precisely because of its iconicity. The ability to chemically fix, and make permanent, the ephemeral images of the camera obscura freed artists from the requirement to portray the visible appearances of the world. Bazin argues that it is this ability of photographs to resemble the object depicted that makes them so compelling and contributes to their continued appeal.

With the discovery of a process by which the photographic image could be made permanent, came considerable confusion as to how the image was created. The forthright iconicity of the photograph was thrown into doubt for many who suggested that the image should be

31 Ibid. 14.
32 Ibid. 10-11.
understood as the direct imprint of the subject. The apparent lack of mediation on behalf of the artist led a number of practitioners and writers to claim 'that the photograph gave Nature the power to reproduce herself directly unaided by man.' Even Fox Talbot (1800-1877), the inventor of the negative/positive process, was uncertain as to the source of photography's generative power, believing that nature spontaneously represented itself. On regarding his first image he stated, 'this building, I believe to be the first that was ever yet known to have drawn its own picture.' His phrase, 'the pencil of nature', underlines his belief in the power of the natural object to generate the image. Such claims suggest the concept of indexicality long before the term was actually coined.

A similar, although more speculative, view was suggested by the writer Honoré de Balzac (1799-1850). According to his theory of spectres, recounted in the memoirs of the French portrait photographer, Nadar (Gaspard Félix Tournachon), the photographic plate captured the emanations from the sitter's soul. This coincided with a widely held belief that invisible traces could, in some way be captured on the photographic plate. Although this idea led to much fraudulent 'spiritualism' there was some serious exploration into the subject. For example, the Swedish playwright, August Strindberg (1849-1912), made a significant contribution to the idea that the photographic plate could record the indexical trace of invisible forces. Strindberg conducted a large number of photographic experiments, which initially took the form of photograms. Like Fox Talbot he worked mainly with plant materials, although none of these works now survive. He also produced what he called 'cristallographies.' These were made by placing photographic paper directly in contact with a piece of glass on which snow and ice had left their mark:

I have gone back to my crystal forming which I photograph directly by copying them from the sheet of glass where the crystallisation has taken place. These aggregates, these ice flowers, have revealed new aspects of nature's secrets which were astounding me.

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34 This idea still holds an appeal and has at times been ascribed to the proto-photographic group discussed in chapter three.
36 Fox Talbot’s book, The pencil of nature, 1844-46, was the first to be published illustrated with photographs.
37 These memoirs were cited by Rosalind Krauss in her essay relating the concept of indexicality to Nadar’s work. Krauss, R. 1978. Tracing Nadar. In October. No.5.
These works, according to Clement Cheroux, best reflect Strindberg's view of natural art in that 'their creative process uses nature, their creative process is that of nature.' Despite this claim, these works remain photogram-type prints and will be classified as 'photograms made without lens or enlarger' in the analysis in the next section. Strindberg did however produce a series of images which may well be primarily indexical, although perhaps not in the way he intended. He called this group of works 'célestographies.'

The célestographies were made in an attempt to photograph the night sky. Up until that point lenses and films were too slow to record the starry sky. By removing lens and camera, Strindberg believed the stars would be directly printed onto his photographic plates. He reasoned that this process was similar to the recently discovered X-rays, about which he had written an article. It is unlikely that his plates did actually record starlight. The abstract coloration is more likely to have been the result of chemical or biological damage. As such these works are probably indexical traces of events that have taken place on the surface of his film.

Once the technicalities of the medium were better understood and a coherent theory of light was formulated, the claim that photographs were the direct trace of nature slipped out of favour. The ability of photographs, to capture and render visible the appearances of the world, came to predominate the understanding of the medium. It was generally accepted that photographs 'mirrored' reality. The majority of commentators, as Martin Jay observes, understood photographs as reflections of reality or, in Peirce's terminology, iconic representations. Jay is in no doubt that the commonplace view of photography was, and still is, that it records a moment of reality as it actually appeared. This innate ability of photographs to look like, or resemble, the subject of representation has led Sonesson to suggest that:

... there are really no theories to discuss about the iconical nature of photography, in the sense that there are no arguments for this position; all through most of photographic history, it has simply been taken for granted.

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40 In most photographic histories the development of the medium is directly descended from the desire to fix the image formed in a camera obscura. Although the immediate connection between the camera obscura and the development of photography is disputed by Jonathan Crary, there seems little doubt that photography was invented to precisely render the visible. Crary, J. 1992. Techniques of the observer. Massachusetts: MIT Press.
42 Sonesson, G. 1989. Semiotics of photography: On tracing the index. Pt.III.1.3.2. 44.
It is only since the late 1960s that an alternative reading of the photographic sign has come to the foreground. Bazin’s essay was influential in reviving the idea that photographs are primarily indexical. Although, as previously noted, Bazin was clear about the iconicity of photographs, he was also of the opinion that the photograph was directly linked to the object, and should be understood primarily as indexical. This confusion is typical in discussion on the signification of photographs.

Although Bazin is clearly impressed by the photograph’s ability to offer similitude it is the apparent lack of mediation in the image-making process that he found so compelling. Despite not actually using the term ‘index’, he is very sure that photographs are traces or impressions taken directly from the world, and compares them to ‘lesser plastic arts’ and in particular moulded death masks. He understands photography as, ‘…the taking of an impression, by the manipulation of light.’ He also compares the process to the manner in which fingerprints are made, suggesting that photography, ‘…contributes to the order of natural creation instead of providing a substitute for it.’

In his enthusiasm for the ‘objective’ or ‘automatic’ nature of photography he contradicts himself at a crucial point in his argument where he asserts that:

For the first time, between the originating object and its reproduction there intervenes only the instrumentality of a nonliving agent. For the first time an image of the world is formed automatically, without the creative intervention of man.

In the very next sentence he qualifies this by affirming that the photographer does intervene in two rather significant ways:

The personality of the photographer enters into the proceedings only in his selection of the object to be photographed and by way of the purpose he has in mind.

It could be argued that the image does form ‘automatically’ in the sense that a latent image is built up on the film by the action of light that is allowed to enter the camera, without the photographer physically placing it there. There is, however, a high level of mediation or control, both before and after the period of exposure. Even during the exposure there is a level of mediation, for example the photographer either chooses to pan the camera or hold it

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44 Ibid. 15.
46 Ibid. 14.
steady. The creative intervention of the photographer, through choice and decision, is essential in producing any particular image as opposed to a different one from an infinite number of possibilities.

Far from the image generation being free from the creative activity of humans, it is clear that the skilful photographer can exert control and creative choice over almost every aspect of the image making process. In a further passage from the same essay Bazin continues to close any gap between the object and its representation suggesting that the object and its photographic image share a common ontology and that they are the same thing:

The photographic image is the object itself, the object freed from the conditions of time and space that govern it. No matter how fuzzy, distorted, or discoloured, no matter how lacking in documentary value the image may be, it shares, by virtue of the very process of its becoming, the being of the model of which it is the reproduction; it is the model.

The line of thought that describes the photographic image as the indexical trace of the object represented has become an assumption in much postmodern analysis of photographs. Rosalind Krauss drew on this essay by Bazin in order to support her claim that photographic images are primarily indexical. In describing the beginnings of postmodern art she notes the pervasive nature of photographic images. Her Notes on the Index, Part 1, link the influence of photography to a rupture in the flow of modernism that ushered in the postmodern period. She argues that:

It is not just the heightened presence of the photograph itself that is significant. Rather it is the photograph combined with the explicit terms of the index.

For Krauss, in this and subsequent essays, the index becomes a defining characteristic of much postmodern art. Although she acknowledges the photograph’s iconic relationship to its object through visual likeness she also accords it an indexical relationship, suggesting that this aspect is the more significant of the two. She follows a Peircean definition of the index, relating it to representations that have a physical relationship with their referents, such as the footprint in sand, and medical symptoms:

They are the marks or traces of a particular cause, and that cause is the thing to which they refer, the object they signify.

49 Ibid. 206.
50 Ibid. 198.
The title and content of a subsequent essay by Krauss, Tracing Nadar, continues the line of argument. In relating the process of photography to the directness of a graft, Krauss again equates the photographic process to the physical trace of a footprint in sand. She suggests that Nadar explored the notion of the photograph as an imprint, register or trace. Although his work predated the writings of Peirce she argues that the concept of the index would have been familiar to him.

Krauss also suggests, more tentatively, that cast shadows could serve as indexical signs of objects. This becomes particularly significant in both her discussion of Marcel Duchamp’s painting, Tu m’, and her subsequent exploration of Man Ray’s experimental photograms. She accurately describes the photogram as a type of photograph since it is caused by light striking a sensitive surface.

Within the field of semiotics the notion of the index was revived in part by Tomás Maldonado in the mid 1970s. Unhappy with the idea that photographs merely resembled the object, or were primarily subject to a coded system of interpretation, he coined the term ‘hard icon.’ The hard icon was a sign that was directly related to, and resembled, the object. It was therefore both iconic and indexical. Maldonado argued that this was important within the context of science, particularly when studying photographs, x-rays, thermographs and ultrasound images. For these images to be meaningful there had to be a direct link between the traces and that which produced them.

This work, and the increase in critical debate surrounding the medium, led to a revival of interest in the indexical status of photographs. The three most prominent semioticians who posit this view are Henri Vanlier, Phillipe Dubois and Jean-Marie Schaeffere. There are, however, significant differences between their works. Schaeffer, for example, takes a less extreme view that the other two and allows the photograph to exhibit both iconic and indexical tendencies.

52 Nadar was working in the 1850s-60s whereas Peirce’s collected writings were not published until after his death in 1914.
53 In this essay Krauss credits Man Ray as the inventor of the Rayograph, or photogram. This is a mistake since, as stated previously, the process was well known to the founders of photography.
In contrast to Schaeffer's position, Dubois is less flexible in his definition of the photograph as index. In a similar vein to Krauss he suggests that photograms are particular kinds of photographic images that highlight the medium's indexicality. Henri Vanlier takes a slightly different approach. In describing photographs as indices, he notes the connection between the image formation and the activity of light. He describes the image as the direct imprint of the actual photons and observes that there is a less direct link between the object and its imprint on the light sensitive surface. Whilst this seems clear he reintroduces a confusion by referring to the 'scene' as being the cause of the picture. If his first view remains valid we have to presume that by 'scene' he refers not to the objects in front of the camera but the light reflected towards the eye causing a visual impression of those objects. This notion of the picture being caused by the scene is the source of much of the subsequent confusion that requires closer inspection because, as Sonesson observes

... there can be no doubt, for the present, the indexicalist theory of photography is the most thoroughly developed one, that is not to say the correct one.56

Section III: Unravelling the confusion through the concept of contiguity

There seems to be little doubt that traditional photography bears some sort of relationship between the image formed inside the camera and the world outside. However the claim for its indexicality is less clear. The qualities that are used to define the photograph as index usually include some type of physical relationship or contiguity, the term used by Peirce. This implies a proximity, contact or abrasion.

If the photographic print, that is the image made in the darkroom, is taken to be the sign under discussion, the notion of contiguity poses a problem. The photographic print, which is usually a positive image, is unlikely to have been made at the same place and time as the original exposure, which is generally a negative image. An indefinite number of positive prints can subsequently be made from the negative without there being any proximity between the photographic sign and its object. The argument for contiguity is not supported by most photographic prints which are far removed from proximity, contact or abrasion with that which is represented in the image. The photographic print therefore cannot be an indexical sign of that which is represented.

