Goethean Science in Britain

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Abstract

Taking the phenomenon of Goethean science in Britain as the starting point this thesis describes aspects of the phenomenon, particularly its method, as it was met by the researcher. Seeing Goethe's own scientific work and pronouncements on how science should be conducted as the foundation, but not the sum of what is taking place now, it explores the historical links in terms of a developing tradition. The preservation and development of Goethe's method is presented as an achievement of Rudolf Steiner's anthroposophy and the roots of this philosophy are shown to be grounded in Goethe's schooled intuitive approach.

The continued presence of a strong moral theme in the tradition is clarified and its aim of self-development is established. Although the idea of Goethean science as inherently ethical is problematized the discussion does suggest that it could be a significant voice in environmental ethics.

To see to what extent a sustained argument can be made for the claim that Goethe was an early phenomenologist an extended comparison with Husserl's work is carried out. The conclusion reached is that there are similarities in their respective methods, practices and aims.

By participating in the style of research proposed by Goethe and developed by Goethean scientists this study also seeks to capture the dynamic of what it is like to engage in this field. Through this method I have emphasised that what is effective in Goethe's approach is its ability to see natural phenomena not as static objects but as in the process of becoming. I have sought to show that only by seeing Goethean science as also in the process of becoming is it possible to capture for a moment in time what it is.

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Introduction

> Maybe one is dealing with the great beech one winter, covered with buds. As the slow ritual of the heavens proceeds, the time approaches when the Moon draws into alignment with Saturn and the earth; and we see this moment greeted by a myriad of buds all over the tree, each making a little gesture of opening, in acknowledgement. Imagine a million pairs of tiny hands, clasped in prayer, and as the appropriate moment arrives, each unfolding a very little, in a gesture - of what? Of receiving? Of gratitude, maybe? I feel that the grail motif, of nourishment, is important here. We are reminded of Rudolf Steiner's words "In our coming to grips with nature we develop forms wherein nature herself worships divinity...In reality, every plant, every tree has the desire to look up in prayer to the divine"[1]

When faced with a statement like that above, coming as it does after a lifetime's rigorous examination of a natural phenomenon, what can one say? How is it possible to begin to understand what is behind the way of thinking that it represents? The phenomenon of Goethean science in Britain presents just this question.

The aim of this thesis is to explore Goethean science as it is in Britain. There are many aspects of Goethean science which could have been central and many ways of looking at something which could have provided a model. However, the aspect which I place at the centre of this study is the method and practice of Goethean science and the way of looking is —as far as I am capable of it— Goethean.

Although this is quite a small movement in Britain it provides an approach which has wider implications in the practical fields of science teaching, agriculture, medicine and ecology. Also the unusual position it occupies at the boundary points between subjectivity and objectivity, between art and science and between the practical and the spiritual make it highly fruitful in terms of a general study of epistemology. Goethean science attempts to dissolve these boundaries without diluting the integrity of the phenomena or the individual.

Beginning just with the idea that any object of study should be handled respectfully I found that Goethean science itself provides a method and many techniques which have been useful in finding a way of looking at something which does not distort what it is.

The epistemological problem that arises from any attempt to speak about facts about the natural world is at the heart of Goethean science. Goethe's own thinking on this question is lucid. His way of working, as it has been developed by Rudolf Steiner, has many adherents whose method and practices are the focus of this thesis.

The first chapter will take the form of a description of the phenomenon in question. As the area to be covered by this thesis is Britain it begins with an account of some of the, seemingly disparate, things happening in Britain pertaining to Goethean science. Its separate sections allow an examination of many different angles such as the teaching of science to children and this will begin the task of defining what is and what is not Goethean science. It will also raise, in the mind of the reader the questions which the rest of the thesis is an attempt to answer. The central question is 'what is Goethean science?' And in answering that question other issues, such as the transmission of authority, embeddedness in an anthroposophical worldview and an understanding of the nature of matter from a spiritual perspective will be discussed. In chapter two one particular piece of research is covered which helps to define what Goethean science is by looking at an anthroposophically inspired project which uses an uncharacteristic amount of purely quantitative data. An examination of this particular work allows a discussion of where Goethean science diverges from what appears to be an application of orthodox science to anthroposophical ends.

Goethe's own writings on the attempt to develop a theory free science forms the basis of the third chapter. This will contain the historical material which presents Goethe as a scientist working at the end of the eighteenth and beginning of the

nineteenth century. It will also show how he interpreted the work of such figures as Francis Bacon and Paracelsus to arrive at a personal configuration of the theory versus practical empiricism tension.

Due to the extent to which some of the practices of Goethean science diverge from 'orthodox' scientific practice the next chapter will give a full account of the four fold method as it is presented pedagogically. I focus on the way the method is taught in Britain through the experiences of participants on the School of Life Science courses.

The greater fluidity between the four stages and the ethical implications of the method is discussed in the real practice (as opposed to the pedagogical practice) of a landscape survey at Pishwanton, a piece of woodland in Scotland. The issues of perception and representation are also raised in this chapter through a discussion of the ethnographic techniques available to the researcher and the choices which have been made in this instance.

Surveying the transmission of authority from Goethe, through the work of Rudolf Steiner's interpretation to the work of practising Goethean scientists such as Jochen Bockemühl forms the basis of the next chapter. Rather than look at this transmission for evidence of corruption of the original work by Goethe it will be viewed as a living tradition which is in the process of defining itself. Following Alasdair MacIntyre's approach to traditions I shall explore the questions that arise about practices and the controversies over interpretation as the process of definition.

Due to the format of a thesis and the way in which the material is dealt with in depth it might seem that the practice of Goethean science is complex and counter intuitive. To explain the simplicity of it I look at a similar instance of growing perceptive powers in one of the pressure group Common Ground's projects. The similarities are explored to show how the kind of 'seeing' which is the aim of Goethean science can occur spontaneously out of a desire to see. Other areas which

share some aspects of Goethean science are also explored: orthodox science, through the biology of Barbara McClintock, and the qualitative understanding of 'place' is briefly revisited through the work of phenomenological geographers and architects.

The final chapter approaches the question of 'what is a phenomenon?' by looking at a different approach —that of Husserl's phenomenology. By comparing Goethean science and Husserlian phenomenology I propose that Husserl's attempt to found a meta-science beginning with the pure perception of essences is at the heart of Goethe's approach. Husserl in this context, retrospectively, supplies the thinking behind the practice which Goethe attempted to carry out.

Fieldwork

Due to the highly experiential nature of Goethean science I found it necessary to learn and share in the practices which are described in this thesis. Although, in the time available, it was only possible to begin acquiring the art of Goethean observation the steps I did make were foundational to being able to describe fully what these practices are and what it is like to engage in them. My training came mainly from participation in the School of Life Sciences' courses: 'Colour', 'The Human Skeleton' and 'The Plant'. I also attended another plant course run in the absence of the main teacher where the participants pieced together their knowledge from other courses and texts.

My contact with the School of Life Science extended to taking part in a landscape study, being involved with the opposition to a leisure development that would threaten their plans of developing a study centre and helping to edit their annual newsletter.

In order to understand the way in which a Goethean science tradition has developed under the umbrella of anthroposophy I needed to acquire a background in and experience of the anthroposophical worldview. In addition to private study of the

primary texts I attended the anthroposophical college The Centre for Social Development for a three week course on adult education and have attended a weekly Steiner text study group in Lancaster. I also participated in a week long Öschelbronn style text study in Strontian.

Other fieldwork at various places in Britain is detailed in the first chapter.

As well as the above fieldwork contacts I have also attempted to repeat, or rather recapture, many of the exercises and styles of study alone. This includes two plant studies and the use of review techniques in my own teaching.

I used the approach of participant observation at all times. It could perhaps be said that I participated more than I observed if by observation one means a standing back from the phenomenon. However, because the participation involves a very taxing form of observation and reflection on the events there is also a sense in which it is all observation. In very practical terms this meant that full participation, for example on the courses, left no time for field notes and interviews with an agenda external to the course itself.

Literature

The literature used in this study can be divided into three distinct, though occasionally interlocking, groups. These are:

The Goethe/Goethean science corpus

Goethe's work in English translation

Steiner's work in English translation

Commentaries on Goethe's scientific work

Anthroposophical commentaries on Goethe's, and current Goethean, scientific work

Contemporary Goethean scientists' work.

Other general material

Ethnography

Philosophy of science

History of science

Phenomenological Texts

Husserl's phenomenological work

Commentaries on Husserl

Current phenomenological research in geography, architecture and environmental planning.

Method of argumentation

The preceding synopsis relies on the formula of 'questions arising'. Although this could suggest a rather vague focus it is drawn directly from the practices of the tradition under examination. The similarities between a Goethean approach to phenomena and phenomenology will be made clear in the final chapter. However, it needs to be stated at the beginning, in order to justify the rather unusual structure of this thesis that it begins with the phenomenon —Goethean Science in Britain. The purpose of this is threefold: it attempts to approach that which is the subject of study without presuppositions, this allows the phenomenon to 'speak' and the investigator to hear, and bring to the phenomenon questions which arise out of that meeting. An alternative to this approach, e.g., applying an exterior methodology which carries its own set of criteria and questions relevant to those criteria, would bring faster and possibly more certain conclusions, but would, I suggest, fail to capture the 'what it is' of the phenomenon.

However, adopting an approach of open enquiry is not itself without problems. The most fundamental of these to the process of writing a thesis has been how to enter into the style of thinking that is required in order to make sense of the texts and practices whilst maintaining an ability to communicate with those who have not

made the same shift in consciousness. This problem, perhaps more common in anthropology or religious studies, was to some extent eased by the similarity in objectives between academic practice and Goethean science. In both areas objectivity and self-reflection are important aspects and so whilst the process of this study sometimes felt like being uncomfortably placed with a foot in each world the shared aims of education, self-development and understanding often resonated usefully.

The structure of the argument is in the form of laying out what is there and then approaching the problems that present themselves. However, there is also an aspect of re-approaching the same questions from different angles so that although, for example, presuppositions are addressed in the third chapter on theory also the same issues emerge when discussing description in ethnography and of course in the comparison with phenomenology. By using Goethe to discuss theory —to set the agenda rather than just describe his position— we get some insights into the background on which the tradition is built.

Along side this returning from a different perspective there are also parallel developments of the less emphasised points which nevertheless repeat throughout the whole structure. These are the issue of subjectivity in environmental decision making and the stress placed on self-development with explicit connection between moral judgement and the ability to be objective about phenomena.

This multiple layering can be seen in the general ordering of chapters which could be summarized as follows:

Introduction

1. Britain: the experience —Describing what it is happening particularly through the style of Goethean science that I met.

2. Britain: the George Adams inheritance —Describing other strands of things happening in this area and their roots in projective geometry.

3. Theory —Clarifying the history and nature of the problems of empiricism through a discussion of Goethe's approach to the question and the scientific traditions on which he was drawing.

4. Method —Explaining the method as it is being practised now and the process through which a practitioner goes.

5. Pishwanton —The method as applied in a 'real life' situation.

6. Tradition' —Identity and tradition defined by authority and debate and a more explicit examination of the process of a training which includes developing perceptive and moral faculties.

7. Common Ground —Emphasising the simplicity and intuitive nature of the method and mention of similarities to other practices.

8. Phenomenology —Presenting Husserl as a complementary figure to Goethe to see how far phenomenology could be seen as a philosophical grounding for the scientific practices that Goethe initiated.

The task of the introduction was to set out the aims and approach of the rest of this thesis. I will not be addressing the issue of how far Goethean science is from, or how it compares with, any conception of a scientific orthodoxy except where it is an issue for the practitioners themselves. My aim has been to engage with and describe what is there. This is an attempt to begin with the phenomena, to move through the phenomena and to end with the phenomena, following Goethe's exclamation that in the things is the theory.

Chapter One

Britain: the experience

This chapter aims to lay out the phenomenon of Goethean science in Britain. It covers three main areas. First an introduction to the work of the Life Science Seminars. Then I give an account of the influence of Goethean science on education beginning with the teaching of science in Waldorf schools. The last main section is an account of using a study technique which draws its design from Rudolf Steiner's idea of the seven life processes. I also give very brief accounts of biodynamic agriculture and the Camphill movement. These crop up in the later accounts and can be seen as recipients of some Goethean research as well as the place where a lot of the research is furthered. (This overview of Goethean science does not directly cover the area of medicine.[2])

Introduction

The following two chapters are about what is happening in Britain in the field of Goethean science. The focus of the discussion will be the present time, although there will be historical details where that helps to shed light on what is happening now. By giving an account of the various initiatives I aim to draw conclusions about the essential nature of Goethean science.

All of the initiatives I will cover occur either under the umbrella of anthroposophical institutions or acknowledge the anthroposophical worldview as the inspiration behind them. As will be shown later, in a comparison with the work of Common Ground and phenomenological geographers, similar practices and ideas do exist. However, when something is called 'Goethean' or 'Goetheanistic' one can be reasonably sure that it has at least sprung from an anthroposophical interpretation of Goethe.[3]

The main aim of the whole thesis is to define Goethean science and so to some extent the whole is required, so it is difficult to say what it is in a condensed form. However, some distinctive features could be delineated and these are:

- ⌘ An emphasis on using all the senses, including an enhanced and objectified emotional response, to bring about a full experiencing of the phenomenon one is studying.
- ⌘ A sense of moving from attempting to grasp the intangible to 'seeing' with absolute clarity and certainty.
- ⌘ An attention to, and a reaffirming of, the interconnections between phenomena.
- ⌘ The retention of, or deepening of, a sense of wonder in the world.
- ⌘ Patience, slowness, and exacting rigour in observation including self-observation.
- ⌘ Acknowledging an ethical dimension to the practice of science.

Other characteristics of the culture of Goethean science in Britain, not so totally shared but, providing regular themes would be: (a) a synergistic relationship with the arts, (b) the desire to reach a wider audience, (c) to have an effect on 'mainstream' science and (d) to develop a British or English speaking Goethean science stream, i.e., not so dependent on German texts and ways of working. These are highlighted here as they might only appear as undercurrents in the ensuing descriptions.

The links between Goethean science and some of the areas that follow, such as teaching and agriculture will need some further explanation. However, it will be shown later that the work of Goethe is foundational to Steiner's development of anthroposophy.[4] And as stated above it is in anthroposophy that Goethean science has been nurtured. This inter-relationship makes it difficult, and possibly misguided, to separate any anthroposophical venture from Goethe's approach and any current ventures in Goethean science from the tradition of anthroposophy.[5]

The purpose of the following descriptions of activities is to 'lay out' the phenomenon as we find it. And in Britain it can be found in original research, in the application of Goethean technology, in science teaching and teaching methods generally, in medicine and in agriculture. Those aspects of the activities which can be related to a Goethean approach will be the focus for the descriptions.

The Life Science Seminar

The Life Science Seminars are an initiative which began in the winter of 1990. They are primarily taught by a Goethean scientist, Margaret Colquhoun and a sculptor, Axel Ewald. I use their interpretation of Goethe's method and my own experiences on these courses in later chapters so I shall cover the broader aims of the seminars here. The courses are organized on a part-time one year basis. Students would normally attend three 2½ - 3 week blocks which happen in various locations around the country. The aim of each block is to bring together art and science "in the doing",

that is in a participatory way, around a particular phenomenon. At the present time these are 'The Plant', 'The Human Skeleton' and 'The Landscape'. The year that I participated there was also a one week block on 'Colour'. Something of the approach is expressed in the promotional literature where the process is described thus:

> In the courses carefully guided Nature observation is complemented by artistic activities which aim to deepen perception and allow the cognitive process to flow into the doing. For each subject studied we try to find an appropriate method of enquiry. Innovative artistic exercises are devised to tune in to different modes of observation and thereby to open up new organs of perception.

The structure of each course gives the student an introduction to a phenomenon, e.g., plant and an introduction to the method of varying one's perceptual mode. The student can then work through these different ways of exploring, both the general theme with the rest of the group and a specific plant in an individual project. The theme is covered by lectures, experiments and group exercises as well as drawing and modelling. A timetable for the skeleton course 1993 is given in appendix A. This shows the scope of the activities that are brought to bear on a topic. The seminars are not presented as a vocational training, but as a "process of awakening through experience". They aim to balance art and science and also the relationship between the social and the individual aspects of study.

My experience of the courses was in line with how they are presented. One can find oneself in a place such as the island of Iona with sixteen people of eleven different nationalities and ages ranging from the mid twenties to mid seventies. The course begins with a walk and we are asked to notice the colours of the place and if we should see anything grey to point it out to someone else. A simple task one might think and yet the first greyish looking stone, examined more closely before showing someone else, actually has a mauve sheen and the next a kind of undercurrent of green. The December sky, previously the epitome of greyness, is 'once one really looks' full of colour from pinks to gold to a delicate duck egg green. The experience

of this intensification of one's receptivity to the environment is a personal one. However, through the lectures and exercises there is the opportunity to share what is happening and such a sharing is built into the teaching. For example, the first lecture began with each person giving an example of a colour and the context in which they had noticed it. When these were examined as a collection three types were apparent which we later learned corresponded to Goethe's categories of physiological, physical and chemical colour.

The courses are based on Goethe's work and one of his most famous maxims appears on the promotional material "He to whom Nature begins to reveal her open secrets feels an irresistible longing for her worthiest commentator - Art". But they also rely on Rudolf Steiner's pedagogical methods and his interpretation of Goethe. The Life Science Seminars were set up with the consultation and approval of the visual arts and natural science sections of the School of Spiritual Science in Dornach, Switzerland. So although a new initiative its authority partly stems from the training both the main teachers received from anthroposophical institutions in Switzerland and Germany. (The issue of authority and tradition is discussed further in chapter six.)

Waldorf Education

The first school set up along the educational lines suggested by Rudolf Steiner was in Waldorf near Stuttgart in 1919. There are now approximately 700 schools world wide and 26 in Britain. The aim of Steiner education is that it develops the whole person —morally and artistically— and is not intended as just a training of the intellect. This is done by a form of integration of subject matters and a very specific sequence of material. This sequence is determined by a perceived appropriateness to the chronological age of the child. It is in fact a guiding idea of this form of education that what comes naturally at particular ages is the basis of what and how material should be taught. For example, the kindergarten child (4-7 year old) will always

imitate and so that natural propensity is encouraged and appropriate equipment and games are supplied. And more importantly the teacher as role model must be someone worthy of imitation. The idea that the style of teaching and the educational experiences can be guided by what a child is at each stage of development can be related to Goethe's insistence on approaching the phenomenon receptively to read from it the most appropriate treatment. (To demonstrate this dictum with regard to science teaching I have included a suggested curriculum for science from age five to sixteen, see appendix B.)

Waldorf/Steiner schools are totally guided by anthroposophical ideas in their structure, having no place for a head teacher, and in the choice of topic and method of teaching. However, it is often emphasised, that they do not teach anthroposophy. In looking at the whole curriculum and practices in the school certain resonances could be drawn between the Waldorf approach and that of Goethe. To demonstrate this I will focus mainly on science education. However, the connection of Goethe to all the facets of the education crop up again and again. To clarify I will quote from the introduction of a chemistry text book for teachers.

> Goethe paid such great attention to the being of man, and its central position in the world's happenings, that all his works, the artistic as well as the scientific, are centred around it. When one follows his method, all the single entities one works upon, slowly unite to form a picture of the world so proportionately constructed that the whole becomes a true reflection of the human being. And the human being becomes a richly varied and differentiated whole, in which the world likewise is reflected. Man becomes the world; the world becomes Man. This is precisely in the direction indicated by Steiner.[6]

As a means of exploring this type of integration I shall describe the way students are trained for the task of teaching science in Waldorf schools.

Science Teacher Training

Although some Goethean science is taught to the Waldorf class teachers training at the University of Plymouth the only science teacher training course in Britain is connected to Wynstones school near Stroud, Gloucester. It is taught in a small building in the grounds of a nursing home approximately two miles from the school. This small timber building, dwarfed by an enormous redwood tree, is shared by the science teacher training course and a kindergarten teacher training. The year long course is mainly conducted in one L shaped room with additional teaching practice in the schools. In the year I visited there were fourteen students which is roughly the number that the course needs in order to run. The students were all science or maths graduates. Some had previously trained as Waldorf class teachers and were making the transition to upper school (subject based) teaching. For others this was their first teacher training or they had come from the state education system. Twelve were British, one was American and one Dutch. And in that year there was only one woman doing the training —apparently women are not normally so under represented but are always fewer than men.

The structure of the day on the course was the same as that in a Waldorf school. So the day began with the main lesson which itself reflected a main lesson in the science block of the curriculum. It began with a poem which the trainee teachers recited together as the children would be expected to. The poem used during the time I was there was by John Muir and was suggested as being suitable for class 10 (14-15 year olds).

> This grand show is Eternal
> It is always sunrise somewhere
> The dew is never all dried at once
> A shower is forever falling
> Vapour ever rising
> Eternal sunrise, eternal sunset
> Eternal dawn and gloaming
> On sea and continents and islands

Each in its turn
As the round earth rolls.

This poem would be used during the chemistry block to help to maintain a global picture. The age of the pupils is seen as dictating that it is necessary to go beyond the immediate environment, but the poem emphasises that this can be done whilst still connecting to the natural world.

After the poem the pupils would usually review the previous lesson which would have been set up to leave them with a question. This question is not set as in the sense of homework or something to complete —something will have occurred in the previous lesson, perhaps a part of a demonstrated experiment, which leaves the pupils with something to think about. During the review the teacher will try to draw out what observations have been made independently by the pupils. An example of this would be where the pupil after a lesson on carbon will bring to the next lesson the experience of burnt toast and thus the teacher can allow the pupils to arrive at a picture of the carbon cycle. It was emphasised to the trainee teachers that the experience of the change in matter was the important thing for the pupil to gain. Presenting the facts as in a diagram would add nothing for the class 9 child and "all such diagrams should be avoided until class 11"[7].

The main lesson continued with the same procedure, i.e., teaching a main lesson as it would be taught to the class with asides explaining why things were done in this way and giving alternative examples. The content of the lesson was on cellulose and covered the way plants transform glucose which is soluble into insoluble starch. The suggested experiment was the mixing of potato with saliva in a test tube which is then warmed by the hand. The pupils in groups would start the warming at different intervals so that the reaction, indicated by a change in colour, could be seen to take place over a specific amount of time. It was also suggested that the teacher could demonstrate the boiling of potato starch in hydrochloric acid to show the difference

between the violent process and the one which occurs in the body more gently, but very quickly due to the nature of the saliva.

Apart from the obvious scientific teaching involved in the process it was also emphasised that the use of saliva and acid in the classroom "required good social interactions". It was a good gauge of the class whether the teacher felt that these things could be done in a sensible and safe way.

By the age of class 9 (14years) the pupils should be moving towards a "wider thinking experience". The use of terms such as sugar and starch as generics is seen as a good move in that direction. So after using potato the teacher will bring them to an understanding of starch in the whole plant world and sugar in other forms than just sucrose. The pupils could be encouraged to bring different foods to school and these could be tested with Benedicts solution for sugar and iodine for starch.

The phenomenon of glucose in the plant was explored in its two forms: the hardening into cellulose (which can be made in the classroom) and its fermenting into esters. The effect on the body of these two forms could also be discussed. The way glucose is absorbed into the body through the stomach wall. In one form it is held in balance by the body and this could lead for class 10 to a discussion of diabetes. In the form of alcohol there is the same direct flow but no check to balance the amount absorbed into the blood. This question of unchecked dissolving of alcohol into the blood, it was suggested, could lead to a discussion of the problems of alcohol. The problem of attraction to alcohol is pertinent to the class 9 or 10 age group and so it was advised that if fruitful discussion opened up time could be spent on that without worry about what else had been planned for the lesson.

The social implications of various scientific breakthroughs was also recommended as a relevant part of the science curriculum. The students were recommended that they always know the historical background to the thing they were teaching and introduce anything that gave a wider view. An example given was the

development of the unions with the coal mining industry when the lesson was on oil and coal.

One feature of the 'lesson within a lesson' was the way in which covering the material was a recapitulation of what the trainee teachers must already know alongside indications of what would not be said to various age groups. When discussing glucose the teacher wrote up the formula $C_6\ H_{12}\ O_6$ but emphasised that one would not use this with class 9 as it "doesn't tell them anything". For class 9 the broader view was the thing to aim for. Such as drawing the child's attention to the difference between the oil in plants and the fat in animals. An example given was the contrast between the animals with the most fat coming from cold climates and the plants with most oil coming from hot climates. This was given not as an aside but as an imaginative picture. It is not the kind of thing the child is expected to learn by rote but is an 'adolescent friendly' picture of contrasts. Examples and pictures such as these are meant to come from the teacher's own imaginative faculty and are not part of an alternative curriculum.

Another distinctive aspect of this style of teaching was the use of stories. During the next day's main lesson which was on oil Graham recalled an incident which he experienced in Saudi Arabia of an oil well being capped. Teachers are encouraged to use anecdotes and stories related to the topic preferably from their own experience. This is just one aspect of the desire to engage in the material in a living way. Another is the rule on the use of text books. The children have only their own exercise books which they are encouraged to fill out in a tidy and artistic way and the teacher does not refer to text books whilst teaching. It is considered the task of the teacher to have absorbed and 'made their own' the material to be taught and this means that it is brought to the pupils in a living way. The trainee teachers were encouraged to use any standard text books for the information they needed to prepare lessons. Also to think of new ways of presenting it each year so that it never becomes

stale to the teacher as this can be picked up by the pupils. Although they were not mentioned whilst I was with the teachers there are specialist text books with suggestions of experiments etc.