The photographic surface, that was exposed at the scene, would seem a more likely candidate for indexicality. However, the contiguity argument is still problematic since, in all photographs made in a camera, there can be no physical contact between the film and what it depicts. In traditional cameras the lens provides a solid glass barrier that only allows in light. Even in a camera without a lens such as the pinhole camera, there needs to be a spatial gap in order for the inverted image to form in the black box, or camera obscura. This is because, for the process to work, the object needs to be in the light and the photographic film or paper needs to be in the dark. The physical gap that this generates causes a problem for the index caused by contiguity. Although there is a proximity, in the sense of nearness, there is no physical contact or abrasion between the object and the image.

Although there is no physical contact between that which is being represented and its image it could be argued that light, as a mediating force, serves to bridge this gap. The camera lens and dark box are specifically designed to keep anything other than light from coming into contact with the film. In normal circumstances it is light, and only light, that causes an abrasion on the surface of the film. This light that records an imprint on film is generally reflected from the object; it is the reflected light that the object is unable to absorb. Rays of light do not, in the majority of photographs, ‘radiate’ from the object but get reflected by it. The radiation, that leaves its impression on film, is invariably from some other source of light than the object represented. It is therefore misleading to describe, as Peirce does, the photograph as ‘the effect of the radiations from the object.’ Although the surface of the film can be described as being subject to an abrasion it is the abrasion of light and not the object represented by the photographic sign. Although it is correct to say that the light causes an indexical trace on the film this is not what the sign is generally considered to represent.

There are a few particular cases in photography when the object does come into direct, and physical, contact with the photographic surface. The most frequent of these is contact printing. This is a method of making a photographic print by placing the negative, or negatives, directly onto the sensitive paper and shining a light through the semi-transparent film onto the sensitive surface. In these artefacts there is clearly a contact between the sign and the negative but this does not extend to the object signified.

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57 This could be positive or negative depending on the type of materials and processes used.
Although the majority of recent analysis has categorised the photograph as an index, there are a few critics who emphasise the significance of light rather than the objects represented. For example, Jacques Aumont, in his analysis of images, observes that, "..the photograph is a recording of a particular light at a particular time." He goes on to suggest, even more tellingly, that "photography transmits to the viewer the time of a 'light-event' of which it is the trace." This instance of the photographic sign being described as the trace of the 'light-event' is a rare example of an accurate assignation of indexicality to the light rather than the scene.

An even clearer statement of the photograph's sign value is expressed by Martin Jay:

The photograph is particularly adept at instantiating the deferral and doubling of writing because of its dual status as indexical and iconic sign, signifying both the physical trace left by the light waves and by the resemblance its image bore to the object off which those waves bounced.

Jay is in no doubt that the photographic sign has a dual aspect. He correctly attributes a photograph's indexicality to the imprint of light waves and not the objects depicted. Although he does not use the term icon he notes that the photographic image bears a visual similarity to the object represented.

Although this knowledge about the origin of the photographic image is embedded in the term 'photography', it seems that a large portion of semiotic analysis has been determined to ignore this whilst advancing the misconception of Fox Talbot. We now know, in a way that Fox Talbot did not, that it is not the object printing itself on the light sensitive surface but light. Although Vanlier, as stated previously, is aware that the photograph is primarily a trace of light he still refers to the scene as being the cause of the picture. As a result he refers to the photographic sign as an index. In directing his attention from the light to the objects that are subsequently depicted on the film he makes a similar assumption to Fox Talbot.

The indexical argument that claims that the photographic sign is contiguous to the object now looks less strong. However, photograms would appear to have a better claim on indexicality since they are usually unique images often made with some form of contact between object and sign. This raises the question of what exactly is meant by 'contiguity.' There are, perhaps different types or categories of index which depend upon different readings of 'contiguity.' The concept of contiguity can be interpreted in the following three

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Ways; physical causality / abrasion, physical contact, and proximity / nearness. By separating out these three distinct aspects of contiguity subtle differences between photographic signs can be illustrated. I will therefore propose the following table which illustrates the degree to which the three most common forms of photographic sign serve as an index of that which is represented by that sign.

(i) **Photographic exposures made at the event.** These are artefacts made in a camera, usually on photographic film. They are generally referred to as negatives although they may also be produced as positives (e.g. transparencies or polaroids).

(ii) **Photographic enlargements.** These are the artefacts that are created from the previous category of ‘photographic exposures made at the event.’ They are generally, although not necessarily, larger in size than the negative from which they were made. They are made with the use of an enlarger to project light through the film onto a suitable light sensitive surface such as photographic paper. They are produced in a darkroom that is removed in place and time from the original exposure.

(iii) **Contact prints.** These are prints made by placing the negative directly onto the receiving, photo-sensitive surface. As with the ‘photographic enlargements,’ they are generally made in a darkroom that is removed in place and time from the original exposure.

<table>
<thead>
<tr>
<th>Relationship between the object and its sign</th>
<th>Photographic exposures made at the event</th>
<th>Photographic enlargements</th>
<th>Contact prints</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical causality / abrasion</td>
<td>never</td>
<td>never</td>
<td>never</td>
</tr>
<tr>
<td>physical contact</td>
<td>never</td>
<td>never</td>
<td>never</td>
</tr>
<tr>
<td>proximity / nearness</td>
<td>usually</td>
<td>unlikely</td>
<td>unlikely</td>
</tr>
</tbody>
</table>

Table I: To identify whether the three aspects of contiguity apply to different forms of photographic sign.

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61 It could feasibly be argued that the sign value of the photographic print refers more to the negative, than the objects or events that the negative represents. However, to take this view would be to disregard the fact that the vast majority of photographs are considered to represent the scene depicted rather than simply being a translation of the negative from which they were made.

62 This is a difficult concept to pin down precisely, photographic images can include objects both near at hand and greatly distant. For the purposes of this table proximity can be considered as being within the immediate human environment, i.e. not distant stars or galaxies.
From this table it can be seen that, using the criteria of contiguity, photographs have a weak claim to indexicality. The weak claim that photographic images have to indexicality can be contrasted with a fully indexical trace found in nature, for example the trail left on a garden path by a common snail. The snail’s trace, which has none of the iconic tendencies of many other indices, satisfies all the criteria for contiguous indexicality, as can be seen in the following table:

<table>
<thead>
<tr>
<th>Relationship between object and its sign</th>
<th>Snail trail</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical causality / abrasion</td>
<td>always</td>
</tr>
<tr>
<td>physical contact</td>
<td>always</td>
</tr>
<tr>
<td>proximity / nearness</td>
<td>always</td>
</tr>
</tbody>
</table>

Table II: To identify whether the three aspects of contiguity apply to a fully indexical sign

**Conclusion: The photograph as indexical icon**

From the above discussion we can deduce that there is a clear distinction between the photographic sign and one that is solely indexical. Although, as Aumont, Sonesson and Vanlier have all pointed out, the photograph records the index of light, this is not its primary sign value. There are only a few, rare instances where the primary sign function of the photograph can be said to be light rather than an object (some of these are discussed in chapter six). As can be seen from Table I, the image that is generally taken to be the photographic sign, is only occasionally or very partially indexical.

In all traditional photographic images the sign is forced, due to the mechanics of its production, to bear a direct visible relation to the object depicted. Since what is generally taken as the photographic sign resembles a particular visual aspect of an object other than light it is, primarily, an iconic sign of that object. Although the photograph records an indexical trace of the light event it is first and foremost an iconic sign. The photographic sign should therefore be referred to as an indexical icon.
This notion is supported by Sonesson who notes that:

In any case, while it may be true that certain photographs are more indexical, or more iconical than others, it seems certain to us that the photograph is essentially an indexical icon, and not the reverse, that is, that it is first and foremost iconical, like any picture.63

In calling the photograph an indexical icon Sonesson is confirming that the sign’s resemblance to its object is more prominent than its being genuinely affected by it. Although this position would seem to bear the closest relationship to our understanding of the photographic process Sonesson does, as I intend to show, make an error in assuming that any picture is ‘first and foremost iconical.’ Whilst this may be true for conventional photographic pictures, it is clearly not the case for all pictures. There are a number of images that are primarily indexical. These are the subject of the discussion in chapter six.

Since photographic signs are primarily iconic they tend to objectify the world. The apparatus of photography, which separates the spectator from that which is observed, creates a distance between the imaging and the imaged. By positioning the spectator in a privileged position, looking through a viewfinder onto the scene, the camera promotes the notion of an active subject surveying the world of objects. Unlike predominantly indexical images, which represent events, the iconicity of photographs makes them an inappropriate choice for artists wishing to represent a reconstructive postmodern view of nature.

Summary

The concepts of icon and index have been explored and defined in relation to visual images. Although many signs possess both characteristics one or the other tends to be prioritised. These concepts have proved useful in the analysis of different types of sign. An interpretation of iconic representations tends to suggest that the world consist of objects. Indexical images, on the other hand, tend to point to the means by which the sign came into being, that is the process of sign formation. They thus reinforce the idea that the world is constituted of events. Indexical images are therefore more suitable than iconic ones for representing the reconstructive postmodern view discussed in chapter two.

Photographic images were then discussed with regard to their signification. In the nineteenth century there were some misunderstanding as to how the image was formed.

Once these were dispelled the general view was that photographs were iconic, that is they primarily resembled the world of visual appearances. A change took place in the late 1960s with the growth of interest in photographic signification, and the more widespread use of photography in critical art practice. The photographic sign came to be considered as primarily indexical in a number of significant critical publications.

It was then argued that, even though the photograph records the indexical trace of light, the photographic sign is, first and foremost, an icon. As a result photographic images are re-defined as indexical icons. In being primarily iconic, photographs suggest that the world is constituted of objects rather than events. Photography is therefore an unsuitable medium with which to represent an ecological view of nature.
Comparison of bioglyphs to other proto-photographic images

The classification of bioglyphs alongside the other proto-photographic images discussed in chapter three, has prioritised one set of criteria over another. The grouping of these artefacts together has been done because of two features that these works have in common. The first is their application of photographic materials to create images through non-conventional methods. The second is the artists' intention to represent an ecological view of nature that is more in keeping with a reconstructive postmodern approach. However, by focusing attention on these common features, the differences between these two sets of work have been pushed into the background. Such categorisation has overlooked the significant differences between these two categories of image making. By applying the critical concepts identified in chapter four, the signification of the different methods can be shown to be quite distinct.

In order to analyse the proto-photographic methods of this group we need to separate images created with a pinhole camera from those created by variations on the photogram technique. Whilst the former are more closely related to traditional photographs the latter appear more direct and less mediated. Although both types of image are generated by the action of light striking a light sensitive surface there are differences in their signification. The case of pinhole photography is relatively straightforward and can be dealt with first.

Section I: Pinhole photographs

Using the criteria for indexicality already drawn up, pinhole photographs are no different from conventional photographs. Although, in a pinhole camera, a lens made of glass is substituted with a simple pinhole aperture, it does not affect the way that the image is actually formed. This is due to the way that an image forms in all cameras. In both of these cases, of cameras with lenses and those without, an image appears inside a dark box when light is allowed to pass through an opening. Both the lens and the pinhole invert the image and the same laws of optics are used to understand the process of image formation.