The main lesson was two hours long as it would be in a school. After coffee some of the trainee teachers were presenting examples of experiments they had devised. This part of the course, specifically called Goethean science, was organised by Robert Rose (one of only three people in Britain who have taken the Natural science training at the Goetheanum). He had been studying Goethe's approach with the students and they had been set the task of devising experiments which were relevant to the phenomenon. It was expected that they should appreciate that, in line with Goethe's methodology, different substances require a different approach. This point was particularly emphasised when one of the students brought along an ongoing experiment with seedlings growing in water with different amounts of fertiliser. This was criticised on several connected points. The plants had become in the experiment a measure of the effect of the fertiliser and this subordination of the organic to the inorganic was seen as pedagogically inappropriate to the class 9 age group. The experiment did not show the essential nature of the plant even though a useful demonstration of the influence of the environment was made. The recording process took the seedlings as static thus the only movement was between the different groups not in the plants themselves. The experiment was seen as being inorganic in its structure which encouraged an empty comparison of results. Work with plants should have been organised to allow the pupils to "live into" the process of plant growth —to "imaginatively participate in the process"[8].

A general criticism of most of the trial experiments was about their complexity. One aspect of that complexity was the use of equipment when it was not necessary. An example of this would be the mixing of sodium thiosulphate with water in one test tube and sodium hydroxide and water in another and then measuring the temperature

change. The latter becomes cooler and the former warms. However, the difference is perfectly perceivable by simply holding the test tube and did not require the added 'abstraction' of a thermometer. This layer of equipment was seen as distancing the pupils from the phenomenon of temperature change. The experiment was also criticised on the grounds of its taking temperature as a key feature whilst not explaining all aspects of the solutions. For example one of the chemicals was a white powder and the other clear crystals. The pupil would be expected to notice everything about these substances and yet this difference was simply passed over.

The only commended experiment was that of demonstrating crystallisation by drying out a salt solution in the oven. This was seen as closer to finding an archetypal example of the processes of change. It used commonly available things with which the pupil would be familiar. However, it transformed a liquid to a solid and produced a beautiful and fascinating end product which would awaken interest in the child.

A constant feature of this form of education is the presentation of material which is not theoretically heavy, but is experientially full. The task of the teacher is not to transmit all they know but to awaken an interest in the child. The presentation of archetypal phenomena is central to this aim.

In the afternoon the students spent an hour with someone who teaches speech and drama. Because they were focusing on class 9 which seemed to be considered the most disruptive age group the exercises dealt with controlling the class with the voice. For this they used Bothmer gym exercises to strengthen the will. The students then were encouraged to internalise these postures so that they were behind a calm exterior when the teacher called for order. As each student practised the rest greatly enjoyed being unruly fourteen year olds and only responding when the 'teacher' managed to be forceful.

The next session in the afternoon was taken by Ron Jarmen. After a lifetime of work teaching mathematics in Waldorf schools he is now an international advisor to

Waldorf schools. He is based in Stroud and participates on the science teacher training. The session I spent with them was not on mathematics but the general structure of lessons.

Ron introduced the idea of a 'breathing' structure to the day and to individual lessons. Whatever the topic there must be the engagement of the thinking, the feeling and the willing. (The students present would have been conversant with this idea of the threefold human being which is central to Steiner's epistemology.) All lessons required the change of pace so that each of these faculties is engaged. So there must be something to engage the feelings —something to engender enthusiasm. Something to do —a physical task to engage the will and those things should have been arranged so that through thinking the pupil can arrive at the underlying laws. Obviously some subjects require more of one thing but all should be balanced across the lesson and across the day. Ron gave the example of a games lesson. Even in sport the technique of a review is used. The lesson would begin with reflection on how it went last week which engages the feelings. Then the sport itself which is largely a will activity. And after the game time should be left to think about tactics. The science lesson obviously involves more thinking but the feeling and willing should not be left out or the material is thought to become too dry.

This threefold structure to the day was achieved on the course by the use of Bothmer gym, as cited earlier, for the will and eurythmy for its soul expressive quality to balance the more intellectual activities of lectures and discussions.

Ron was also used by the students for his wealth of practical advice on controlling disruption in the classroom. This he advised was all in the method of teaching because if the pupils were excited by what they learnt then they would listen. The concept of a breathing structure helped here because there was a let out for action and for the pupils to say how they felt. Self expression and activity were seen as

particularly important for adolescents. Also the students were told the importance of setting the example of being able to control their anger.

I spent some time with the course towards the end of the last term when most of the students had found work in Waldorf schools in Britain. Only two were staying in the Stroud area the rest were moving to take up their appointments in various parts of the country. Apart from the concerns of being able to do the job most talked about the difficulty of living on a very low income. In Britain there is no state funding and so unlike their German, Dutch and Swiss counterparts these teachers would be working in schools funded by a voluntary fees system. To keep the schools as open as possible for any committed parent the running costs are kept to a bare minimum. This means that most teachers in Waldorf schools earn well below what they would in the state system. It seemed to me a measure of the immense dedication to the concept of this type of education to take on a more demanding job for less pay.

Science Teaching

The account I have given of the teacher training scheme focused on the part of the curriculum that would be taught to class 9. To understand how it relates to the whole of science teaching in a Waldorf school more needs to be said about the whole approach.

By looking at the way of teaching and the things taught in the science classes it is possible to draw out several items of emphasis. These will find a resonance with the work done with adults and with Goethe's scientific work as it is discussed here and in the following chapters. These points of emphasis which distinguish Waldorf science teaching are:

- The experiential —seeing, handling the phenomenon 'in the flesh'.
- Image building —recalling what was seen and picturing it to oneself.
- Non-theoretical concepts

⌘ Life context —how the thing is encountered in the life situation

⌘ Cultural connections —bringing the wider picture including the ethical dimension.

⌘ History and biography of the scientist.

Other strands which are of interest in terms of seeing in this approach resonances with Goethe's methodology are the alchemical, with its centrality of the human in the world picture, and the principle of appositeness of material to the age of the child.

It should be emphasised that the reasoning behind these emphases or the alchemical strand itself is not taught overtly. So, for example, the pupil studying heat mechanics at fourteen would not necessarily be receiving different information than a pupil in a state school. Perhaps the only difference a pupil might notice in the content is the connection of socio/historical information to the purely scientific accounts.

Links To The Alchemical Tradition

Where the work of the science teachers is influenced by Goethe it is possible to see the influence of an even older tradition, that of alchemy. In *The World of Matter and the Education of Man* Frits Julius sets out ideas for the teaching of chemistry at various stages. An important part of the curriculum for class 7 (twelve year olds) are their lessons on combustion and sulphur, on lime and other salts and on water. What can be seen in this structure is the *'Tria Principia'*[9] of the alchemists. Frits Julius is explicit in making the connection as he explains:

> For the true alchemists these three principles, Sal, Mercurius and Sulfur —salt, mercury and sulphur— formed the basis of an all-round view of the world, indicating both the human organism and Nature. Although the words appear to point to certain substances, actually far more comprehensive principles are being named, which condition order in Nature.
>
> Wherever solidification appears, above all where the liquid condition passes over into the solid, the alchemist spoke of **salt**. The earth's crust therefore originated as a result of a great salt process.
>
> With **mercury**, the alchemist indicated chiefly the mighty role

> played by water in the whole of Nature. This is often connected with the interplay between air and water.
>
> With **sulphur** he points to the processes in which fire and warmth play a part. In Nature this principle is pre-eminently connected to the sun's influences in the atmosphere, and the warmth processes proceeding from the sun.[10]

What would a lesson on combustion be like? The suggestion from the above book has the following pattern. The children are asked the day before the lesson to bring to school something to be burned. The resulting collection of materials is set alight in turn for the children to watch. The teacher may just draw the children's attention to the way some things are combustible and some not and the way things have a characteristic manner of burning. As many of the things will have smouldered or smelt unpleasant something is saved for the end to make a pleasant experience. For this Frits Julius suggests wood-wool of which he says:

> When this is kindled, we have a particularly beautiful and lively fire. We draw attention to all kinds of peculiarities; to the colour and form of the flames; to the transition from flame into smoke; to the flashing sparks; to the carbonisation of the light wood; to the glowing places which devour the charcoal. especially important is the change into the dull, formless ash.[11]

After the last experience of fire the teacher briefly summarises what has been seen. However, the teacher is warned not to intersperse this with any sort of "view or explanation" so that the children may 'take into sleep' a clear picture. At the next lesson which, because these things are taught in blocks, will be the first lesson of the next day, the children will retell what they had seen. During the re-telling it is the teacher's task to "ensure a really vivid re-emergence of the pictures, laying particular value on intimate observations."

Only after this procedure is it considered right for the teacher to address considerations other than observation of the phenomena. The idea is that now that the children have slept on the experience the information which the teacher brings will resonate with their own thinking and questioning. This aspect of the approach fits very well with one of Goethe's maxims:

> He who beholds a phenomenon will often extend his thinking beyond it; he who merely hears about the phenomenon will not be moved to think at all.[12]

The primary objectives of the first part of dealing with fire is to bring the children to an understanding that the natural things which burn previously grew and that the flames are always "striving upwards" whilst the formless remains of carbon and ash fall downwards. In this polarity between the light and warmth above and the dark gathering of substance below the child is given a picture of the plant. Plant matter, especially wood, in its manner of burning is seen as recapitulating the way the plant develops out of the formless soil from below and the warmth and light of the sun from above.

It is not surprising that there appears to be an alchemical thread in much of Goethe's work. His earliest systematic study of science was through the works of Paracelsus (1493-1541) and the *Aurea Catena Homeri* a mystical scientific description of nature.[13] It was in Frankfurt in 1768 whilst Goethe convalesced after an illness that he learned about alchemy from two devotees Dr Metz and Susanna von Klettenberg. Goethe went as far as setting up his own chemical laboratory at his home in Frankfurt and after returning to his law studies maintained an interest and his connection to Susanna von Klettenburg.

Although the alchemical background is perhaps clearer in Goethe's literary works, especially *Faust* and *The Fairy Tale of The Green Snake and The Beautiful Lily,* it also informs his approach to science. But what aspects of alchemy carried through to Goethe's scientific work and thence to the Waldorf schools?

Central to the alchemical worldview is the idea that the whole of creation is a unified macrocosm which contains within it parts which reflect that whole. The human being was believed to be the most perfect reflection of the whole, a microcosmic representation. Thus knowledge of nature was believed to be uniquely within the grasp of humanity because of this perfect match between the macrocosm of creation and the microcosm of human being. This idea was present in Greek

philosophy and Cabalism, but in the work of Paracelsus it combined with an empirical approach in order to utilize the correspondence. Goethe developed aspects of this view in his approach to science and in the work of Goethean scientists today these themes can be seen as a strong undercurrent.

The Anthroposophical Colleges

Emerson College: In and around the area of Forest Row in East Sussex there are four anthroposophical colleges. These are Emerson College, Peredur, Tobias and the Centre for Social Development. Of these it is mainly Emerson college that will be of importance in exploring the explicit use of Goethean science. It is the largest of the colleges with approximately one hundred full time students. Many of those will be taking three year vocational courses such as sculpture or music or one year courses such as education or speech and drama and some will be attending the foundation year. On the foundation course time is spent on two scientific fronts: Goethean observation and projective geometry. The course prospectus presents the science part thus:

> Natural science and its achievements stem from the fundamental human desire to understand the world. Its methods require accurate observation and exact thinking, essential for any furthering of knowledge. The materialism often associated with the scientific attitude derives from a way of looking at the world and not from the facts themselves. Steiner's own scientific training brought him into contact with Goethe's studies of nature, and the significant approach of Goethean phenomenology characterises work done in the college. Attempting to make visible the working of the super-sensible, it represents a step towards a new mode of consciousness.[14]

However, the science part is only one of many areas the foundation year covers. The course is designed as "a year of self-exploration, reorientation in life goals, and preparation for further training or future work" and covers a wide range of subjects.

Goethean science is also mentioned in the 'Biodynamic Agriculture and Rural Development'[15] programme. As part of the autumn term they will look at "Goethean

sciences and Phenomenology". The sculpture students also work on flowform research (see page 64.) and in their third year attend the Life Science Seminar on the human skeleton (discussed further in chapter four).

The sculpture students as well as the foundation year students will also spend time studying projective geometry. This is taught at Emerson by Olive Whicher. As well as inspiring and exasperating new generations of students with the complexities of space and counter-space Ms Whicher continues her own research and writing.

The Centre for Social Development: The programme at this smaller college, also in the Forest Row area, is largely directed at training in social skills. The one year programme contains blocks on adult education, counselling and biography work. It works largely on the ideas in Rudolf Steiner's book *The Threefold Commonwealth*. One would not expect the programme at this particular college to connect to Goethe's scientific work. However, to show the breadth of the application of ideas from Goethe's methodology and how they infuse much of the teaching I will use one example of a technique used at this college.

On the adult education course the pattern of the morning programme was such that the students have a lecture as the first main session. After coffee and a eurythmy lesson the forty or so students assemble in small learning groups and for one hour follow a very strict pattern of tasks. This pattern begins by the group first reconstructing the facts of the lecture —what was actually said. They then share anything which aroused a soul response in them —what made them angry or pleased or relieved etc. Then as a group they must come to an agreed one sentence encapsulation of what the lecture was about. This one sentence will of course bring in the parts that excited those particular students but must also reflect the whole facts of the lecture. Finally the students each spend five minutes or so in silent reflection coming to the point where they can write down a question that the lecture has aroused or reawakened in them. Sharing of these questions is optional and the session ends

when each person has had the opportunity to say the question that now "lives in them".

This four-fold process shares many similarities with that of Goethean observation of things in nature, as set out in chapter four. The phenomenon is now the lecture and the same techniques of (a) recall and rebuilding what was actually there, (b) separating the personal from the facts, (c) coming to an idea about the central point and then (d) seeing what that might lead one to go on to do, all have resonances with what one might do with, for example, a landscape. In this form the same overall approach is applied in a way which is appropriate to a lecture on adult education.

Camphill Communities

The Camphill movement was founded in 1940 by Karl König (1902-1966). Applying the teachings of Rudolf Steiner to the human situation of mental handicap he sought to develop the type of communities where people could live and work together. A distinction which expresses much of this impulse is that "Camphill communities are communities *with* handicapped people and not *for* the handicapped."[16] Key elements in the life of Camphill are the treatment of each person as an individual, work —usually agricultural or craft based— for everyone to suit their abilities, a complete sharing of all resources and a strong Christian ethos. All of these seem to contribute to a clouding of distinctions between what are called the 'co-workers', the 'villagers', and the 'pupils' which is a striking characteristic of the communities.

Biodynamics, anthroposophical medicine and aspects of Waldorf education could all be construed as being shaped by Goethean science and are all used by and nurtured within the Camphill movement.

Biodynamic Agriculture

The system of biodynamics was developed by Rudolf Steiner very late in his life.[17] It has grown into a world-wide movement for a renewal of farming practices. Biodynamics was one of the earliest redevelopments of organic farming and gardening. However, as a system it is vastly more complex than just an organic approach.

For example, the biodynamic farm aims to be a closed system, so not only does the farmer not buy in artificial fertilisers they would attempt to not introduce anything from outside of the farm. This means that the farm has to run as a self-sufficient unit and will therefore have to sustain a diversity of production for itself as well as a surplus for sale.

Perhaps the most distinctive aspect of the biodynamic system is its use of specific planting times. This takes the position of the moon in the sidereal zodiac as an indicator of the best time for planting and tending a particular crop. The plants are divided into four elemental types dependent on which part of the plant is the reason for its being grown. For example, leaf crops such as lettuce are planted when the moon is in a water sign, either Scorpio, Cancer or Pisces.

Treatments for pests and diseases extend from the natural remedies used by organic farmers to the use of potentized preparations. This practice uses the homeopathic principle of 'like cures like' to treat the land for any persistent weeds and animal pests. As well as specific treatments there are also biodynamic preparations for the health of the land. One of these, called 'the 500', is prepared by burying a cow's horn full of manure in the soil over winter. In the spring a small amount of this is dissolved in a large quantity of water and then stirred 500 times (for approximately an hour). This homeopathic solution is then sprayed on the land to increase its fertility.

The whole biodynamic approach is based on an understanding of the environment, both terrestrial and cosmic, as an organism. It also relies on a very perceptive approach to the animals, plants and soil to keep this organism in a healthy state. As well as having aspects of Goethean science at the foundational level of biodynamics this form of agriculture is also a recipient of the fruits of present research.

Öschelbronn Style Study

As well as the initiatives occurring in particular places there is an ongoing study of lectures from 'the astronomy course' taking place at various venues around the country. These occur at the rate of about one a year. The following section is an account of the 1993 lecture study.

From the 6th to the 13th of March a small group of people stayed together in two hired chalets overlooking loch Sunart in Strontian to practise projective geometry (which is discussed in the next chapter) and to study one of Rudolf Steiner's lectures from the "astronomy" course using the Öschelbronn study method.

The lecture used was from the Third Science Course 'The Relation of the Diverse Branches of Natural Science To Astronomy Lecture 6.' This is one of a lecture cycle of eighteen which was originally given to a group of scientists and Waldorf teachers in Stuttgart in January 1921. The lectures were only given verbally, but were written up in German from notes by one of the recipients. The copies we used were translated into English by George Adams and Olive Whicher at a later date. A German copy was also available during the week for clarification and was used several times. The previous five lectures had already been studied in the same way by at least two of the participants.

The name Öschelbronn is taken from the Carl Gustav Carus Institute which is attached to a medical clinic on the edge of a small village called Öschelbronn in

Southern Germany. It was there that this method of text study was devised using Rudolf Steiner's indications drawn from the seven life processes. This was developed by Thomas Göbel and Christoph Lindenau[18] for studying , specifically, the work of Steiner and particularly the lectures. The lecture cycles have been studied in this way in Germany for fifteen to twenty years and by the medical doctors in Britain three times every year for the past twelve years. The event I attended was the 6th in a particular cycle all being studied in Britain over the last five years.

To explain the process I will first describe the seven life processes. However, it should be understood that although the physical processes fit as a metaphor more than that is intended. The technique assumes that the human abilities and responses to things are all built out of the same patterning of substances, it is just the substances themselves which are changed.

Using the cycle of nutrition and growth we can see that distinct stages can be characterised.

1. The first stage could be described as a *taking in,* many things are going on in the body before we take even the first bite of something, there must be an initial attraction and the decision to try it as well as the preliminary production of saliva.

2. As soon as we have taken a bite our bodies begin *adjusting* it, the saliva begins breaking it down by adding something of ourselves, something which did not come from the food.

3. The *digestion* process is where our bodies really begin to break up the food so that it no longer is what we took in. The process has taken the substance further from what it is towards what will fit; what is possible for the person to make use of.

4. The fourth stage of this process is called in the German *Absonderung* for which there is no easy English equivalent, but *secreting* is a possible term if it is understood to work in both directions; a casting off the parts of the food that are not useful and a movement of food through the gut wall. This is perhaps characterised as a

discriminating process where the food no longer bears any resemblance to what it was, not just through mastication, but because it has been significantly altered.

5. Physiologically the *sustaining* part is where substances are further refined so that they are specific to the tasks of the separate organs

6. The *growth* stage is not seen a purely additive, it is not just getting bigger but transforming the bodily substance fit it to the outside world.

7. The final stage in the cycle, *reproduction,* mirrors that of the first. Instead of taking something in from outside it is when the organism passes something of its own creation back out into the world.

These seven stages are taken to be an archetypal human process. In a sense it sets a seven fold pattern of the way in which the human being engages with the outside world. Whilst easy to identify in this specific process other activities can be separated into stages in a similar way. With the Öschelbronn method this patterning is not only identified as being inherent to how one would read a lecture, but is actively applied to the process of reading a lecture so that the lecture's full import is gained.

Reading a text is acknowledged to be an engagement of the reader with the ideas of another, not just an intellectual exercise, but engagement in the fullest sense so that the internal struggle of agreement and disagreement, sympathy and antipathy extends consciously to a recognition of the effect of another's ideas on every aspect of the individual's being. This takes time. Many of the effects do not become apparent immediately and some stages are acknowledged to need a nights sleep for them to be fully taken up by the individual. How do the digestive processes relate to study? By now exploring the seven stages of text study similarities can be found in the process with the use of occasional reference to the categories above: *Taking in, Adjusting, Digestion, Secretion, Sustenance, Growth* and *Reproduction.*

SATURDAY: On the first evening in Strontian all twelve participants sat together to read aloud the lecture taking turns and generally reading about a paragraph

each. (The paragraph breaks were imported into the lecture for the purposes of this style of text study and are not in all cases identical with the original.) There was no discussion of the lecture although it was in keeping with the method to ask for clarification of the meaning of any words which were not understood. Some people had prepared short talks or done preparatory reading about various of the topics covered in the lecture and so these were volunteered as possible items for evening discussions.

SUNDAY: After the first session where we just saw what was there (taking in) we moved on to "bring it nearer to ourselves"(adjusting). To do this we read a section, as much as we felt able to grasp the meaning of, which could be a whole paragraph or as little as a sentence, and then put it into our own words. During this part of the process all were invited to add anything to another's paraphrasing which they felt had been omitted and question the addition of something which was not in the original. For the most part the participants policed their own contributions, identifying when their own words were not representing but interpreting or where there were gaps which they could not fill. A common experience was that on reflection what they had understood whilst reading was suddenly more complex when they attempted to assimilate it into their own language. I was particularly conscious of myself adding what would come later in the lecture rather than just stating what was in a particular part, as well as a valuing of some parts and a disinterest in others which I tended to skip over.

During this a brief account of the different stages of the lecture study was given. As well as giving guidance this was also to help those unfamiliar with the method to comply with certain prohibitions such as lapsing into discussion whilst engaged in retelling etc. By this point in the process most people were expressing a desire to question things in the lecture, to discuss how they should be interpreted and generally to ask questions and talk about it. Although there was no explicit prohibition on

discussing the lecture outside of the two and a half hours there was not much unstructured discussion as far as I could see. Knowing that there was a place for responses and questions and it would be reached seemed to satisfy most of the participants.

MONDAY: For the third session we had reached the point when the written lecture was supposed to be abandoned and we should be able to summarise it in our own words without reference to the text (digesting). Margaret had a copy and said that she would participate if possible but also refer to the text when it was necessary to help anyone out. Anyone could start and when they could get no further another person should carry on until they in turn were stuck. However, it was pointed out that we should not jump in when someone stopped, but allow them time to find the next piece and only help when asked. This part of the process was quite a revelation to me as I had assumed that I would be reasonably competent at it. However, when a part I thought I knew well was approaching I took over the summary and immediately everything I had known vanished. Not only could I not put it in my own words I had absolutely no idea what it was about, after staring into this blank space for some time I begged to be helped out and of course just one word from someone else brought it all flooding back. This was the experience of most people and after the initial shock of inadequacy one had to just try again and really clutch at anything that appeared in that blackness trusting that the others would not be too critical. We stumbled through the lecture and at one point David suggested that Margaret should not have the text as we were reducing the process to the level of a game. This was partially resolved by Margaret offering to only use it when something crucial was missing. At the time I thought that we probably needed it, but in retrospect it might have been better to struggle together and if too much was left out to try again.

Already the pressure of time was apparent as all seven stages had to be worked through and so no extra time could be given up to any one part. Michael asked if

doing this could improve the memory and although neither Margaret or David gave a categorical yes David said that he used to have a very poor memory and this had improved greatly. He attributed this partly to being a Waldorf teacher for two years and having to teach without text books open on the desk and partly to engaging in this type of study. He said he was now learning two languages and memorised many words a day and that same black hole had to be stared into and only by not going straight back to the book could any of the words really be retained. Michael was duly impressed with this and it probably helped to keep us all trying whilst reeling from an awareness of our own inadequacy.

After coffee we spoke more about the difficulties of doing this remembering and went on to responding to what we had read. Each person was given the chance to say how they had felt about a part of the lecture, what made them angry, inspired, overjoyed, depressed, etc. These are supposed to be given and not discussed, but as can be seen from the following notes there is some continuing on a theme and answering others complaints:

Tim: *(jumping in at the first opportunity as he has been visibly 'boiling over') I get really annoyed about this use of "empirical", he says empirical but then goes on about a future ice age. And then this stuff about the Greeks and Ancient India—he's using his own perceptions— these are spiritual perceptions and it comes over as a dictum.*

Erik: *Yes I was annoyed about this empirical, but looking at it again he does say he isn't going to stick to the empirical it's just the "starting point".*

Mike: *He is clear about it like when he says we can't go back to those times and so we have to move into spiritual science.*

Jenny: *I had a reaction to the yoga practice part, it was many thousands of years ago, but people practice this sort of breathing now and they don't breath eighteen breaths a minute. But I was excited by this idea that its a cyclical thing.*

Hugh: *I got terribly confused and then when we got to the part about the breath I felt hooray! to know something definite.*

Mike: *I was really frustrated at the lack of precision for example with the time periods.*

Tim: *We've moved on scientifically since Steiner's time, it is difficult to take it as relevant in the present context, we know much more now that it just seems woolly and naive.*

Isis: *I suppose my strongest reaction was, well to do with when he talks about other races, when its contemporary, I always hope he's not going to say anything too horrible, it seems too ethnocentric. So the part about "polar and temperate man" is difficult for me. Also I get really confused about these time things why are they so vague one minute with thousands of years missing and then really precise dates like 747 B.C. and the 15th century is not the middle of the middle ages at least I don't think so. And I haven't fully worked it out yet but it feels that there is something circular about the argument if taken at face value it stays up in the air somehow.*

David: *I was relieved to find that give or take a thousand years or so it is very accurate leaving a long period for the ice age.*

Jenny: *I liked how it made sense to non scientists it isn't too technical.*

Mike: *I liked the way it is about consciousness changing, it relates to other lectures, I get a positive feeling about it.*

Kenny: *I've done one of these lectures before and it was a stinker! so I was a bit reluctant to take it on. You sit looking at a page of words and it doesn't mean anything its just words, but now I feel pleased I understand a bit more about rhythms.*

Erik: *This is the first time I've read a science lecture, I was surprised to find not much science in it, but pleased to find how broad/wide it is there are lots of things here. At first, all that about empirical fact—I thought I was being hoodwinked, but*

then I had this impression of him trying to talk to scientists who are thinking like I was thinking and realised the pain of his effort.