The image that is formed inside the dark chamber of any camera can only be generated as a result of being projected through an aperture from the outside. Although there is, in the
pinhole camera, no glass to physically separate the object from its image it is still not possible for the object to come into contact with the surface on which the image forms. This is because, apart from a very small opening, the dark chamber in which the image forms is completely sealed off from the exterior world. The focused image is the result of light passing from the exterior, through the pinhole, into the camera. The pinhole aperture has the effect of filtering out what would otherwise be a confusion of light and only allowing a focused image to be projected onto the back of the darkened chamber. There can, therefore, be no direct contact between the object and its image.

As well as a complete lack of contact, caused by the necessary distance between the sign and the object represented, there will also be no physical causality or abrasion between object and image. This is true for the vast majority of camera-generated photographs. There are however a few rare cases where there is some contiguity through abrasion. These cases, which are discussed in the next chapter, are those where the sign denotes the light that strikes the sensitive surface rather than any physical object. Those cases excepted, a further table can be drawn showing that pinhole photographs have the same level of indexicality as traditional photographs. This is perhaps not surprising since they are both instances of 'photographic exposures made at the event.' (see Table I.)

<table>
<thead>
<tr>
<th>Relationship between the object and its sign</th>
<th>Photographic exposures made at the event</th>
<th>Pinhole photography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical causality / abrasion</td>
<td>never</td>
<td>never</td>
</tr>
<tr>
<td>Physical contact</td>
<td>never</td>
<td>never</td>
</tr>
<tr>
<td>Proximity / nearness</td>
<td>usually</td>
<td>usually</td>
</tr>
</tbody>
</table>

Table III: To identify whether the three aspects of contiguity apply to the image made using a pinhole camera.

The table shows that pinhole photographs only conform to one of the criteria of indexicality by contiguity, i.e. proximity or nearness. Even in this case proximity is not necessarily guaranteed as a great many pinhole photographs are made of distant objects that could not be described as being in proximity to the image formation. The claim to indexicality for pinhole images is therefore relatively weak. On the other hand, pinhole images always bear a
visual similarity to the object or scene represented. As such, images made in a pinhole camera are primarily iconic.

Section II: Photograms

The signification of the photogram images produced by this group is less clear. Photograms are made by placing of objects directly onto the sensitive surface and using them to partially or completely block a light that is shone onto the paper. The photogram is praised by Honnef as, ‘an elementary technique of photography completely independent of technical equipment.' To create one it is not necessary to have a camera or an enlarger. It therefore appeals to those artists who find the dependence on photographic apparatus to be an intrusion into the image making process. Unlike camera photographs there is no intermediate negative since the image is created by placing objects on or in front of photosensitive paper which then block or filter a light shone at the paper. As well as missing out this intermediate stage photograms are usually unique works that cannot be identically repeated. Both the directness and uniqueness of photograms reinforces the impression that the image is the natural trace of the object. Krauss suggests that such cameraless photography forces ‘the issue of photography’s existence as an index.' It is probably this aspect of photograms that has led to the popularity of the method amongst the proto-photographic group.

In the case of photograms, the argument in favour of indexicality appears stronger since there is a direct, and physical, contact between the object and a light sensitive surface. The photogram is, by definition, always made in the presence of the objects depicted. Even though there is no ‘abrasion’ there is some form of ‘contiguity’ – often a contact or, at the very least, a proximity – between the object and its image. Consequently the sign is made in the vicinity of that which is represented. There is, in these forms of contact print a closure of the gap between the sign and the signified. However, although the photogram is a special, and unique, kind of photograph, it is still a photo-based image. This means it is not the object, placed on the sensitive surface, that does the printing. The image is still deposited by the action of light. Any change that takes place on the receiving surface is directly the result

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of light that has not been absorbed or blocked by the object. It is the light, even in the case of photograms, that causes the image to form. If no light is allowed to fall on the surface no image will be deposited, however long the contact is maintained. Even in the case of these images made without a camera, where the object is in direct contact with the photo-sensitive surface, light is still the mediating force that causes the imprint or trace to remain.

As well as placing materials directly in contact with the photographic surface two members of the group, Miller and Derges, have also placed living matter in the photographic enlarger and projected the light through their subjects, at the paper. Mark Haworth-Booth, writing about Miller’s images of plant materials, suggests that there is sufficient difference between his methods and conventional photograms to warrant a new term for the process.

These images are not quite photograms, as light was projected through the plant and onto positive paper – in fact no appropriate term for the process has yet been devised.

Haworth-Booth is correct in his observation that there is a difference between photograms made by placing material in the photographic enlarger, and those made by placing material on the photographic surface. In photograms made using an enlarger there is no physical contact between the object and the light sensitive surface. Such works should be positioned somewhere between traditional enlargements and traditional photograms. Only in traditional photograms, those where materials are placed directly on the paper, is there any form of physical contact between the sign and the signified. Table IV identifies the difference between these two types of photograms.

<table>
<thead>
<tr>
<th>Relationship between the object and its sign</th>
<th>Photograms made with lens/ enlarger</th>
<th>Photograms made without lens/ enlarger</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical causality / abrasion</td>
<td>never</td>
<td>never</td>
</tr>
<tr>
<td>physical contact</td>
<td>never</td>
<td>sometimes / partial</td>
</tr>
<tr>
<td>proximity / neanness</td>
<td>always</td>
<td>always</td>
</tr>
</tbody>
</table>

Table IV: To identify whether the three aspects of contiguity apply to the different forms of photogram.

3 Examples of this type of work are Garry Fabian Miller’s images of leaves, Risen. 1989., and Susan Derges work using toad-spawn, Vessel. 1995.
From this table it can be seen that the claim for indexicality for those photograms made by placing materials in the enlarger is slightly weaker than the more traditional, contact type of photogram. However, both of these examples have a considerably weaker claim to indexicality than the example of a snail’s trail in Table II.

Despite the subtle differences between the contiguity of these two types of photograms their iconicity arguably still predominates. Derges, Fuss and Miller, all use Cibachrome paper to produce their photograms of semi-translucent materials. As a result their images are full colour, positive representations of natural objects which reveal a remarkable fidelity of detail. This technique, for which they are all well known, produces images which bear a more fully realised degree of visual resemblance to the objects denoted. The photograms of Neusüss, although exposed in unconventional conditions – outside in the landscape, during a lightning storm – are still very much in the tradition of black and white, negative images. These, although generally silhouettes with a limited and reversed range of tones, still portray an image that bears strong visual resemblance to the objects denoted. The photograms produced by this group of artists are thus highly iconic.

Section III: Bioglyphs

Bioglyphs are quite distinct from both pinhole photographs and photograms. In contrast to the photographic images created by this group, the changes that occur on the surface of bioglyphs are not caused by light. The film has been pre-processed with the express purpose of making it insensitive to the action of light. (For a detailed description of the methods used to generate these artefacts see separate volume Bioglyphs: Images.) The changes in the emulsion, and the resultant images on the bioglyph, are caused directly by the physical activities of micro-organisms moving across and through the gelatinous emulsion.

The trace left both on and under the surface of the bioglyph is the result of what would generally be classified as ‘natural processes’. This phrase describes a series of interlinked activities through which the living organisms carry out their existence. Such activities include eating, growing, defecating and breeding. Bioglyphs denote the proximity of micro-organisms, causing an abrasion on the film through direct, physical contact. They therefore

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fulfil all three of the criteria for indexicality through contiguity. This is represented in the following table:

<table>
<thead>
<tr>
<th>Relationship between the object and its sign</th>
<th>Bioglyphs</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical causality / abrasion</td>
<td>always</td>
</tr>
<tr>
<td>physical contact</td>
<td>always</td>
</tr>
<tr>
<td>proximity / nearness</td>
<td>always</td>
</tr>
</tbody>
</table>

Table V: To identify whether the three aspects of contiguity apply to bioglyphs

Bioglyphs are defined as artefacts in which the film’s emulsion has become the receptacle for micro-organic activity; the gelatin provides a layer within which events unfold. The artefacts are not images of living, microscopic organisms, but are actually created by them. Bioglyphs are therefore quite distinct from photographs or micrographs in that they do not portray entities or objects. There is, in bioglyphs, little or no visual resemblance to that which is denoted. Any iconic signification that may be attributed to bioglyphs is secondary to their indexical signification.

This is true for the actual artefacts themselves. However, when slides or prints have been taken from the bioglyph, the signification undergoes a subtle shift in category. Being reproductions, made by the action of light, such slides or prints fall into the same category as all photographic images. Although they can, in common with all photographs, be considered as indices of the light, the sign is primarily an icon of the object represented, in this case, the original bioglyph.

As a radically indexical method of image generation, bioglyphs contribute to an art methodology in which living matter participates in the creation of the work. Rather than denote entities or objects bioglyphs primarily represent the events which cause the marks on

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Despite this they have still provide a valuable form of presentation for the dissemination of the ideas, particularly when accompanied by a written or verbal text.
the film. They thus support and prioritise the ecological view that interprets nature as a series of events or processes that unfold through time.

Summary

The proto-photographic group have developed methods of generating images that appear to represent a more ecological view of nature than those of traditional photography. However, despite the experimental methods of this group, the majority of their work can be categorised within two distinct photographic types, photograms and pinhole photographs. As a result, the images of this group are shown to be primarily iconic and thus contribute to an objectified view of nature. Using the same criteria, of icon and index, bioglyphs are shown to be radically indexical in their representation of nature’s events. A clear distinction can therefore be drawn between bioglyphs and other proto-photographic artefacts. The conclusion is reached that bioglyphs are incorrectly categorised with this group.
6

Regrouping of indexical art

As a result of clarifying the difference between icon and index as applied to photography, and the refutation of photography as the paradigm of indexicality, we can now reconsider the role of indexicality in other forms of image-making. This chapter brings together a number of artists who have devised indexical methods for generating images. Although these artists have not previously been linked together there is a consistent theme running through this area of their practice. This theme is the common use of radically indexical methods to represent nature through its events. This group provides a more appropriate context for the interpretation of bioglyphs than a categorisation based on proto-photographic technique.

Although indexical signs far outnumber iconic ones in the natural world this is not the case in a human sign system. Indeed images which foreground their indexicality at the expense of iconicity are relatively rare in fine art practice. There are, however, a few artists who have produced work that is primarily indexical and fulfils all the criteria for indexicality outlined previously. Two of these artists come from the group discussed previously, Adam Fuss and Garry Fabian Miller. Although Fuss and Miller are both well known for their iconic photogram images they have also produced other work which can be considered as primarily indexical using the definition of the term from chapter four.

As well as these two there are a number of other artists, not previously linked together, who have all, at some time, expressed an interest in the traces of nature and have used these to produce art works. The indexical works of five of these artists are also considered. These are, Yves Klein’s Anthropométries and Cosmogénies; Charles Ross’ Solar Burns; the Snow and Ice Drawings of Andy Goldsworthy; and Stephen Turner’s series entitled Tide and Change; and the recent work of Alan Smith, Filter. By focusing on the indexicality of these works I suggest a grouping or category which enables a new interpretation of art which supports a reenchanted paradigm.

Adam Fuss’s Love and Light series

Adam Fuss has explored many avenues of photography, using both conventional methods and adapting alternative ones, including pinholes and photograms. One series of works was unusual in that it created images which the iconic and indexical sign value are so closely entwined that it is difficult to place one above the other in the hierarchy that Peirce suggests
is always at play. They may indeed be a rare exception to this hierarchy. These images are the ones made using dead rabbits and animal organs. In order to create them recently killed rabbits were placed on photographic paper, which was then exposed to light. The light records a silhouette of the rabbit on the photographic paper (fig.8).

While this method, produces a primarily iconic image, it is not the only process at work on the paper. As well as being affected by light, the photographic paper has also reacted to the chemical constituents of the rabbit’s bodily fluids, which are spilt onto its surface. The resulting swirls of colour are the result of a direct physical exposure to dead rabbit’s internal organs and fluids. The resulting images are caused, in part, by what they depict. All three criteria for indexicality through contiguity are in force. There are, in the generation of these images proximity, contact and physical causation through chemical ‘abrasion.’ Looking at these images an interpreter is confronted with both iconicity and indexicality. This series of

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Fig.8. Adam Fuss. Love. 1993. Cibachrome photogram.

1 Although beyond the scope of this thesis, the ethical implication of using freshly killed animals to generate art is highly contentious. These works were the subject of much discussion in the art/photography press.
works oscillates between the two but does not settle on either. Since producing this work Fuss has also created images using other animal organs. These employ the same method, that is a combination of light and organic fluids to generate the image.

In addition to Fuss’s images that are a combination of index and icon there are others which are primarily indexical, for example hisUntitled (Blue Spiral) of 1990 (fig.9). This image was made by recording the path of a light bulb, that was swung in a spiral, until it reached a point of rest above the centre of the photographic paper. Through the use of Cibachrome paper the image recorded is that of light that spirals in towards the centre, tracing its own path. It is not a representation of the light bulb in an iconic sense since there is no visual resemblance. The image represents the phenomena, the event of light moving through time and is thus primarily indexical.

Fig.9. Adam Fuss. Untitled (Blue Spiral). 1990. Cibachrome photogram.
Garry Fabian Miller's solar images
Like Adam Fuss, Garry Fabian Miller is well know for his photogram images, particularly his many series of plant leaves. His engagement with proto-photography stemmed as much from his interest in light as his desire to be free of the intermediary camera. This has become more apparent in his most recently exhibited art. Since the early 1990s he has been working more extensively with methods which represent light itself. These include such works as Angel (1 June 1992), Son (9 June 1992) and Crown (16 July 1993).

In these works, and other from the same period, the materials are listed as being ‘light, oil and Cibachrome print.’ In these images, in which light is filtered through oil, light becomes both the subject of the work and the means by which photographic paper records an image. His use of light is as much metaphorical as it is physical. The sign, as well as being generated by light, also refers to it. In denoting the light which caused them to come into being these images are primarily indexical.

Fig.10. Garry Fabian Miller. Son (9th June 1992). Light, oil, Cibachrome print.
Yves Klein’s *Anthropométries* and *Cosmogénies*

Amongst Yves Klein’s brief but prolific output are a number of images that demonstrate his interest in the notion of indexicality even though it was not explicitly expressed in that term. His interest in the traces and marks left by the human body are evident in an early untitled painting completed in 1948. In this work he has decorated a shirt with hand and foot imprints. This theme was revisited in the well known series of *Anthropométries*, that he began in 1958. The idea for this development can, according to Weitmeier, be related to his interest in judo and the marks left on the mat when a fighter falls. With this new series he became less interested in the imprints of hands and feet and focused on the torso and upper thighs. This being the area where the body’s energy is most concentrated. The *Anthropométries* were made by painting a model with blue paint and having her press her body directly onto the canvas (fig.11).

![Yves Klein. Untitled. 1960. Shroud anthropometry.](image)

In not being made by the hand of the artist, but by instructions issued during a public or private ritual, the sign is read primarily as the immediate document or record of the events. Although there is, in some of the series, an iconic resemblance to a human torso, this takes

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2 A more photographic version of Klein’s celebrated paintings appears in Michel Tournier’s short story, ‘Veronica’s Shrouds.’ In this story the photographer, Veronica, devises a way of recording the direct imprint of her model. She produces images without camera, film or enlarger. In order to create what she calls the ‘direct photos’ she exposes large sheets of photographic paper to light. She then had her model dipped in photographic developer before lying him on the paper. This method, which caused the demise of her model, produced unique life sized silhouettes. See, Tournier, M. 1983. Veronica’s shrouds. In The fetishist. Translated by B. Wright. New York: New American Library.
secondary place to the physical contiguity that generated the marks on the canvas. They were, according to Weitemeier,

... the means to capture life through the traces left by a living human being, who was present in a work which simultaneously transcended personal presence.\(^4\)

In addition to Klein’s interest in the imprints of the human body he complemented the Anthropométries with a series of Cosmogénies. These were made by recording the marks of nature, including the effects of rain, wind and plant materials. His Untitled work from 23\(^{rd}\) March 1960 shows imprints from leaves and reeds caked with moss and mud, and immersed in blue pigmented water from the mouth of the Loup river (fig.12). As an alternative method some of these paintings were made by strapping a freshly painted canvas onto the roof of his car and driving at speed through a storm allowing the adverse weather to interact with the wet paint. The painting Le vent du voyage records a car trip from Paris to Nice (fig.13).

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\(^4\) Ibid. 53.
These paintings were a radical and early engagement with the processes of nature. Although not framed within an explicitly ecological context he was concerned with capturing the spirit and energy of the event, as well as the transformative, ephemeral character of life. Sidra Stich observes that in these indexical works:

> the goal was not to create a representational image but to trace the passage of an object or climatic condition through time and space as a phenomenon within the universe. Klein sought to suggest the sense of movement, birth and death, thus capturing the vital forces of existence; the unknowable, ever-changing, indefinable dimensions of being; the cosmic reality of life.5

Even when there is a discernible object represented by the image, as in the case of the Anthropométries, his primary concern was not with separating the objects from the flux of time but in recording their passage through time and space. In these works, as with much of Klein’s output his concern was with representing the phenomena or event.

Some works made in the year preceding his death in 1962 show a return to the theme of the index. These were the fire paintings, and in particular the imprints made from the fire wall, mounted at the Museum Haus Lange in Krefeld, Germany. Stich links these works with the Anthropométries and Cosmogénies noting that:

They too were imprints (here recording the trace of fire), marks of the immediate, and works caused by living brushes.6

Fig.14. Yves Klein. Untitled. 1961. Fire painting from the fire wall at Krefeld.

As with all artists of the index his decisions determine the overall form that the artefacts take. For example there is the inevitable predominance of Klein Blue in many of his indexical works. However, the generation of the actual image is beyond the direct control of the artist. This distancing of the artist is what unites these works of Klein with the more ecological artists that similarly allowed nature’s events to participate in the generation of the image.

**Charles Ross’ Solar Burns**

In the 1970s Charles Ross produced a series of images by concentrating the sun’s rays onto planks of wood. Using a large condensing lens to focus the light, a trace was burnt into the wood’s surface throughout the day. The same process was repeated each day for a year. The 366 planks record the energy of the sun as deeply burnt tracks on cloudless days and as intermittent lines on cloudy days. On days when the sun was completely obscured by clouds there are no traces on the wood (fig.15).

6 Ibid. 224.
Ross refers to this imprint of the solar rays as the sun’s signature. Like the signature of a person, these artefacts not only represent the energy of the sun but are also drawn by it. It a text written by Ross to accompany the exhibition of the entire work he states, 

The discovery and direct materialisation of forms and structures contained in light... discrete, tangible images drawn by light itself... Each of the works can be considered a facet of a single larger work whose subject is the totality of light energy.

The resulting images are not in any way mimetic of the sun, but are the residue of its passing. What is represented in these works is not the sun, as an object, but light energy as a phenomena or event that unfolds throughout each and every day. This art satisfies the criteria for indexicality since the energy represented has not only come into contact with the surface of the wood, but has also physically caused a change in that surface through burning.

In creating this work the artist steps back and, using ‘simple tools and direct methods,’ allows the energy to trace its path. Ross sees his artistic role as a, ‘catalyst, initiating but not causing, participating without interfering; materialising the invisible on its own terms.’ This is typical of the method adopted by artists aiming to create indexical work. There is, in this method, an acknowledgement that through channelling and participating with nature’s events, a more connected and ecological view can be represented.

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9 Ibid. 4.
Andy Goldsworthy’s Ice and Snow Drawings

Although the majority of Andy Goldsworthy’s art is not concerned with the production of indexical images, he has produced a series of works on paper that do fit this criteria. These are the Ice and Snow Drawings first started in 1989. To create these pictures the artist gathers up a large ball of snow and incorporates mud, leaves or berries from where the snow is collected. Returning to the studio with his snowball he allows it to melt on a large sheet of paper, placed flat on the ground (fig.16). The slowly melting water carries with it the previously incorporated materials and deposits them on the paper creating an image (fig.17). In using this method Goldsworthy describes himself as ‘the initiator of the act but not the controller.’

Although the artefacts refer to the mountains where he has gathered his materials they do not depict them in an iconic way. They are primarily indices of a natural event which is beyond the control of the artist. The artwork is the residue of this event, the deposit of material over time. Whilst all paintings are likely to have this indexical aspect to some extent, and could be described as a ‘deposit of material over time,’ few are so explicitly concerned with foregrounding the process and linking it to a deep understanding of the underlying forces of nature. As Richard Bright spells out, in an essay on these drawings,

At the heart of Goldsworthy’s working method is the concept of unpredictability. This is not a reliance on blind chance, but a process of looking, touching, trying things out, and discovering hidden potentials. This process of making leads to discovery and understanding of the hidden forces of Nature. It is a learning process in which Nature is the guide.

Goldsworthy is often acclaimed as an artist whose work whose work is fully supportive of a reenchanted vision of nature. However, most of his sculptural output does not fully support this. Although he works exclusively with natural materials and organic forms, and thus draws attention to nature, this does not guarantee that he recognises an ‘element of mind in the so-called inert objects that surround us.’ His sensitivity and intuitive understanding of nature are not in question, however the majority of his work is still influenced by traditional sculptural ideas of shaping and forming of nature. His ephemeral sculpture is very much about, rather than by, nature. It is characterised by a balance between the delicacy or lightness of this touch and the precision of his control. Although many of

11 Ibid. 42.
these works will rapidly succumb to nature’s events their success lies partly in their
orderliness and temporary resistance to natural processes. This sets the snow and ice
drawings apart as they genuinely celebrate the unpredictably creative face of nature. It is
with these works on paper that he has most fully contributed to the notion of collaborating
with nature rather than imposing a vision upon it.

Fig.16. Andy Goldsworthy. Snowball melting on paper, Borrowdale, Winter 1991/2.
Stephen Turner’s *Tide and Change*

Stephen Turner’s approach to a particular site shows a clear concern for recording ‘nature’s performance’ and is a significant contribution to indexical art. His series of large canvases entitled *Tide and Change* were made at Darnet Ness in Kent, in 1998. The artwork is site specific not simply by being created and exhibited within a particular place, but is also, in a very real sense, made by the location - the Medway Estuary. In his method he has been described as, ‘... curator of work done by the river.’

His conceptual approach acknowledges the intimate relationship between the actions of the river and the activities of the changing human population, who have used the qualities of the particular place for centuries.

Turner’s ‘landscapes’ were made by fastening blank canvases onto the muddy estuary at low tide.