Margaret: *At paragraph six I experienced immense joy —this inner living certainty, you don't have to prove it. And the way to the future is an echo of the past. From 14 onwards you get this space/time echo. And I was excited when I realised he's not talking about sun but Christ and then this mirror image of the Great Spirit I felt humbled by it.*

There was some more general discussion about the nature of these responses and it emerged that Tim, particularly, was not happy with just leaving it there and going on to the next stage. He suggested that anyone could just refute all that was in the lecture and so it was suggested that he do just that for one of the evening discussions.

For that evening Margaret and David presented a review of the previous five lectures in that cycle to help those of us who had not read them to contextualize the one we were studying.

TUESDAY: The morning began with a short review of the previous three stages and an introduction to the forth. This, like the *secreting,* has two sides; it is connected to the past—what we read and felt about it—and to the future by our questioning. And so we were to read through the lecture again taking a turn whenever we wanted whilst also noting down what questions arose in us and from what part of the text. When the whole lecture had been read, which took longer than expected as there was so much writing going on between each paragraph, there was time to decide which of the things we had noted down was our main question and this had to be formulated into a sentence or two preferably with the paragraph number to which it was related.

My own notes from this process were as follows:

Para. 2. "essential source of the celestial phenomena" this is a reversal of what I assumed it to be about, i.e., that celestial phenomena were the source.

Para. 4. Is it the fact that the very debate about the ideas has incarnated the idea into the phenomena?

Para. 6. What does philosophy do, cosmologically speaking? This is a question of causes and relates to my question about para. 2.

Para. 8. "symptomatically" suggests caused—is my cultural inclination to think in terms of cause and effect creating problems in understanding what this lecture is about? Should I be looking for some connection without cause and effect?

Para. 9. What is working in Plato and Aristotle such that thought comes through them from outside and they were able to perceive that it was outside hence forms etc.?

THIS IS REAL (not sure what this note refers to but something to do with the activity of thinking)

Para. 16. "source of this in celestial spaces" that's turned around again isn't it?

Para. 21. How does this connect to Realism and Nominalism —the farther but greater or the closer but smaller.

My focusing of all that into a central question was: *What does philosophy do—can the very fact of debate about the nature of the real incarnate the Idea into the phenomena?* And what in my notes was presumably an explanation of the question reads: *"This would be the other side of seeing the development of thought as an effect of celestial phenomena, its all celestial, all connected. If we balance the two, cause and effect, where lies the differentiation between Ego and everything else?*

In retrospect I am not surprised that my question was answered by some rather blank looks. Also, at the time, throughout the whole process of that fourth stage, I was increasingly aware of a tendency in myself to focus on what interests and not to struggle with other parts, for me it seemed that the material about the ice ages was superfluous and I just could not engage with it. If we were all doing this, focusing on our individual interests and unable to connect to the whole, was it the reason for doing this study as a group? There was enough time for a second question from anyone

with a burning one and afterwards we each wrote down our main question and left them on the table where we could look at each other's at leisure. They were as follows:

Erik: *"What is the mathematical boundary and how do we cross it?*"

Tim**:** *"Are mathematical thought forms empirical? If Steiner got his information from the Akashic records, then should we not be trying to, through this process, gain some intuitive revelation of these records?"*

Michael: *"The sensation of the dark colours can be seen to have arisen simultaneously with the capacity for intellectual concepts, why, what does level of consciousness have to do with colour?"*

Margaret: *"Is this lecture about the changing relationship of the Christ Being to the earth, ref. paras. 3,7,10? What is ice from a spiritual scientific viewpoint? Is the "something" in para. 5 the same as that in para. 14 in the polar people and children and what is the relation of this to the Father God. Why do all the events described/discussed here all happen in the northern hemisphere?"*

Jenny: *"If consciousness is evolving and effects the universe including the planet then could we not prevent the onset of another ice age? If that is not possible then are we advancing in freedom?"*

David: *"How do the after effects of scholasticism show in the present time?"*

Hugh: *"Where in the lecture is the departure from the empirical into other realms of developing knowledge? Can this lecture still be understood empirically?"*

It was by then apparent that Tim was also unhappy about the end of this session; not only had we not discussed our responses from yesterday we now had many questions and it did not appear as if anyone was going to answer them. I knew from experience elsewhere[19] that questions are regarded in a very specific light in anthroposophical circles and are not something one throws out expecting an answer from someone else. Seeing someone else struggling with the concept, to some extent

calmed my worry about reading too much from a personal standpoint. Just as a question of the type we had been generating can only be answered by oneself so must it be a function of study to draw out of what is read that which we can use. To some extent the problems that could arise from all coming to a personal interpretation of the lecture had been prevented by the careful progress through the distinct stages. Seeing those dangers and also wanting to come to an understanding of the lecture which was not the one I would have come to alone with no other voices to prevent me rewriting the meaning I was happy to proceed, but also aware that it was a great struggle for some.

For the evening session Tim gave his ‘anti-lecture’ which sparked off a keen discussion although the content in my view was not very good. There was very little actual engagement with the argument in the lecture, but only a blanket refutation of everything it said with no grounds being offered for the opposing view. The idea to do it is possibly a very good one but a well argued refutation is a powerful thing and so the concept would require some close examination. The other presentation was my own on the nominalists and realists. As there had already been some discussion I rejected my earlier plan of just dividing the group into two and getting them to debate it. So I just gave an historical overview of scholasticism and the debate between these two ideas and the background to its theological importance and with Michael also looked at Anselm's ‘ontological’ argument.

WEDNESDAY: For this session we were back without the texts and having to recall the lecture in our own words, but this time from the end and, as much as possible reversing the order of each individual argument (sustaining). Before we began Tim asked again when we would be dealing with the questions and was told that we had to proceed with the process as set out in the Öschelbronn method. It was explained that time was allotted to a discussion of the questions during one of the evenings. At this

point Tim was looking extremely angry and said, “We don’t have to stick to that, if we can see that things need to be discussed why don’t we do that when it arises.”
Margaret said that “now we have started it is best that we see it through, perhaps for another time we need to look at that but now we have come to do this and this time in the morning is what we agreed to spend on it.”
To which Tim replied, “Are you saying that discussing what I think is a waste of time?”
Erik: You don’t have to stay.
Margaret: No but we are trying to do something else now and this is not helping.
Tim: Are you saying that I should go?
Margaret: No I’m just saying that you have to decide whether you will to be here. It doesn’t help us if you are here resisting what we are trying to do, some of us find that very difficult, I don’t know how everyone else feels.
Erik: Yes I don’t know about anyone else but I feel it is unhelpful.
Tim: So you’re saying I should go.
Margaret: No, only that you should decide whether or not you are taking part and if you are not taking part then we have to be aware that everyone else is carrying you and we can’t be expected to do that.
Isis: I understand that you are having to struggle with this, to some extent we all are, but you need to just observe what is going on not become caught up in it and, well let it leak out.
Tim: So you’re saying I should repress my feelings?
Isis: No, but during this session you should just observe them.
Margaret: I don’t feel we can go on now, we prepare for this session with singing and a verse and now all that is lost we would have to start again.
Tim: Look all right I’ll stay, I don’t want to but I will.
Margaret: You have to want to otherwise we can’t do it.

Tim: (getting up and throwing down his notebook) Look I said I'd stay and now she's saying I can't I'm really fed up with the whole thing.

David: If you are willing to take part then of course you can stay.

Margaret: I don't think we can go on.

David: Yes we will take a five minute break and all go out for some air.

Hugh: When we come back we should all sit in different places.

The cooling off period was spent walking around outside the chalet although Jenny stayed inside to comfort Tim who was visibly upset by the episode. My own feelings were mainly anger at Tim, which seems very unsympathetic, but I was aware of the time and trouble that so many people had put into getting there and doing the work and that the whole thing was being jeopardised. As I walked back towards the chalet I passed Kenny who said, "I was an angry young man once, there were none angrier", to which I replied rather unkindly, "but he's not young he's thirty four" which surprised Kenny as Tim does look much younger.

We reassembled with everyone in different places except Tim who always sat very close to the fire as he suffered from the cold. We proceeded with the lecture moving concept by concept from the end to the beginning, each trying to give a whole part or idea. Although occasionally someone would say something like "and then on the middle of that page" or "above the diagram" this is supposed to be avoided as it prevents us from taking possession of the concepts as not necessarily connected to a piece of paper. This part of the process is extremely hard and I kept wishing I had spent more time studying it before. After we had got through we discussed the problems. Most people had the experience of realising that we were going back in jumps from concept to concept and then forward when elaborating the concepts. I asked how reversed it should be and Margaret said, "as much as possible". Given that we are using our summaries and not the text it should be possible to turn it around completely, but it would be a daunting task and I thought at the time that it would not

necessarily be helpful to have someone too able in a group as everyone else might give up. (It is mainly the freeing of the concepts from the text that is important and reversing the direction is a means to that.)

THURSDAY: For this session we were to use our summaries to build the lecture from the beginning and the end towards the middle (growth). Also the summary of each concept was to be refined to the extent that it could be represented in a picture or symbol and these were drawn on the blackboard beginning in the top right and left corner and descending in two arcs towards the central part. From the very beginning it was apparent that a form of mirroring was evident in the structure of the lecture such that the first and last thought were related, the first proposing a way of approaching something and the last showing what has come out of that approach. Also both are the only reference to mathematics, the first speaking of the realms of astronomy and embryology as requiring a move beyond mathematical thought forms and the last speaking of incommensurable numbers impelling us beyond calculation. This mirroring was evident throughout the lecture although we were sometimes struggling to find where the beginning and end of a thought was. The pictures were built up as a group with someone offering an idea and others agreeing or more usually modifying it. By the time we had reached the crossover point there were some parts that not everyone was happy with, but we knew that this was a first try and we would be doing the same the next day. Indeed at the end of the session the picture was wiped off the board. Tim had not participated much although he was present and had begun drawing his own set of pictures.

During the evening Erik gave a presentation of four stages of Goethean science and how they relate to different kinds of thinking and Margaret explained the seven life processes and how that relates to what we had been doing in the lecture study.

FRIDAY: Beginning again at both ends of the lecture, and able to refer to the text when necessary we began building the pictures again (reproduction). On this

occasion it felt tremendously hard to get the concepts in the right order and to stick to what we were doing. Tim had brought his pictures along and some of the ideas from these were used. Although I felt we were, in a way just keeping him happy by using his input, when really we should have been building the pictures as a group. Building it as a group was emphasised at one point, but the whole process seemed to be caught up in a kind of lethargy. I kept feeling my attention slipping from what was going on, but endeavoured to stick with it. I became aware that several people had hardly contributed at all and after thinking I should make sure I was not talking too much I realised that someone needed to save the situation, but I just could not get my thoughts straight. Margaret, David and Hugh seemed to be carrying the process, but we were running out of time. David suggested coming back to it rather than rushing the last bit, but Margaret wanted to finish and offered to fill in the last two or three thoughts. David was not entirely happy with this and left to make coffee. Margaret finished off the drawing.

We broke for coffee before reviewing the whole week. Part of that review was looking towards the future, to the other lectures to complete the cycle.

People's responses to how the week had been were mixed, their initial statements were as follows:

David: I have enjoyed this more than some of the eight I have done. The number of sleeping people in the group has been low, I know I wandered off sometimes, but I've been elsewhere doing this and with a bigger group, people just sleep through the whole thing. Here we have had real participation. About the method, well I like looking into that blackness and trying to move backwards. I would like to see the Third Science Course through, but not by the Öschelbronn method. Not in Britain, we have to find a new way of doing it.

Erik: For me its similar, but I wouldn't do it again, we need to do other things in-between, something artistic.

Jenny: I would do it again because of the things that have come up, I agree we need to dance or paint or something, but I feel that something is going on in the process.
Margaret: I don't ever want to do it again, not like this, its not hygienic. Its so Germanic and out of context here. And I have questions about doing this and the geometry at the same time they're too similar.
Hugh: I don't really feel I can judge, I don't feel as if I have done the method. I think we could have done, but everyone would need to be more disciplined.
Tim: Unfortunately, or fortunately, it brought up a lot of emotions in me—it had an effect on my feelings which I thought came from it—on reflection I should have dealt with it another way. I felt unsafe about what was going on. The artistic part should have come sooner and we could have done some movement and dance. I enjoyed the picture making, now I feel I could make pictures out of lectures—the middle section upset me especially, the structure is so definite.
Michael: I enjoyed doing the lecture, so many other points being brought in. I don't know about the process its too early to say what effect it will have. The pictures I felt should come more intuitively. And last night, the weight of different concepts was too much, but it might come together in the future. And we do need a different more flowing activity, more artistic.
? We could have done more preparation and it wasn't entirely clear what we were going to be doing, we need informed consent and it should be group led.
Isis: I have enjoyed doing the lecture, I think I must be quite a strange person because I would have been happy to do more, spend more time on it. To me thoughts/concepts are creative so that's OK, but I agree that projective geometry is not the right complement to it, some eurythmy or painting would be good.

Three strands in the comments require further explanation as they each have a history which runs through not only the sessions, but personal histories, general, and more private discussions. These are the nature of Britishness, knowledge and

consent, and the question of clairvoyance. The first two have a bearing on the whole process and exploration of them could lead to a way forward for this method, the last is particularly complex and perhaps only relevant to that particular group and point in time.