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14 The phrase was used by Turner in personal communication.
tide, and leaving them for a complete twelve hour cycle of the tide. The canvases were exposed to the incoming and outgoing tides which deposit mud, silt and river detritus onto their surface (fig.18). The tidal events are recorded through their contiguity with the canvas. Turner, himself, even uses the term ‘abrasion’ to describe the interaction between his canvas and the mud. After these events were recorded on the canvases Turner installed them in Darnet Fort. Each was hung adjacent to the gun port which overlooked the location in which the work was made (fig.19).

As with other indexical artists, Turner’s decisions are very precise about the parameters of his work which dictate its overall form. But within this the actual outcome, and the appearance of the work on the canvas, is solely due to the events that unfold during the time that the work is exposed to the river. This method, as Collier suggests, ‘... allows the estuary, rather than the artist, to make the gestures.’

Fig.18. Stephen Turner. Canvas pegged to Medway Estuary, 40° from Darnet Fort. 1998.

Alan Smith’s *Filter*

A similar method to that used by Stephen Turner is employed by another artist, Alan Smith. As an artist Smith is primarily concerned with weather patterns and water movements and the, ‘collection and re-presentation of evidence of organic and man made activity.’ This preoccupation with activities, and the re-presentation of natural events, links him directly to the work of Alan Sonfist and other artists concerned with the index.

Like Turner, Smith has also worked on canvases to record the deposits left by the movement of water. However, instead of using the tides he has placed his canvases in the silt beds of reservoirs and down disused lead mines at Nenthead, in Cumbria (fig.20). The canvases are left for several months before being retrieved and stretched to create the finished works. They record the staining and oxidisation that occurs through the interaction of the moulds, minerals and microscopic life forms. The resulting works have the appearance of ‘colour field paintings that are simultaneously beautiful and abject.’ (fig.21). However, unlike colour field paintings these works are not primarily concerned with an overriding aesthetic sensation but with the process by which the marks are generated. The canvases that constitute the series ‘Filter’ thus provide another example of art that is first and foremost indexical.

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18 From statement sent by the artist.
Fig. 20. Alan Smith. Fresh canvas left under ground, 1998.

Fig. 21. Alan Smith. Untitled. 1998. Completed canvas.
A new grouping of indexical art

A new grouping of reconstructive artists has been defined through the common use of the concept of the index. Rather than make links based on use of similar materials, as with the proto-photographic group, this categorisation is based on a shared concern of collaborating with natural phenomena or events in the image making process.

The seven artists, discussed above, have not been collectively exhibited or critically linked with the concept of the index. Although Fuss and Miller have been categorised together this has been on the strength of their proto-photographic methods. Unlike the majority of proto-photographic work, which is primarily iconic, some of their works can be considered as radically indexical. In both of the examples discussed light is used to create images that represent light as a phenomena or event rather than an iconic sign.

All of the works identified are generated through a direct physical abrasion, or contiguity, with the natural world. This would suggest that, using the criteria of indexicality outlined previously, the above seven artists have all created work that is radically indexical in its interpretation of natural phenomena. This points to a new categorisation, or grouping, that could be formulated which pulls together a number of artworks.

By employing a method that is designed to record nature’s events the above artists are actively collaborating with what is usually referred to as chance. These artists accept, and even encourage, unpredictable events to play a large part in the aesthetic. Whilst the harnessing of chance events in art is not in itself a new form of practice, this acknowledgement of the creative potential of nature’s performance is a relatively new phenomenon. In these indexical works chance is employed to emphasise that the unpredictable possibilities of nature are inherently creative. It is an art where the aesthetic results cannot be fully anticipated and possible outcomes only predicted. This acceptance of natural phenomena, that are beyond the direct control of the artist, emphasises that we do not live in a fully deterministic universe. By encouraging nature to become a participatory creative agent in the generation of art, such works support the panexperiential concept of nature and thus a reenchanted interpretation of the world.

19 There are many instances of artists actively employing chance in the creation of work. It was, for example, a method employed by a number of surrealists, particularly Marcel Duchamp and Max Ernst.
Because photographs have been shown to be indexical icons and because bioglyphs are radically indexical, a new grouping has been proposed based on the primary significance of index rather than secondary significance of proto-photography.
Conclusion

This project has considered the representation of nature through a contemporary ecological artistic practice. Using the concept of aletheia it was argued that images can provide us with a way of interpreting or understanding the world. Images do not simply show us what we already know but, by revealing previously hidden or obscured facets of the world, provide us with a ‘purchase.’ It was further argued that representations give us a form of knowledge about the objects or events of the world.

The mechanistic model interprets the world as though it consisted of separate objects that are acted upon solely by external forces. This model, which still exerts great influence on our thinking, has caused a number of serious problems. However, the idea that the world consists of objects is inappropriate for a reconstructive postmodern interpretation of nature. Reconstructive postmodernism is directly opposed to a modern, mechanistic view of the world which is defined as being profoundly disenchanted. These problems may be avoided by the process philosophies of reconstructive postmodern thought, and in particular, by the theory of panexperientialism.

Panexperientialism offers an alternative to the mechanistic model by suggesting that nature is more accurately described as consisting of events rather than objects. This model also suggests that these events, as well as being acted upon by other external events, also possess some degree of internal creative experience. In crediting the events of nature with internal experience and decision, panexperientialism provides a reenchanted model of nature.

Despite the growing number of artistic practices that are inspired by process thought and the notion of reenchantment, there has been little recognition of the participation of natural events in the actual generation of the art. Although artists have developed a number of strategies which focus on ecological process there has emerged no coherent formulation or analysis of how such ideas could be represented through photographic images. Indeed many examples of such work have been shown to be methodologically antipathetic. There has also been, at the same time, an increase in the deconstructive use of photography. This work, which has received considerable critical attention, is in conflict with an ecological or reconstructive view of nature.
There has, however, emerged a group of artists who have developed photographic methods which appear to reveal a view of nature that is more in keeping with the reconstructive model. It is amongst this group that the bioglyphs of this project have most frequently been categorised. Such categorisation, based on use of similar materials, has overlooked some key differences. These relate to whether such images represent nature as object or event.

In order to develop an analysis of these works two concepts have been explored. These are the Peircean notions of ‘icon’ and ‘index.’ It was argued that iconic images, by concentrating on appearance and abstracting it from the flow of time, contribute to the notion that the world is constituted by objects. In contrast to this, indexical images primarily represent events. This is because the purely indexical trace does not signify any visible object but the event which is, in some way, responsible for the residue that constitutes an indexical sign. This would suggest that, in order to represent a reenchanted view of nature through images, a primarily indexical method should be deployed.

Using these concepts it was argued that photo-based images are particularly ill-suited to represent an ecological view because, contrary to much recent discourse, photographic images are primarily iconic and thus contribute to the reification of nature. In contrast to this, the creative practice of the current research is radically indexical. By recording the traces made by micro-organic activities, bioglyphs allow images to be generated directly by natural events. Bioglyphs therefore provide a method for generating indexical images that are in keeping with an ecological position.

The classification of bioglyphs with the proto-photographic group is therefore rejected in the current project. A more appropriate grouping of artefacts has been proposed, which links bioglyphs to other forms of indexical art. Artists creating such work, that allows nature’s events to participate in the creative process, support an ecological model and contribute to the project of reenchantment. Such a realignment of artists suggests a new way of interpreting existing indexical artworks and highlights their relationship to the concept of reconstructive postmodernism.

This research suggests two further potential projects. The first would be the curation of an exhibition which brings together these indexical images and forges their link with the concept of reenchantment. The second would involve using the criteria for indexicality to create new methods of generating images by recording nature’s events.
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Bioglyphs: Generating images in collaboration with nature’s events

DARO MONTAG

A thesis submitted in partial fulfilment of the requirements of the University of Hertfordshire for the degree of Doctor of Philosophy

The programme of research was carried out in the Faculty of Art and Design, University of Hertfordshire

September 2000
Bioglyphs: Generating images in collaboration with nature's events

IMAGES
## Contents

**Introduction**

1. Creative method 2
   - Method / process 2
   - Biological status 3
   - Artefacts 4
   - Summary 5

2. Data for bioglyphs 6

3. Images 12

**Appendix I.** Public presentation of bioglyphs 89

**Appendix II.** Degradation of photographic film 91
Figures

1. Photograph showing micro-organic decay on 5.4 film – plum. 13
2. Photograph showing micro-organic decay on 5.4 film – kiwi fruit. 14
3. Photograph showing micro-organic decay on 5.4 film – sharon fruit. 15
4. Photograph showing micro-organic decay on 5.4 film – lemon. 16
5. Photograph showing micro-organic decay on 5.4 film – clementine. 17
6. Photograph showing micro-organic decay on 5.4 film – tomato. 18
7. Photograph showing micro-organic decay on 5.4 film – orange. 19
8. Photograph showing micro-organic decay on 5.4 film – apple. 20
9. Photograph of small section of film buried in sterile soil. 21
10. Film buried in garden soil for 8 days. 22
11. Scanning electron micrograph of the surface of film buried in soil. 23
12. Scanning electron micrograph of the surface of film buried in soil. 23
13. Scanning electron micrograph of the surface of film buried in soil. 24
14. Scanning electron micrograph of the surface of film buried in soil. 24
15. Scanning electron micrograph of the surface of film buried in soil. 25
16. Scanning electron micrograph of the surface of film buried in soil. 25
17. Buried, 10 days, East Dulwich. 26
18. Splendor Solis. 27
20. Beacon (Holy Island). Installation view and details. 29
21. Lemon. 30
22. Lemana IV. 31
23. Lemana V. 32
24. Earth Room Earth. 33
25. Yew. Installation view. 34
26. Yew II & XIX. 35
27. Yew V II & IV. 36
28. Yew X V III & X IV. 37
29. K2 I. 38
30. K2 II. 39
31. K2 III. 40
32. K2 IV. 41
33. K2 V. 42
34. K2 V I. 43
35. K2 V II.
36. K2 V III.
37. K2 IX.
38. K2 X.
39. K2 XI.
40. K2 X II.
41. K2 X III.
42. K2 X IV.
43. K2 X V.
44. K2 X V I.
45. K2 X V II.
46. K3.
47. K4.
48. K5 I & II.
49. K5 III & IV.
50. K5 V & V I.
51. Lower Treculliacks – Grass.
52. Lower Treculliacks – Lichen.
53. Lower Treculliacks – Moss.
54. Lower Treculliacks – Mud.
55. Lower Treculliacks – Wood.
56. Lower Treculliacks – Petals.
57. Work in progress – elderberries on film.
58. Work in progress – elderberries on film.
59. Work in progress – yew arils on film.
60. Work in progress – kiwi fruit on film.
61. Exhibition publicity material – Heaven’s Embroidered Cloths.
63. Installation view – Exposition à Suivre, Castello di Brunico.
64. Exhibition catalogue – Exposition à Suivre.
65. Lecture series publicity material – The Essential Image.
66. Installation view and exhibition publicity material – Caren Golden Fine Art.
70. Exhibition catalogue – Near.
72. Exhibition publicity materials – Phenomena, Unnatural? & This is not a photograph. 80
73. K3 installation view, Purdy Hicks Gallery. 81
74. K2 published in 'TT' magazine. 81
75. Installation and publicity material – K, The Economist. 82
76. Installation view details – K3. 83
77. Installation views – Lower Treculliacks, VTO Gallery. 84
78. Installation view and publicity material – Lower Treculliacks, VTO Gallery. 85
79. Exhibition publicity materials – Summer Exhibitions, Purdy Hicks Gallery. 86
80. Exhibition publicity material – Research into Practice, University of Hertfordshire. 86
81. Article - Nature tracing itself: Chris Townsend on Daro Montag's Bioglyphs. 87
82. Article - Nature tracing itself: Chris Townsend on Daro Montag's Bioglyphs. 88