The Öschelbronn method comes from Germany as does so much else in anthroposophical circles. This is often commented on in Britain at the level of humour "our punctuality is slipping a bit, but never mind this is England" etc. The German anthroposophists being characterised as too dogmatic whilst the English are too easygoing. The anthroposophical colleges here are well liked by German students because of their more relaxed atmosphere although sometimes the English character is criticised for being too 'laid back'. Several conversations around this theme occurred during the week. The first centred on Hugh's reasons for giving up Eurythmy training after two years because he found it too dogmatic and we discussed the flexibility in the pronunciation of English vowels and how this was not taken into account by some of those teaching. A possible reason for the development of this theme was that only one person present was not British which is unusual on a course of this type. These national differences were only ever spoken of at the level of style with no inherent value judgements, but during the week we did refer to the question of identifying this difference.

Along side this debate and probably not entirely detached from it was a growing disquiet amongst some participants that they had not been informed before coming what this study week was about. This was first raised by Joel who had heard about the projective geometry part by word of mouth and came expecting just that, his response on finding there was more to it was to just attend the part he was interested in and spend more time on projective geometry. At one point at the beginning of a lecture study session Tim questioned whether we had all been informed about the nature of what we were doing as he felt that he had not. David referred him to the

letter which had been sent out, which clearly stated the itinerary of the week and asked that further details should be asked for if required. The letter said:

> I am writing to invite you to join us at a meeting which is being held in Strontian close to the home of Lawrence Edwards who has kindly agreed to lead daily workshops on projective geometry. In addition to this work, which will concentrate on the geometry of the imaginary, complemented by making some string models, we shall study Lecture 6. of the Third Science course...
> The lecture study will make use of the sevenfold Öschelbronn method developed by Thomas Göbel and Christoph Lindenau. It continues the work done on the previous five lectures by different groups of people at various places in the country since April 1988. This method is seen as a way for scientists, artists, doctors, farmers, therapists, teachers and others to help build a spiritual foundation for work in Goethean Science in its various applications in Britain. The daily programme will include not only lecture study and model making but also ample time to enjoy the extremely beautiful scenery on the sides of Loch Sunart where the accommodation is situated.

And after the practical details it ends:

> If you require more information, please do not hesitate to phone.

Although this does seem reasonably clear an undercurrent of feeling drawn in without full consent did remain, at least, with Tim. This could possibly explain his particular difficulties with sticking to the method although there did seem to me to be more of an element of a continuation of whatever problems he usually has to contend with. It was said at one point that the method is not a form of therapy, but for those who are reasonably healthy which would raise issues of who should be doing this and the need for a more explicit warning about the possible internal struggles which would have to be dealt with alone. Whatever the reason for Tim's particularly difficult time and the fall out of that on everyone else it does highlight a particular concern which I think we all carried. This could be joined by the national style question and subsumed under the general heading of method and individuality.

Authority of the Method and the Individual From the experience of just this one week it would not be appropriate to attempt to rewrite the method. However, my

offer to write some reflections on it was well received and from such an attempt something of a drawing together of the experience of the method could be achieved.

The process is difficult, tasks like summarising a lecture from memory are difficult there would seem to be no getting away from that. However, some of the difficulty arose not from what we had to do, but from a lack of understanding why we were doing it. The process was perceived as being imposed from outside, perhaps because it was so far from the way in which we would normally go about studying something. The criticisms which were voiced and seemed to gather momentum throughout the week point to a sense in which the people present did not own the process, we had not made it ours. And yet that sense of needing to adapt what is taken in to ourselves is such a dominant theme in the whole method. What prevented us from rewriting the rules, as it were, was both the presence of participants with a greater experience and a sense of respect towards those who have developed the method. In one way this respect operates as a check on ones own impulses and prevents individuals or the group challenging a method which they are necessarily struggling with, but it can also prevent the group changing that which is unproductively difficult.

At the very centre of the method is a part of the process which should shed some light on the whole question of how much we can make something our own without being back where we started and how much we should comply with a method without falling into the trap of going through the motions without actually doing it. The two extremes are obviously misguided, but how to tread the path between them is the question and is it the case that the path should be different here than in Germany to take into account the different spirit of the people and of the place?

At the centre of the process we can picture someone standing with one hand holding on to their past ideas and one holding their questions which link to the future. This central space or gap invites not a blind leap to some other's ideas and a throwing

away of the past, but a real consideration of who am I doing this. This 'I' it seems must not jump either forwards or backwards without a real understanding of where all the responses and questions are in themselves. To be too individualistic and cry out for liberty at the first resistance does not allow the process to go any further and to comply without thinking it through is to be led blindly and thus not see anything new. There is an English characteristic to both of these responses which could be stereotyped as the self-absorbed eccentric and the easy going diplomat the former is not really engaging in the process because of being too caught up inside and the latter is similarly disengaged through a kind of ironic participation with only the outside form. The way to avoid slipping into these two extremes comes from participation.

It is an obvious statement but one that cannot be stated too strongly that the method requires a full participation —a kind of shared striving. This does not mean just being there at the time or being able to remember a sequence, but also at the appropriate times being willing to reflect on oneself doing it and engage with the wider experience of the group. This two sided participation is particularly demanding as the inner part demands that we reflect on and speak of our true inner responses and not some constructed to be acceptable to the group. However, our attention to, and contribution to, what is being produced by the group also demands our full co-operation. This is bound to cause both inner and outer conflict. However, by knowing what is involved, what level of participation is expected and allowed, gives the group a sense of ownership of the process and the conflicts are more likely to be of the productive type.

Goethean Observation groups

As well as the Öschelbronn study there are other groups who meet to study together. These are usually less formal but more regular than a course. There are very many study groups who meet to read Rudolf Steiner's lectures and of course these will

sometimes be on specifically scientific topics. However, the more restricted focus of this subsection is the much smaller number of Goethean observation groups.

Why groups? Participants on the Life Science Seminars often comment that the process they go through whilst on a course is very much harder to repeat when studying alone. There are several factors which people mention: the group introduces a sense of discipline which helps one to stay focused on a task, the insights that others bring keep one's thinking mobile, general help with materials such as clay or wax which one is unskilled with but wants to use to bring some insight into expression and reassurance that comes from sharing a process. It has been an obvious step for some people working with this method to join with others for support and to make the activity a social as well as a scientific task.

The groups that I know of are in East Lothian, Stourbridge and Forest Row. They all have a small membership who meet on a regular basis to study a particular thing. The East Lothian group have been meeting for three years and are studying the plant realm. They began with liverworts and mosses and have been working their way up the plant kingdom. The Stourbridge group meet once a month to study rocks. This group is closely connected to Park Atwood clinic and has several medical doctors amongst its members. In Forest Row a study group have chosen a particular small piece of land which includes a stream to study. By focusing on a piece of land in its totality they are able to observe its seasonal changes very closely. The latter group is also interesting because it is co-ordinated by Erik Frydenlund. Erik is a biodynamic gardener and a eurythmist, but his 'credentials' for coordinating a study group probably stem from his taking the Life Science Seminars in 1991/2. The 'striving together' aspect of this form of study does allow for informal developments such as study groups even with no leader although these are not always wholeheartedly welcomed.

The plant course at the Penquoit Centre in Pembrokeshire that has run in 1992, 93 and is planned for 94. is one development that highlights both the potential for a burgeoning tradition and the potential for inherent tensions around the issue of authority. The first course was organized by Ginny Carslile, also a Life Science Seminar participant in 91/2. Using the Penquoit Centre —dormitories and studio— on her parents' farm Ginny set up a slightly shorter course with more rough and ready accommodation. For this she collaborated with Naomi Brandel an art therapist. The intention of the first course was for Ginny to take over the administration, publicity etc. and Margaret Colquhoun would teach the course with Naomi taking the place of Axel Ewald. However, the day before the course was due to start Margaret slipped a disc and was unable to come. So the circumstance arose that Ginny, Naomi, the participants who could not be contacted and some who said they would come anyway for a holiday were gathered at Penquoit and decided to pool their knowledge and do it anyway. The course was not for me as intense an experience as the Life Science Seminars, but we all felt we had made progress and the plant world did begin to open up. Ginny's experience on the seminars together with her experience as a gardener and with rural development in Brazil meant that she was able to start the process of developing the method in her own way. In a letter to Margaret, Naomi placed responsibility for the success of the course on the method.

> I think everyone (including me now!) was very glad we went ahead with it. It has given us all a rich time. And I think that must be because this process which you have brought has a deep truth which people can resonate with on different levels. It is about the way we can meet a plant and the changes, the emphasis we have to alter in ourselves in order for that meeting to occur.[20]

When the letter was published in the Life Science Newsletter Margaret added a note in square brackets so that it read: "And I think that must be because this process which you [from Goethe and Steiner] have brought has a deep truth..."[21]. . The course that ran from Penquoit last year although now entirely organized and taught by

Ginny and Naomi includes in its information leaflet: “This workshop is inspired by courses given by Margaret Colquhoun and Axel Ewald on Goethean Science”. Traditional storytellers are said to, with a gesture, throw some of the applause they receive over their shoulders to all the story tellers before them to acknowledge from whence the stories have come. The practice can be seen as twofold —it authenticates the story and thus the storyteller, but also diminishes the individual achievement by placing the storyteller in a tradition.

Individual Scientists’ Work

Robert Rose is the other scientist in Britain who was trained at the Goetheanum and is currently working within Goethean science in Britain. Robert teaches on the science teacher training course in Stroud and the Plymouth University Waldorf teacher training. He also ran a course on Goethean science taught mainly from a philosophical perspective. Robert’s individual research is based in the areas of philosophy and optics. His project whilst on the Natural Science course at the Goetheanum was on colour. After completing the course he stayed on for a further two and a half years to pursue research into the polarization of light and colour. Robert worked largely with Georg Maier, both in terms of learning a Goethean approach to physics and a Goethean approach to teaching. He emphasises the necessity of awakening a question in the student. Georg Maier surprised and engaged his interest by only showing a phenomenon and leaving it to the student to think ‘yes why is it like that?’ So Robert emphasises that the teachers need to provide the experience and support the exploration not jump in with the answers.

Robert’s study of the philosophy of science has made him aware of the complexity of the issues surrounding, e.g., perception, and also confident enough to reinterpret the method as taught by Bockemühl and make adaptations he sees as necessary for the particular phenomena that are the focus of his continuing work.

Robert and Margaret, as well as training at the same time are in a similar position in Britain in that they have developed a role in teaching Goethean science and thus to some extent have compromised the amount of time they have for pure research. Although as it has been emerging in the preceding sections and will be developed in later chapters, Goethean methodology is never restricted to what is done at a laboratory bench. It is the explicit aim of those concerned to allow aspects of the method to permeate other areas of the scientists' life and social interactions.

There are many other scientists working with or interested in some aspects of Goethean science. Some, such as Dr David Heaf, are trained in orthodox science and have left that area to develop their work from a Goethean perspective. His work at present is focused on "really getting [his] bearings" with a different approach.[22] Dr Stuart Brown in Reading is experimenting with soil in freezing temperatures. Dr Philip Kilner, a heart specialist, uses Schwenk's work on water to look at blood flow in the heart.[23] And William Steffen is applying very rigorous criteria to test the capillary dynamolysis technique as well as setting up a data base of Goethean style research. Nick Thomas also works in the area of mathematics and plays a large part in coordinating the efforts of some individual scientists. These scientists working independently rely on conferences and publications[24] coming out of the research establishments in Germany and Switzerland. In Britain they exchange ideas and findings through the journal *Science Forum* which is published by the Science Group of the Anthroposophical Society.

The reliance on indications from Rudolf Steiner amongst some of the scientists involved and the emphasis on the mathematics of projective geometry are explored in the following chapter.

Chapter Two

Britain: the George Adams inheritance

Whilst still engaged in the project of laying out the phenomenon of Goethean science in Britain this chapter has as its focus the use of projective geometry. Its three sections cover George Adams' development of synthetic geometry along the lines indicated by Rudolf Steiner and the coming together of projective geometry and Goethean observation in the invention and practical application of flowform technology. To begin the examination of questions that arise about the extent to which Goethean science is orthodox, and how far it is directed by anthroposophy and not Goethe's science I also look at ongoing research into leaf buds.

Projective Geometry

In the area of projective geometry there would seem to be an obvious disjunction with the work of Goethe. In *The Theory of Colours,* with reference to mathematics, Goethe says:

> The author cannot boast any accomplishment in this field, and therefore restricts himself to those areas which involve no geometry; in recent times such areas have been opened up far and wide.[25]

It was approximately twenty years later that Gauss, Bolyai and Lobaschevski, independent of one another, all made the breakthrough into non-Euclidean geometry. Why is this nineteenth century development in mathematics relevant to Goethean science in Britain today? The initial impulse is to be found with Rudolf Steiner and developments from there will lead back to Goethe.