Words in italics signify titles of artefacts or exhibitions.
Introduction

The thesis of this research project consists of two parts. The two parts, entitled Bioglyphs: Images and Bioglyphs: Text, are presented together in one slipcase. This part, Bioglyphs: Images, describes the creative practice. The other part, Bioglyphs: Text, contains the argument and the contextualisation of the practice. The first section of Bioglyphs: Images outlines the methods used to generate artefacts which support the argument of the other part of the thesis. The description of creative methodology is then followed by a section which lists the main works produced. Details are given of title, date, materials, dimensions, where and when the work has been exhibited and other relevant information for each artefact. A number of these works were made before 1996 and predate the registered research period. These are clearly identified and are included for reference purposes. The final section illustrates the actual artefacts, work in progress and materials referencing the public dissemination of the artefacts.
1

Creative method

A new method for generating images is employed in this creative practice. These images consist of abstract marks etched into the gelatin surface of coloured films. The process uses the activities of micro-organisms to generate marks on specially prepared films. Tests have been carried out to ensure that these traces are the direct result of biological activity rather than chemical reactions. It was found that the images are primarily generated by the activities of living matter, such as fungi, bacteria and nematode worms. Since this method is a novel way of creating visual art a new term, 'bioglyph,' has been coined to describe the artefacts produced. A bioglyph is the resulting artefact created when the activities of living matter have been encouraged to ingest the gelatin emulsion of specially prepared films.

Method / process

The process uses colour transparency film in either sheet or roll form. Artefacts have been created using samples from the major film manufacturers - e.g. Kodak, Fuji, Agfa. Although there are small differences in the chemical constituents of their films these only affect the colour balance of the image and not the means by which it is generated. It is therefore not a factor that needs to be taken into consideration in this section which is concerned with image formation rather than aesthetics.

Colour film is made of a clear plastic base which supports three layers of emulsion, each containing silver halides and chemical dyes. Light sensitivity is provided by the silver compounds. The yellow, magenta and cyan dyes allow a spectrum of colours to be created by their various combinations. This chemical mix is suspended in gelatin, an industrial product derived from animal skin, tendons and ligaments. When the film is used in traditional photographic processes, exposure to light causes its silver halides to chemically change and create a latent image. This is subsequently revealed during film development by the partial removal of the coloured dyes from the emulsion.

By subjecting transparency film to E6 processing without exposing it to light, the silver halides are washed away leaving only the coloured layers suspended in their gelatin emulsion. The outcome of this is a stable piece of film that has the three layers of coloured dyes and

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1 Film comes in a number of different standard sizes, i.e. 35mm, 120, 5x4, 10x8. All of these formats as well as non-standard ones have been used with this method.
thus appears, in photographic terms, black - i.e. it does not transmit light. Although the treated film is no longer sensitive to light the gelatin layers are still relatively fragile and susceptible to degradation. To prevent degradation film manufacturers incorporate a biocide into the emulsions and recommend the use of dry, acid free storage. It is this susceptibility of gelatin to decay that is utilised in the production of bioglyphs.

Since gelatin is derived from animal materials it is organic and thus susceptible to the biological processes of decay and decomposition. To initiate this natural process, and overcome the manufacturer’s biocides, soil, fruit, or other organic matter are placed in contact with the film’s surface. This is achieved either through burying the film in earth or placing plant matter on it and keeping it in a humidity tank. Through this process of contact exposure, micro-organisms, found naturally in the air and soil, invade the emulsion. Since there are vast numbers of micro-organisms present they effectively overwhelm the biocides by sheer quantity. Examples of this process are provided in figures 1-8. These photographs of bioglyphs show how micro-organisms have spread from pieces of fruit onto the surface of the film.

It should be noted that the term ‘exposure’ is used not in its photographic sense of exposure to light, but to refer to the film being in physical proximity to, and thus exposed to, micro-organisms. In these circumstances the film becomes a ground on which, and in which, micro-organic events unfold. The film’s environment becomes a small ecosystem where micro-organisms feed off the gelatin as well as each other. Such activities damage the film’s surface and, by the process of subtraction, leave a permanent trace in the coloured layers.

**Biological status**

In order to explore this practice more fully, and confirm that the traces left on the films were the result of micro-organic activity rather than simply the residue of chemical reactions, it was necessary to devise a method for testing this assumption. For the ecological coherence of this project it was considered essential that the images were significantly caused by biological rather than purely chemical means. An experiment was set up and carried out, with assistance from Dr. Richard Murphy, a microbiologist based at the Imperial College in London (see Appendix II).

In this experiment some samples of film were placed in individual containers of soil. These were then divided into two groups. The first was treated with gamma radiation, while others were left as a control. Gamma radiation was selected as it would sterilise the soil by killing all living matter. The results of the two sets were inspected after a period of nine days, both visually and with a scanning electron microscope. Samples were also viewed on a microscope through which micrographs were taken.

An initial comparison showed clear visual differences between the two samples. Although the emulsion of the film that had been buried in sterile soil was moist and soft it exhibited no significant
visual changes. Apart from small scratches caused by the removal of soil particles the surface was still dark and showed no extra colouration. In contrast to this, all of the samples buried in unsterilised soil showed distinct and dramatic changes in colour. Both sets of films were then studied under an optical microscope using reflected light. This has the effect of illuminating the surface and making visible the three-dimensionality of the sample studied. In the sterilised sample there was no trace of living matter. In the unsterilised sample living organisms were not only apparent but still visibly moving around on the surface. These were identified by Dr. Murphy as nematode worms and mites. The contrast in the two samples of film was even greater when they were studied under transmitted light. In this case light is shone through the samples. The sterile sample appeared as an overall dense, dark tone (see Bioglyphs: Images fig.9). However in the unsterilise sample the colours that had been revealed through the process of biological etching were intense and bright (see Bioglyphs: Images fig.10). This experiment confirmed that the colour changes in the film were due to biological activities rather than chemical reactions. This result implicated living matter in the creation of bioglyphs. The results from the scanning electron microscope were equally conclusive. Although only visible as black and white images on a monitor the small samples of film from the unsterilised batch were clearly damaged and covered by fungal hyphae, bacteria and other organisms (see Bioglyphs: Images figs.11-16).

Artefacts
A number of artefacts have been made as a result of this research project, some of which have been exhibited publicly. The public display of the bioglyphs has, to date, taken four different forms. These are (i) the original pieces of decomposed film exhibited on light boxes, (ii) 35mm slides made from decomposed film designed for projection, (iii) enlarged Ilfochrome prints taken from the original pieces of film and (iv) 35mm slides made photographically from the Ilfochrome prints. Although all four forms have been used to present the ideas that this method explores it is only the first two, which present the original sheets of film, that can genuinely be considered as bioglyphs. The second two, being photographic reproductions of the original film are quite distinct in their means of generation. Prints taken from the original film are copies of bioglyphs; and 35mm slides of these prints are thus copies, of copies, of bioglyphs. These differences will be analysed further; however it is sufficient to note, at this stage, that the images that accompany this thesis are not the original bioglyphs but reproductions of them, both photographic and digital.

The generation of bioglyphs has, so far, used micro-organisms occurring naturally in either the air or some material that contains oxygen, such as soil, manure or compost. Although there are other environments where micro-organisms occur in large numbers – such as the human gut – these have

\[2\] Although the actual bioglyphs cannot be bound in with this thesis, as much to protect the archived document as the artefacts themselves, some will be exhibited at the PhD examination.
not yet been explored for the creation of this art. This is partly due to health and safety considerations since aerobic bacteria are generally safer to handle than anaerobic ones.

Summary
This volume outlines the art created prior to, and during this research project. It describes a novel method of generating artefacts, which have been termed ‘bioglyphs.’ Bioglyphs are made by encouraging micro-organisms to interact with the coloured, gelatin emulsion of film. These biological activities, which record micro-organic events, have been instigated through two distinct processes. One is through burying film in soil and the other is by allowing plant matter to decompose on the film’s surface.

The data relating to the specific works of art, with key information concerning their public dissemination, are presented in the following section. Those bioglyphs made before 1996 predate the registered research period but are included for reference. The third section of this volume provides images which represent the bioglyphs, photographs of works in progress and visual material relating to the public exhibition and presentations. The issues raised by this particular method of generating images are discussed within the context of related artistic practice in the accompanying volume.
2

Data for bioglyphs

<table>
<thead>
<tr>
<th>Bioglyph: Images of BURIED 10 DAYS, East Dulwich (fig.17)</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 film, soil, microbes, lightbox.</td>
<td>99.5 x 20.5 x 13.5 cm.</td>
</tr>
<tr>
<td>L’H du Siège, Valenciennes, France – 1996.</td>
<td></td>
</tr>
<tr>
<td>Bruneck Castle, Italy – 1996. (see Bioglyphs: Images fig.63)</td>
<td></td>
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<tr>
<td>University of Hertfordshire – 1997.</td>
<td></td>
</tr>
<tr>
<td>Museum of Sharjah, United Arab Emirates – 1998-99. (see Bioglyphs: Images fig.70)</td>
<td></td>
</tr>
<tr>
<td>Bioglyph made by burying a roll of film vertically in the soil. The film was exhumed after 10 days and exhibited in lightbox.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bioglyph: Images of LIVING LIGHT Manure, Compost, Topsoil</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel of 3 Ilfochrome prints.</td>
<td>108 x 240.5 cm.</td>
</tr>
<tr>
<td>5.4 film, manure, compost, topsoil, microbes.</td>
<td>27.5 x 33 cm.</td>
</tr>
<tr>
<td>Three sheets of film were buried separately in three different media. Prints made from the buried film were exhibited above a box containing the original manure, compost and topsoil.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Bioglyph: Images of FACE UP ~ FACE DOWN</th>
<th>1993</th>
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</thead>
<tbody>
<tr>
<td>Panel of 2 R-type prints.</td>
<td>101 x 159 cm.</td>
</tr>
<tr>
<td>5.4 film, garden soil, microbes.</td>
<td>27.5 x 33 cm.</td>
</tr>
<tr>
<td>Two bioglyphs made by burying film in a London garden. One sheet was buried face up, the other face down. Film exhibited on lightbox under the large prints.</td>
<td></td>
</tr>
<tr>
<td><strong>SPLENDOR SOLIS</strong> (fig.18)</td>
<td>1993</td>
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<td>-----------------------------</td>
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<tr>
<td>Panel of 4 Ilfochrome prints.</td>
<td>109.5 x 77 cm.</td>
</tr>
<tr>
<td>10.8 film, elderberries, microbes.</td>
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Bioglyphs made by covering film with elderberries gathered from the garden. The film was kept in a glass tank to retain humidity and allow progress to be checked. (see Bioglyphs: Images fig.57-58)

<table>
<thead>
<tr>
<th><strong>KIWI I, II, III</strong></th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 R-type prints.</td>
<td>97 x 76 cm each panel.</td>
</tr>
<tr>
<td>5.4 film, kiwi fruit, microbes.</td>
<td>27.5 x 22.5 cm.</td>
</tr>
</tbody>
</table>

National Museum of Photography, Film and Television, Bradford – 1995. (See Bioglyphs: Images fig.61)

The work was made by encouraging kiwi fruit to decompose on film. The bioglyphs were exhibited on a light box underneath the three large prints. Kiwi III was used as a poster for Banker’s Trust Awards.

<table>
<thead>
<tr>
<th><strong>FRUIT OF THE SUN</strong> (fig.64)</th>
<th>1994</th>
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</thead>
<tbody>
<tr>
<td>4 Ilfochrome prints.</td>
<td>51 x 40 cm.</td>
</tr>
<tr>
<td>5.4 film, fruit, microbes.</td>
<td>27.5 x 22.5 cm.</td>
</tr>
</tbody>
</table>

Exposition à Suivre, The Tannery, London – 1995. (see Bioglyphs: Images fig.64)  
L’H du Siège, Valenciennes, France – 1996.  
Bruneck Castle, Italy – 1996.  
University of Hertfordshire – 1997.  

A series of bioglyphs made by encouraging single slices of fruit to decompose on film. The four bioglyphs were exhibited on a light box underneath the four prints.

<table>
<thead>
<tr>
<th><strong>OXLEAS WOOD</strong> (fig.19)</th>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video</td>
<td>6.36 mins.</td>
</tr>
</tbody>
</table>

### EXPIRE - Hope of a Tree

<table>
<thead>
<tr>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bioglyph</strong> made by positioning a cross-cut piece of timber on the film and placing in the humidity tank. The bioglyph was exhibited on a lightbox under the large print.</td>
</tr>
</tbody>
</table>
| **R-type print.**  
5.4 film, cross-cut timber, microbes.  
97 x 76 cm.  
27.5 x 22.5 cm. |
Bruneck Castle, Italy – 1995. |

### MUNDI I, II, III

<table>
<thead>
<tr>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bioglyphs</strong> made by masking a cross on the film with sand before burying it in compost and manure. The bioglyphs were exhibited on a lightbox under the three large prints.</td>
</tr>
</tbody>
</table>
| **3 R-type prints.**  
5.4 film, compost, manure, sand, microbes.  
97 x 76 cm each panel.  
27.5 x 22.5 cm. |
Windlesham Arboretum, Surrey – 1996. |

### BEACON (Holy Island) (fig.20)

<table>
<thead>
<tr>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processed film</strong> was buried in soil gathered from five different locations on Holy Island, off the West Coast of Scotland. Holy Island is an interfaith centre which concerns itself with spiritual and ecological values. The film was exhumed after a period of two weeks and used to make five separate prints. These are presented one above the other resting on a plinth of oak which contained the original soil. The vertical form of the finished work reflects the lighthouse on the island which once served as a beacon of warning and now used for symbolic reference.</td>
</tr>
</tbody>
</table>
| **5 Ilfochrome prints.**  
Oak, soil from Holy Island, microbes.  
255 x 76 cm. |
Windlesham Arboretum, Surrey – 1996. |
**LEMON**  (fig.21)  1996

Unique Ilfochrome print.
5.4 film, lemon, microbes.

97 x 76 cm.
27.5 x 22.5 cm.

Windlesham Arboretum, Surrey, 1996.
Caren Golden Fine Art, New York – 1997. (see Bioglyphs: Images fig.66)

A slice of lemon was positioned on the processed film which was then placed in a glass tank which provided a humid environment. Micro-organisms, present in the air, grew on the fruit and spread into the film. The arrangement was left for thirty days after which time much of the film’s emulsion had been decomposed.

---

**LEMANA I-VI**  (figs.22-23)  1996

6 unique Ilfochrome prints.
5.4 film, lemon, microbes.

97 x 76 cm.
27.5 x 22.5 cm.


Further works using slices of lemon of varying thickness to instigate the biological activities.

---

**EARTH ROOM EARTH**  (fig.24)  1996

Unique Ilfochrome print.
5.4 film, soil from New York Earth Room, microbes.

97 x 76 cm.
27.5 x 22.5 cm.


For this work a small sample of soil was taken from Walter de Maria’s permanent installation, New York Earth Room (1977). This installation consists of 197m² of earth, peat and bark. The soil collected contained no visible living organisms. The soil was placed in a circle, 5cm in diameter, on a sheet of processed film. Within a few days of being placed in a humidity tank visible organic growth was observed spreading from the soil into the film. The work was first exhibited at a gallery in the same street as the New York Earth Room.
### YEW (figs.25-28)

<table>
<thead>
<tr>
<th>20 Ilfochrome prints (edition of 3).</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>35mm film, yew arils, microbes.</td>
<td></td>
</tr>
<tr>
<td>30.5 x 40.5 cm.</td>
<td></td>
</tr>
</tbody>
</table>

Caren Golden Fine Art, New York – 1996. (see Bioglyphs: Images fig.66)

A series of twenty bioglyphs made by placing fruit (arils) gathered from a yew tree on to the film’s emulsion and leaving for a period of fourteen days. Initially made to be exhibited as a series of light projections, the work has been shown more frequently as a series of Ilfochrome prints. An accompanying catalogue has been published (Montag 1997) which contextualises reproductions of the bioglyphs with two essays (see Bioglyphs: Images fig.67). The work has also been reproduced and discussed in the catalogue, Near (Museum of Sharjah 1998) (see Bioglyphs: Images fig.70).

### K21-XVII (figs.29-45)

<table>
<thead>
<tr>
<th>17 unique Ilfochrome prints.</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4 film, kiwi fruit, microbes.</td>
<td></td>
</tr>
<tr>
<td>102 x 76 cm.</td>
<td></td>
</tr>
<tr>
<td>25.5 x 20.5 cm.</td>
<td></td>
</tr>
</tbody>
</table>

Hartlepool Art Gallery – 1997 (K2 V I).

A series of seventeen works made using slices of kiwi fruit to initiate the process. A similar procedure to that used in the creation of Lemon was followed. Three of the works were printed in ‘IT’ magazine (see Bioglyphs: Images fig.74).

### K3 (fig.46)

<table>
<thead>
<tr>
<th>8 unique Ilfochrome prints.</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 sheets 5.4 film, kiwi fruit, microbes.</td>
<td></td>
</tr>
<tr>
<td>250 x 400 cm.</td>
<td></td>
</tr>
</tbody>
</table>

Purdy Hicks Gallery, London – 1999. (see Bioglyphs: Images fig.73)
Carlisle City Museum and Gallery – 2000.

One kiwi fruit was cut into twenty slices. These were distributed over the surface of eight sheets of film in the humidity tank.
<table>
<thead>
<tr>
<th><strong>K4</strong> (fig.47)</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 unique Ilfochrome prints.</td>
<td></td>
</tr>
<tr>
<td>4 sheets 5.4 film, kiwi fruit, microbes.</td>
<td>204 x 152 cm.</td>
</tr>
</tbody>
</table>

To be exhibited at Caren Golden Fine Art, New York – Oct. 2000. Also to be included in group exhibition, *This is not a photograph*, University of CA at San Diego, La Jolla; University of Virginia, Charlottesville, VA; De Paul University, Chicago – Mar. 2000 - Mar. 2001.

Twelve slices of kiwi fruit placed in grid formation on four sheets of film in the humidity tank.

<table>
<thead>
<tr>
<th><strong>K5</strong> (fig.48-50)</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 panels, digitally printed onto canvas.</td>
<td></td>
</tr>
<tr>
<td>8 sheets 5.4 film, kiwi fruit, microbes.</td>
<td>Each panel 100 x 125 cm. Installation dimensions variable.</td>
</tr>
</tbody>
</table>

The Economist, London – 2000. (see Bioglyphs: Images figs.75-76)

Kiwi fruit sliced and placed at random on eight sheets of film in the humidity tank. This work was commissioned by The Contemporary Art Society. The final prints were printed onto exterior grade canvas and installed on Boodle’s wall in the Economist Plaza.

<table>
<thead>
<tr>
<th><strong>LOWER TRECULLIACKS</strong> (figs.51-56)</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass tank containing 8 sheets 5.4 film, grass, lichen, moss, mud, wood, fungi, compost, petals, well water, microbes.</td>
<td>Glass tank 30 x 30 x 45 cm.</td>
</tr>
<tr>
<td>8 unique Ilfochrome prints.</td>
<td>Each panel 102 x76 cm.</td>
</tr>
</tbody>
</table>

VTO Gallery, London – 2000 (see Bioglyphs: Images figs.77-78)

Materials gathered from Lower Treculliacks, Cornwall, placed on film in humidity tank. Tank was sealed for duration of the exhibition. Prints made from exhibit used for catalogue and forthcoming exhibitions.
3 Images
Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of plum. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig. 2

Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of kiwi fruit. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig. 3

Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of sharon fruit. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig 4.  

Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of lemon. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig.5

Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of clementine. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig.6

Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of tomato. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of orange. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig. 8

Photograph showing micro-organic decay on 5.4 film. The process was initiated using a slice of apple. Micro-organisms from the air settled on the fruit before spreading into the emulsion of the film.
Fig. 9

Photograph showing small section of film buried in sterile soil.
Samples of film buried in garden soil for 8 days. Photographic prints made from small sections using transmitted light on microscope. Images show clear evidence of biological activity on the film.
Fig. 11 EL400 6 days Cryo 8kv 350Adeg x125 +30deg 32mm

Fig. 12 EL400 6 days Cryo 8kv 350Adeg x500 +30deg 32mm

Scanning electron micrographs of the surface of film buried in soil. Images show spores, fungal hyphae and soil particles.
Scanning electron micrographs of the surface of film buried in soil. Images show nematodes, fungal hyphae and soil particles.
Scanning electron micrographs of the surface of film buried in soil
Images show fungal hyphae
Fig. 17

*BURIED, 10 Days, East Dulwich* 1993
120 film, soil, microbes, lightbox
Fig. 18

Panel of 4 unique Ilfochrome prints.
Fig. 19

*Buried, Oxleas Wood* Video, 27.4.94.
Installation view, Possibilities of Extension, Aspex Gallery, 1995

*Beacon (Holy Island)* 1995
5 Unique Ilfochrome prints
Oak, soil from Holy Island, microbes

Fig.20
Fig. 21

Lemon, 1996.
5.4 film, lemon, microbes.
Fig. 22

*Lemana IV*, 1996.
5.4 film, lemon, microbes.
Fig. 23

*Lemana VI*, 1996.
5.4 film, lemon, microbes.
Earth Room Earth, 1996.
5.4 film, soil from Walter de Maria’s New York ‘Earthroom’, microbes.
Fig. 25

**Yew**, 1996.
20 Ilfochrome prints (ed.3).
35mm film, yew arils, microbes.
**Yew II**, 1996.
35mm film, yew aril, microbes.

**Yew XIX**, 1996.
35mm film, yew aril, microbes.
35mm film, yew aril, microbes.

**Yew IV**, 1996.
35mm film, yew aril, microbes.
Yew XVIII, 1996.
35mm film, yew aril, microbes.

Yew XIV, 1996.
35mm film, yew aril, microbes.