Steiner studied mathematics, natural history and chemistry at the *Hochschule* in Vienna, although he was usually to be found attending the lectures of Robert Zimmermann, Franz Brentano and other philosophers. On one occasion, however, he was inspired by a mathematics lecture which he relates thus:

> A decisive experience came to me just at that time from the side of mathematics. The conception of space gave me the greatest inner difficulty. As the illimitable, all-encompassing vacuity —the form in which it lay at the basis of the dominant theories of natural science— it could not be conceived in any definite manner. Through the more recent (synthetic) geometry, which I learned by means of lectures and in private study, there came into my mind the perception that a line which should be prolonged endlessly toward the right hand would return again from the left to its starting point. ...I left the lecture at which this was first passed before my mind as if a great load had fallen from me.[26]

By moving from the closed realm of Euclid what is now termed modern, synthetic or projective geometry was no longer concerned with finite space and with measurement. What is explored in the infinite space of projective geometry is the patterns of form. Steiner indicated the importance of this type of mathematical thinking for conceptualising the nature of space. However, it was in the work of

George Adams and Olive Whicher that projective geometry consolidated a presence in the centre of anthroposophical teachings. They also show how mathematics could be redeemed in terms of Goethe's attitude to its over emphasis on measurement.

George Adams had already encountered projective geometry at Cambridge when, in 1919, he met and was encouraged on this path of enquiry by Steiner. He thereafter worked both to introduce anthroposophy to England and to develop the mathematics of dynamic space. George Adams is probably best known for the work on plants which he pursued with Olive Whicher from around 1947 to his death in 1963. Olive Whicher in a biographical essay recalls a breakthrough in this field:

> And so it was that one day in the spring of 1947, walking in Regent's Park past the freshly budding hedges, George Adams suddenly stopped and literally shouted at me, "*There* it is! Of course it *is* an ethereal space!" And he continued to describe in geometrical terms how the sprouting shoot —the associated group of little planar leaves, or a single leaf, opening out conically from the growing point, becoming ever larger as they diminish in vitality— is indeed a physical manifestation in living substance of a process which is really taking place in "ethereal space" —in fact, in the space and with the forces of the "growing-point". Such a "point", like a seed or a germinating embryo, is small physically, yet mighty ethereally! It is an exact analogy to the concept derived from higher mathematics.[27]

In 1947 George Adams together with Michael Wilson set up the Goethean Science Foundation based in Clent. There Adams and Whicher developed a geometrical approach to plant morphology and Wilson pursued his research into colour.

One aspect of projective geometry which relates to a key idea in Goethe's work is that of 'the development of organs of perception'. It is represented as being a practice which reaps benefits beyond the purely mathematical of understanding the logic of its own manipulations. Not only is the projective geometer able to represent reality in a mathematical form, but the very practice of attempting to do that creates a mind capable of seeing with greater clarity the world it is attempting to represent. George Adams and Olive Whicher express this in terms of seeing the deeper import of Goethe's emphasis on polarity.

> A schooling in this geometrical discipline gives to the mind capacities in thinking of a unique kind when applied to the observation of Nature; it offers the inclusion of the *plane* and of planes moving in from the periphery, as form- and space-creative entities, side by side with the *point* and its centric and contracted nature. The Goethean terms of "expansion and contraction" acquire a deeper meaning than the merely spatial one, for the Principle of Polarity leads beyond the conception implied by these terms in the old geometry. The law provides the *leitmotif* for the idea of metamorphosis. *Metamorphosis is possible in the changing interplay of polarities.*[28]

It is said of projective geometry that once one "gets the idea" or "really can think that" then the transformation of substances in the imagination or a "living into that flux" becomes second nature.[29]

Flowforms

A practical application of some of the ideas behind projective geometry is the use of flowforms. These sequences of vessels through which water is made to flow can be seen in action in many places around the country and are made in at least three places in England.[30] The whole story of flowforms is an interesting example of a discovery coming about through the practice of a Goethean approach to phenomena and their development and application is indicative of what might be called a Goethean technology. In the study of his home on the Emerson College campus, amongst his books, papers and geometric models which can be turned inside out, John Wilkes ARCA the inventor of flow forms told me their story.

When John Wilkes joined Theodore Schwenk and George Adams to help with the building of geometrical surfaces for experiments with water he had already trained as a sculptor and architect, had been introduced to projective geometry by George Adams and had written a thesis on 'the living nature of form' whilst at the Royal College London. Initially their work was to get water to flow over surfaces which had been geometrically designed. The aim was to see if water could retain some memory of the form it had moved across. And whether forms designed to replicate

certain geometrical dimensions of organisms could be used to 'inform' the water such that it could be specifically supportive to those organisms. In practice getting water to flow across surfaces was difficult and that avenue of research came to an end after the death of George Adams in 1963. John Wilkes described Theodore Schwenk's work.[31]

> I had come to know the research Schwenk was doing with water and how he was showing phenomena in this very subtle realm of moving water, in other words water moving within its volume. A volume which is full of surface. If you have ever taken some water in a vessel and put some colour into it you will see that colour is immediately taken into a whole galaxy of veils...they are just border phenomena between what seem to be surfaces of moving water. It is this realm which is important for the life supporting capacities of water.[32]

In *Sensitive Chaos* Theodore Schwenk describes the way water in a stream displays a series of vortices when a twig or blade of grass breaks the surface. They are revealed by the small discs of shadow that are projected onto the bed of the stream. The phenomenon can easily be recreated, as in figure 2.1, which shows the vortices created by drawing a thin rod through still water.

As a result of "watching water and observing metamorphic processes" Wilkes, in a way characteristic of Goethean scientists, had come to a question.

figure 2.1.

From watching water in rivers and vessels and watching fluid in living organisms Wilkes wanted to see if there was a way of imparting the greater degree of order exhibited in living organisms to the incipient order of water in its normal flowing state.

> My question in 1970 ... would there be any possibility to create a situation, a vessel, even in terms of an organ, would it be possible to create a kind of organ for water in which it could move and manifest this potential to order and metamorphosis... could one, as it were, manifest a metamorphic process.[33]

By working with water Wilkes came to the observation that water is usually asymmetrical, in rivers, in vortices etc., whereas the organisms it supports are always "moving towards symmetry", spherical, radial or bilateral. He experimented by "offering the water symmetry" in a channel and discovered that the water in the channel with its opportunity to flow and rotate in cavities was emerging from the channel in oscillations.

> I saw that the waterfall out of the end was falling in a double motion, a big one and then a little one, and I thought that is rather like a pulse and I have got a pulse and why have I got a pulse? And in the end of course you realize that everything that is living is pulsing. Even a plant lives in the day rhythm and the seasonal rhythm it doesn't pulse actually but in a sense it is pulsing slowly because the saps are moving and then they're not moving and then they're moving so everything is in a rhythmical context.[34]

From those initial experiments a flowform was developed which generates a figure of eight rhythm in the water moving through it (see figure 2.2.). Water which has been thus treated is being used and further researched in the mixing of medicines, in plant germination, in biodynamic preparations, the cleaning up of canals and other expanses of water and for aesthetic purposes for their visual impact and sound. The first use to which they were put in 1973 was in conjunction with aquatic plants for sewage treatment.[35] It is this context that I shall further examine.

figure 2.2. (after Wilkes)

Flowform as Goethean Technology: If for the present descriptive purposes we accept the premise that flowforms are a Goethean technology an examination of their invention, development and use will help to define in more general terms what a such a technology is like.

As the account above makes clear the starting point was arrived at by a close observation of the phenomenon in all its modes and really treating the whole realm of watery phenomena as a mystery to be explored. Part of that exploration is to extend one's enquiry beyond the field of obvious study, i.e., fluid dynamics, into the whole of nature and thus drawing parallels from the plant world and the motion of blood etc. It is by extending the field of relevance that aspects like the importance of rhythm can suddenly become part of the picture. Out of that wider understanding comes the possibility of doing something for the phenomenon because one is then able to accentuate what it is doing naturally. Thus the flowform, which offers the water the shape in which it can move rhythmically in a figure of eight, is seen as a) imparting a rhythm and thus bringing the water closer to life processes, b) giving water (a memory of) a form which resonates with that of the micro-organisms that assist its purification, and c) increasing the surface movement and thereby increasing the

oxygenation potential.[36] All three dimensions of the artefact are seen as drawn from observation and then accentuating or 'raising up' the phenomenon in a manner in keeping with its essential nature. The water cycle and even stretches of river have the ability to clean water. A flowform can thus be seen as assisting the regeneration water, not by extracting anything, but by offering the water the most auspicious conditions to do what it does naturally. John Wilkes offered the comparison between a natural and a mechanistic technology:

> ...a natural technology arises out of observation and tries to go with the processes and not counter to them. All our mechanistic approaches are countering what goes on in nature, you can't have rhythm in a machine. Oxygenation, for example, in a sewage plant —we thrash the water about, mix it with air, but we mutilate 23-30% of the micro-organisms that we are trying to support.[37]

The attempt to de-mechanize the process extends to looking for other ways to move the water. At present most flowforms are fed the water by means of a pump, but John Wilkes has also developed a simple helical screw type pump so that the water is moved by the action of the screw and not directly by the electrical pump.

Enhancing natural processes can be seen as a response to nature and as a response to the present problems such as pollution. The flowform is one such attempt to do something positive with "a technology which is born out of intimately observing what is going on."[38]

In general use, apart from being installed for aesthetic reasons and as a form of air-conditioning in public buildings, flowforms are to be found in association with aquatic plant sewage treatment systems (APTS). At Oaklands park, a camphill community in the Forest of Dean, Camphill Water maintain two systems serving the community and design and install the systems as a business. They have also used their large system to treat industrial waste from a number of sources on a contract basis.[39] Figure 2.3., from their promotional literature, outlines an aquatic plant

treatment system of the type they use for the treatment of waste from up to 100 people.

figure 2.3.

The role of the flowform in such a system is to:

> ...encourage aeration and to impart rhythmical, natural movements as a revitalising process [and as] aesthetic features enhancing the appearance and attraction of the amenities.[40]

Why a sewage treatment system should be concerned about aesthetic features highlights another aspect of this type of treatment. Incorporating the solution of what to do with one's sewage into the community and the landscape is connected to a greater awareness about complete solutions to environmental problems. The reed beds, ponds and flowform enhance the environment for both flora and fauna as well as becoming an enjoyed amenity. Moreover, the sludge which goes into the reed beds is removed as a rich humus every ten years. Figure 2.4 is the flowform in the smaller system at Oaklands which is sited in a garden. And figure 2.5. shows part of the reed beds and pond of the larger system as a feature in the landscaping of the house and park. In conversation with Mark Moodie who maintains these systems and designs them for clients it emerged that he saw the flowform as a very expensive way of oxygenating the water. He said he would sometimes prefer to sell something "cheap that just swishes it around, because it's the thin curtains of water that do the oxygenating".[41] As to its more "cosmic" properties he

preferred to leave that sort of speculation to others as he saw himself a practical person who would just like to see more people able to deal with their own wastes. In fact Mark, in line with the wider environmental movement, saw the flush toilet itself —which these systems are designed to retain— as the real problem. His preferred solution was the dry compost toilet. Camphill Water have installed one of their own design at Oaklands and are monitoring its progress. Mark agree that the APTS is a good interim solution to use until the public are weaned from their addiction to flush toilets and thereafter for the treatment of 'grey' water. His own research and 'husbandry' of the Oaklands Park APTSs also seem to be developing the technology towards a solution for the treatment of some industrial wastes. Although as with farm effluent disposal the designers at Camphill Water require their clients to reflect on the processes which have brought about the production of substances which then have to be treated.

The flowform as part of an APTS system is seen by those involved as a practical solution and an example of the resolution of a tension between material science and a 'back to nature ethos'. Rather than rejecting experimentation wholesale they see the possibility of a science that bridges the gap. Uwe Burka has written that the development at Oaklands Park was inspired by a three-fold approach which he outlines thus:

> The first step is that of material science which penetrates the mineral world with all objective facts.
> The second step is to seek an understanding of life processes which involve both growth and movement.
> The third and crucial step is to connect these two realms; to allow man's feeling for truth to become the judge and guide for his actions.[42]

The link between science, movement and a feeling for truth will emerge as a recurrent theme.

figure 2.5.

The purely aesthetic and multiple sense experience afforded by flowforms has led to other styles such as this non-cascade type in the grounds of Emerson College (figure 2.6), and use in children's playgrounds and gardens for the blind. Figure 2.7 is a cascade by a mill pond at

figure 2.6.

Ruskin Mill

near Stroud.

Leaf Buds in Strontian

I am going to focus on the work of Lawrence Edwards in order to explore several issues that have arisen. Lawrence's work is not typical —this field is too small to produce typical examples— but finding in what way it departs from Goethe and from the School of Life Science work we can again approach the question of 'what is Goethean science'? The techniques which are used look more like science as we usually understand it. And yet the questions which drive the research are not coming from an orthodox framework. An examination of the initial impulse of this work will clarify both the framework within which it does fit and the relationship between anthroposophy and Goethean science.

The Experimental Procedure

Lawrence Edwards has been involved in research using projective geometry for over thirty years. As a retired mathematics teacher he has spent his time on several research projects connected with nature's patterns in space and time. It is his current work on tree leaf buds that I shall be referring to.

In 1982 Lawrence shifted the emphasis of his scientific research to a programme of measuring tree leaf buds in order to record fluctuations in the form of the bud. This work begins in September of each year and ends when the buds open in the spring. During the dormant stage over winter the buds appear to make very slight fluctuations in their shape. This is revealed by measurements to the accuracy of 100th of an inch.