Fig. 28
Fig. 29

5.4 film, kiwi fruit, microbes.
Fig. 30

5.4 film, kiwi fruit, microbes.
Fig. 31


5.4 film, kiwi fruit, microbes.
Fig. 32

5.4 film, kiwi fruit, microbes.
Fig. 33

5.4 film, kiwi fruit, microbes.
Fig. 34

5.4 film, kiwi fruit, microbes.
Fig. 35

5.4 film, kiwi fruit, microbes.
Fig. 36


5.4 film, kiwi fruit, microbes.
Fig. 37

5.4 film, kiwi fruit, microbes.
Fig. 38

K2X 1997.
5.4 film, kiwi fruit, microbes.
Fig. 39  

5.4 film, kiwi fruit, microbes.
Fig. 40


5.4 film, kiwi fruit, microbes.
Fig. 41

5.4 film, kiwi fruit, microbes.
Fig. 42


5.4 film, kiwi fruit, microbes.
Fig. 43

5.4 film, kiwi fruit, microbes.
Fig. 44

5.4 film, kiwi fruit, microbes.
Fig. 45

5.4 film, kiwi fruit, microbes.
Fig. 47  
5.4 film, kiwi fruit, microbes.
Fig. 48

**K51 & II**, 2000.
5.4 film, kiwi fruit, microbes.
Fig. 49

5.4 film, kiwi fruit, microbes.
Fig. 50

5.4 film, kiwi fruit, microbes.
Fig. 51


5.4 film, grass, microbes.
Fig. 52

5.4 film, lichen, microbes.
Fig. 53

*Lower Trecullacks - Mos*, 2000.
5.4 film, moss, microbes.
Fig. 54  

5.4 film, mud, microbes.
Fig. 55

5.4 film, wood, microbes.
Fig. 56

5.4 film, petals, microbes.
Fig. 57

Work in progress.
Elderberries on 10.8 film.
Use of humidity tank to encourage microbial growth.
Fig. 58  Work in progress.
Elderberries on 10.8 film.
Advanced stage of decomposition.
Fig. 59

Micro-organic activity on film instigated by placement of arils on emulsion surface.
Fig. 61

The artist in the exhibition, Possibilities of Extension, explores the properties and significance of light. Through the process of photography, they focus on light with reference to its elemental impact on life and existence, and as a representation of God. These photographs question the relationship between science and nature as they outline an exploration of the principles which define natural phenomena. As we consider these, we can see that they are an examination of man’s relationship to the world and that they indicate a re-interpretation of the world of sense as determined by concepts of the sacred.

Susan Derges

In the series Vessels, Susan Derges has recorded the early growth of rooted plants. As we follow the series we slowly see the formation of the individual plant. By recording the action of the roots, we slowly see the growth of the plant. This series is an attempt to outline the relationship between the “Observer and the observed - the experimenter and the experiment.” This relationship can be defined by the principle of an inner “unity of opposite.” Eastern religious and contemporary physics have presented a version of reality as a series of opposites, a discovery that the physicist, Ludwig von Bertalanffy refers to as the way in which “hardly separable and inseparable opposites turn out to be...complementary aspects of the same reality.” If we accept this reasoning we can see that Susan Derges is acknowledging that the observer “makes the world in a very real way.” Until such Derges is “placing herself in the work.” “I believe that the work is the desire to integrate the self with the world, for the self to be fundamentally one with the universe. Vessels allow the sense that “existence is not a matter of oneself and the world, but rather oneself in the world.”

Diana Montag

Diana Montag, like Susan Derges, records traces of movement and growth, “recordings of living processes.” C. R. M. Davy’s decal of the photographic film is allowed to take place by involving living organisms to feed on its chemical coating. Montag refers to this work as “not concerned with appearances but with expressing the energy that is stored in all living things.” He outlines the pattern of growth and expansion to which we are inevitably bound. The earth is developed from soil taken from Holy Island. Montag chooses specific sites of spiritual significance to bury his film to allow the chemical changes to take place. His work refers to the cyclic nature of life and death. He expresses how our relationship to the world appears in a state of radical interchange, not separate but interwoven. The suggestion is that the sacred is revealed through phenomena that binds us to the cosmos and not solely through mankind.

The photographs in this exhibition refer to the impression of reality and the natural powers which dominate all living organisms and express those elements which reveal to the viewer aspects of the sacred. In order to achieve an expression of the relationship between natural causality and God, the artists have chosen to abandon forms. In their work, they illustrate the metaphysical relationship of man to his surroundings. The earth does not portray nature for the purpose of an experiencing of nature, but for the experiencing of the spirit. Abstraction is then considered a process, the means of which is to incorporate ideal significance over formal perfection - the mystery of spirit over matter. So that, having avoided direct indication of nature by using abstract forms the artists are able to demonstrate naturalistic forms and spiritual concerns.

Possibilities of Extension

Aspex Gallery
4 November - 24 December 1995

Fig. 62 Exhibition catalogue, Possibilities of Extension, Aspex Gallery, Portsmouth, 1995.
Fig. 63  Installation view, Castello di Brunico, Italy.  
*Exposition à Suivre* Acte de Naissance exhibition, 1996.

Fig. 64  
*Exposition à Suivre*  
Acte de Naissance catalogue, 1996.
Fig. 65      Poster for Oxford Photography lecture series, The Essential Image, 1996.
Fig. 66  Top: Installation view, Caren Golden Fine Art, New York, 1997.
Fig. 67

Front and back covers.

Title page.
Sci~art: Partnerships in science and art.
Catalogue of collaborative projects between artists and scientists,

Fig. 68
this art does not portray objects or entities - it discloses events
it is not concerned with classification but with revelation

the method uses film but not a camera
it is not optical but physical
the black film is loaded with colour
waiting to be released

the creativity of this project does not reside solely with the artist or the scientist
it also includes countless micro-organisms
the art is in the performance of these subjects
their play of interaction leaves an indelible trace

this work is made by a range of biological activities
these include eating, defecating, wriggling, procreating
when carried out by micro-organisms these activities are commonly known
as decomposition

in exposing film to such activity
the art realises the creative potential of decay
it is composition by decomposition

everything is in the process of becoming something else
creativity is the natural state of living matter
living matter is the embodiment of creativity

this art makes visible the unseen events of the micro-organic world
the insignificant is brought into signification
in a universe in which all things are connected
it is a celebration of cosmos

Fig. 69

Sci-art: Partnerships in science and art.
The Wellcome Trust, London.
Fig. 70

Work by
David Hiscock
Paul Kenny
Garry Fabian Miller
Daro Montag
Floris Neussüs

REVELATION
12 March to 10 April 1999
Private View
Thursday 11 March 6 to 8pm

Purdy | Hicks
63 Hopton Street, Bankside, London SE1 9ER. Telephone 0171-401 3399. Fax 0171-401 3955.
Monday, Tuesday, Thursday, Friday 10am-11pm. Wednesday 10am-7pm. Saturday 10am-1pm.

Review of exhibition, Creative Camera, Apr-May, 1999. 46.
Fig. 72  Publicity notices, group exhibitions, U.S.A. 1999.
Fig. 73


Fig. 74

*K2* series used as triple page spread for *TT* magazine, 1999.
Fig. 75

Daro Montag
10 May – 2 July 2000

You are invited to the opening reception on Tuesday 9 May, 6.30pm–8.30pm
at The Economist Plaza 25 St James’s Street London SW1

K5 2000.
The Economist, London.
Fig. 76 K5, 2000, (details).
The Economist, London.
Fig. 77

*Lower Treculliacks.*


Tank contains grass, lichen, moss, soil, wood, fungi, compost, petals and water gathered from Lower Treculliacks, Cornwall.
Installation of view of bioglyphs in progress, Lower Treculliack, VTO Gallery, London.

Fig. 78 Publicity material for Somewhere, someone is doing something, VTO Gallery, London, 2000.
Fig. 79  Publicity materials for summer exhibitions, Purdy Hicks Gallery, London, 1999 & 2000.

Fig. 80  Publicity material for Research into Practice, Exhibition & conference, University of Hertfordshire, 2000.
Bioglyphs: Images

I AM A CAMERA

Chris Townsend gets his hands dirty with DARO MONTAG

If photography is considered as a process of ‘writing with light’ then we should perhaps query Daro Montag’s credentials. Recently appointed head of the Photography course at Falmerse College of Art, Montag is one of those British photographers - with Susan Derges, Adam Fuss, Chris Bucklow, Gary Fabian Miller - whose work has become increasingly elemental and, in consequence, increasingly independent of the action of light on a subject on film.

The action on film in Montag’s work is in no way mediated through a camera. The film, itself, becomes the subject of direct actions by the landscape. For several years the principal direction of his work has been the burial of film, allowing micro-organisms and fungal structures to work on its surface, or else, in his series Yow, the film is placed beneath decaying organic matter. The Scanning Electron Microscope photographs of recent burials show how the film is not only the subject of chemical attack, but also begins to bear the traces of terrestrial worms both on its surface, and within its supposedly dimensionless thickness. And at this scale the film itself becomes landscape.

In what sense are these traces photographs? Montag himself refers to his images as “bioglyphs”; traces of the organic. Unlike the elemental images of Derges, whose waste and light combine, light here is not the stimulus to chemical action on the film, as it is even in a contact print, what happens is a reaction between chemicals and the image - a representation as much of that reaction as it is of the organic object after which the work is named.

And yet what we have here is a fulfilment of the (failor’s) fervent dream for photography: a clear, self-reflective act, the very nature of which Nature holds a mirror up to itself. The agency is that of the subject, rather than that of the artist, as in painting. The image derived from chemical agency here is not such an indexical trace of its subject. It is the phyloscopy, the absolute certainty, of this reference that makes Montag’s work ‘photographic’.

Daro Montag

Nature recording itself. In his letters to Herschel, Talbot constantly comes back to photography as a process by which Nature holds a mirror up to itself, and in which the agency is that of the subject, rather than that of the artist, as in painting. The image derived from chemical agency here is not such an indexical trace of its subject. It is the phyloscopy, the absolute certainty, of this reference that makes Montag’s work “photographic”.

If one of the defining characteristics of the photograph is its individuality, what Roland Barthes defines in L’auteur in the same way that phlogograph has been, a phenomenaological act at a moment in space and time, then Montag’s bioglyphs are indeed “photographic”. There was a poor bear; it took its seat, as an object present at a specific moment and in a specific space.

Barthes, however, also seeks to stress another quality of photography as a coherence between the reference of the image and its “referent”, the address of the image to the spectator by its subject. Writing a commemorative essay on Barthes, and carefully separating the functions of the image from the conditions of reference, Jacques Derrida comments... In the photograph the referent is necessarily absent, responsible, warranted into the unique past time of its event, but the reference to this referent... also implies incoherently the happening of a unique and inevitable referent. It implies the “return of the dead” in the very structure of both its image and the phenomenon of its image. Barthes’s coherence is between a presence and an absence, though, and this is what interests Derrida, where he sees a fundamental connection between photography and the Western metaphysical tradition. It’s an absence that re-mark presence.

It’s at this point that Montag’s work’s task is to pose a challenge to photography’s absolute guarantees - much as Barthes himself relentlessly undermines categorical statements in
The turn to the Yew reflects an interest in the sacred and nature: earlier projects included film burials in places such as Holy Island, and Montag certainly would describe himself as an ecological artist, as opposed to being a photographer, or even an environmental artist. There's no sense of human intervention in these works in either the scale or traces of agency that characterise environmental art from the 1960s and 1970s. What there is, however, is a dialogue with such art. In Earth Room...