Two methods of getting the data from the buds have been used which are called the multiple bud method and the single bud method.

The multiple bud method involves removing ten buds a day from a tree, photographing them and measuring the buds on the photographic enlargements. The diameters of each bud are measured at different points on and at right angles to the axis of symmetry. For each of those measurements it is possible to assign a λ and

from those to determine a mean value for λ. The amount of deviation from the mean λ can then be given for each individual diameter and the mean deviation for the whole bud worked out from that. A mean deviation of less than 4% is considered significant as this places the bud within the form of a path curve. The choice of 4% and the significance of path curves will be discussed later. For the purposes of explaining the procedures involved in the multi bud method we need only be concerned with λ. By taking ten buds a day from the same tree it is possible to come to an average λ for each day. This average λ is recorded on a graph and the fluctuations in the λ can be seen by the movement in the graph. Once a long pattern has built up it is possible to seek for correlations between the observed rhythmical fluctuations and other factors. Lawrence's work is primarily concerned with the mapping of the λ fluctuations with the movement of the moon and its periodic conjunctions and oppositions to various planets.

To recap the procedures, these are: taking the buds, measuring them, applying a mathematical formula to reach a single λ value from six measurements on each of ten buds, plotting a graph of these values against time, marking points on the time axis when conjunctions and oppositions occur between the moon and one of the planets, and looking for any significant correlations.

Although the multiple bud method was initially done in the way described above in 1987 the whole process was speeded up by the use of a computer and TV camera. An enlarged image of each bud is sent to the computer and the measurement and calculation are all dealt with by the computer programme. By cutting down the work a larger number of buds can be taken and so the present procedure is to use twenty buds per day. The larger number thus increasing the statistical accuracy of the mean λ.

The single bud method is the same as the earlier method as described above once the photographs have been taken, but it uses only one bud for the whole season. This is

possible because the bud is left on the tree and photographed with as little interference to it as possible. Also with one bud only the six λ-s generated from the diameter measurements need to be averaged. There is no need for a statistical average of many buds as the phenomenon which is the subject of this enquiry should be taking place and recordable in a single bud. The single bud method is now being used to see if the evidence that has been gathered by Lawrence in Strontian can be replicated elsewhere and by other people.

There are several reasons for using a different method which could be described in general terms as financial, methodological and environmental.

The funding for this type of research is very limited. Lawrence's technical equipment is funded by the Margaret Wilkinson Research Fund who help to finance small scale science projects which have connections to anthroposophy.[43] The same fund has paid for the two cameras and the films etc. that will be used in the replication study. The outlay is obviously much less than it would be to provide more of the adapted computer systems.

The different method ensures that the effect being recorded is not a product of, or enhanced by, the way the experiment has been set up. It also brings in geographical variation and different people. This variation ensures that it is not only tree buds in Strontian measured by Lawrence that display fluctuations in their λ. Also under methodological considerations there is a desire to approach the phenomenon more closely —to almost see it happen rather than see it revealed statistically.

The impact on the tree being used is obviously much less if the same bud is used. Some people involved in Goethean science are uneasy about the invasiveness of the multi bud method and Lawrence admits that any way of getting the data which damages the tree less would be better. He has noticed that an early symptom of the tree suffering from having so many buds removed is that the fluctuations which the whole experiment is set up to record begin to weaken.

The features that I would highlight as emerging from an examination of the procedures involved in this particular piece of research are the following.

⌘ A long time span.

⌘ The repetition of particular actions.

⌘ The emphasis on consistency in all of the procedures.

⌘ A strongly mathematical theme.

⌘ Replication to exclude factors and show stronger evidence for an hypothesis

Several questions arise from these features. For example, to what extent are they drawn from a scientific orthodoxy? Or are they being used to protect the study from the criticism of that scientific orthodoxy? Do some of the procedures bring into question the scientific validity of the research or are they the very parts which this study shares with orthodox science? It is these questions that the next section will begin to address.

Embedded in orthodox procedures and unorthodox theories.

Much of what has been described of Lawrence Edwards' work will look very much like 'ordinary' science. The only unusual feature which is apparent is that he is engaging in the kind of practices which might take place in a university department or commercial laboratory in his own home. The makeshift nature of some of his equipment and the small scale of his study is symptomatic of the way in which he has to work rather than any fundamental difference between what he is doing and what is pursued in a research laboratory.

However, the comparison breaks down when we ask the question 'why'. This was probably apparent in the above description of the procedures when the move is made between the empirical observation and recording and the theoretical seeking for correlations with planetary movements. That is the point at which the onlooker might surmise that this is not just a retired scientist with a rather time consuming hobby but someone attempting to prove an hypothesis from one world view with the techniques of another. That is to verify a correlation indicated by Rudolf Steiner between trees and planets by a rigorous adherence to orthodox scientific procedure.

The way in which Lawrence's work has developed out of not just the worldview of anthroposophy, but also from some of its scientific practices places it as within one guiding parameter of orthodox science. That is the way in which research should not stand alone, but should be tied into not just the theoretical framework but the practices of ongoing or past research programmes.

The shift which Lawrence made into the current programme occurred when he was clearing away the results of a previous project. The initial observations were a side product of that work and showed more promise of consistent results. The photographing and recording the λ of buds was an additional feature of a research project involving the technique of capillary dynamolysis.[44] This continued work developed by Lili Kolisko and Rudolf Steiner which attempted to record the strength of the etheric forces in plants. The technique involved crushing the sap from a plant (buds were used because they were thought to contain the strongest etheric forces). A cylinder of filter paper was then placed in a shallow vessel containing the sap until it had taken up some of the substance. The paper was then transferred to a vessel containing silver nitrate. The paper when dried revealed patterns (in appearance much like frost on the window) and these patterns were then interpreted as measures of the degree of etheric force working in the plant at that time. Lawrence Edwards, reflecting on this technique, has written:

> In the course of nearly half a century since this method was first developed, many scientific workers have come to recognize that the sap pictures, both in their quality and their strength, represent in some way an expression of the qualities of the life forces which were working in the plant to produce that sap. If no sap is present in the paper, then no pictures arise, and it has been established that the pictures are produced by the presence of various metabolites, that is, the results of the metabolic, life, forces which were working in the plant. And I think it a reasonable assumption that a strongly developed picture indicates a greater presence of metaboloids, and stronger life forces in the plant, than a weaker picture.[45]

Using this technique and adding his mathematical skills in projective geometry Lawrence sought to find a correlation between the strength exhibited in the pictures

and the proximity of the form of the bud to a perfect path curve. After photographing and then carrying out capillary dynamolysis on many hundreds of buds he was "forced to the conclusion that no evidence could be found for a correlation of this sort"[46]

The idea that perfect form (mathematically perfect) would in some way influence the amount of metabolites in a plant is drawn from a particular way of looking at the world. The idea that patterns in nature are susceptible to an aesthetic mathematical analysis is itself interesting. However, for the moment the aspects of this narrative of discovery that I want to emphasise are the acceptance of empirical evidence over theory and the chance discovery. The latter is a feature of the rhetoric of orthodox science —the serendipity factor. Both factors can be found in a single paragraph of Lawrence's narrative on how he came to move from capillary dynamolysis testing to measuring buds as the central work.

> As far as the life forces are concerned it seemed to be a matter of indifference whether the bud was a perfect curve or not. The question had been put to Nature, and she had answered: 'No'. And I was about to give up this line of investigation altogether, and turn to other more fruitful directions when, on having a last look through my figures, I noticed, or thought that I noticed, something else.[47]

The "something else" was the fluctuations in the λ of buds on a roughly fourteen day cycle. Stepping outside of his assumptions that nature would favour the mathematically perfect Lawrence developed the method of measuring each bud and working from its own mean λ from an average of the λ values at each of seven diameters. Therefore each bud was recorded in terms of "the ideal form towards which it was striving" and the deviations from that form and not from the path curve were seen as significant.

This movement away from seeking an ideal correspondence between path curve and bud towards an acceptance of the phenomenon —the bud itself— could be seen as a shift in Lawrence's work towards a more Goethean approach. Comparing the

daily mean of a number of buds and seeing the fluctuations as fluctuations away from what they are usually like to a more "relaxed" λ rather than comparing both to a path curve is obviously simpler and closer to the phenomenon. Seeing a correlation between this rhythmical relaxing gesture and the positions of the moon and a specific planet moves again towards the theoretical. However, what could account for this phenomenon? The rhythm and the fourteen day lapse does suggest a Lunar influence. As Lawrence says "when you see a fourteen day cycle the first thing that springs to mind is the moon"[48] Perhaps it would be in an orthodox context, but the subsequent move to link the moon's position vis a vis the planetary ruler of the plant in question is, I think, not an orthodox response. The planetary connection, I feel reasonably sure, would not have been considered a viable hypothesis. The evidence so far would seem to suggest that if it is a Lunar phenomenon then something else is involved because beech buds do not "relax" at the same time as oak or ash.

Within an anthroposophical frame of reference it is perfectly reasonable and indeed expected that there is an interaction between cosmological events and events on earth. For Lawrence it is not a leap in the dark or wild speculation but merely an obvious likely hypothesis that the phenomenon he has observed mathematically can be traced as occurring within a cosmological frame of reference. The ultimate interconnectedness of all phenomena makes it not just plausible but highly likely that planetary influence of such a distinctive kind will be taking place.

The planetary connection links Lawrence's work to that of Rudolf Steiner both at the level of worldview and, as we saw earlier, in terms of procedure. However, the leaf bud work will also feed into practical developments such as bio-dynamic farming. This work can thus be seen as central to anthroposophy both at the level of verifying aspects of its worldview and at the level of practical work in the world. For example, by improving the biodynamic planting calendar as well as giving more information on the timing of the collection of plants for medicinal purposes.

This section has shown that although many of the procedural features of the leaf bud work look like orthodox science they are also connected historically to a technique that was developed by Lili Kolisko and Rudolf Steiner. The purpose behind the work and the kind of hypotheses it uses are also fully embedded in an anthroposophical worldview. However, it has also shown, in the rejection of the initial project which involved a simple 'goodness of fit test' involving path curves, that the reality of the buds themselves is of determining importance.

Lawrence's links his use of mathematics to the aim, proposed by Rudolf Steiner, of developing sense-free thinking. By really penetrating the inner life of mathematics he believes that one can reach a pure concept, one not dictated by percepts but drawn from its own truth. Then in the world available through our senses that concept can either be found or shown to be an abstraction "devoid of essential reality". In the first publication of Lawrence's work in book form *The Fields of Form* he described his approach as "polar-Goethean". In the more recent publication *The Vortex of Life* he explains more fully what he meant by the term in order to dispel some of the controversy that the earlier reference caused.[49]

> In using this expression there can be no suggestion of trying to put forward some kind of antithesis of Goethean thinking. It is indeed just within that thinking, and also within our geometry, that we come to appreciate the peculiarly intimate relationship that exists between true polar opposites.
> But Goethean or polar-Goethean, the end result which is sought is the same: the truthful bringing together of inward thought and outward perception, the healing of the split which the limitations of our organism have imposed on our apprehension of an undivided world.[50]

The attention to percept and concept is a theme which will recur. Although emphasised in Rudolf Steiner's philosophy[51] it is there in Goethe's thinking about science. It is to Goethe's foundational input to this field that I shall now turn.

Chapter Three

Theory

This chapter looks at Goethe's attempt to develop a theory free scientific method. It covers Goethe's use of prevailing and older philosophies of science. It approaches Goethe not solely as an historical figure, but also as the progenitor of a developing tradition and examines those aspects of his work that are most readily drawn upon by practising Goethean scientists. It begins with Goethe's attitude to theory as he saw it being applied and works through those aspects of empiricism, induction and perception that are necessary to give the background to Goethe's idea of the archetypes.

Introduction

The main part of this thesis is about the contemporary phenomenon of people using, what they term, a "Goethean" approach to the study of nature. Whether their method and practices are derived from a close following of Goethe's procedures or the name is just in some way expedient is not yet the main issue of contention. Nevertheless it would be instructive to set out what science was for Goethe in order to clarify what was distinctive about his approach. Establishing what Goethe was extolling and what he was doing in his own scientific work will shed light on the work of current 'Goethean' practitioners.

Preamble

Goethe spent the years from 1777 until his death in 1832 engaged in scientific exploration. Prior to his first work in geology he had as a student attended lectures on physics and medicine whilst studying law at the University of Leipzig. And indeed from Goethe's autobiography *Poetry and Truth Vol.1* it is possible to see his life as a scientist (at least a Goethean one) beginning at the age of seven. At this time he arranged his collection of natural objects in "pretty and at the same time sufficiently significant" layers upon a music stand. On this makeshift altar he ignited pastels by intensifying the rays of the sun through a magnifying glass. The intention was devotional but it also reveals the beginnings of the concept of the continuum in nature. This action is also emblematic of Goethe's lifelong quest to uncover and revere that continuum. About this childhood action he says:

> The alter remained as a peculiar ornament of the room which had been assigned him in the new house. Everyone regarded it only as a well arranged collection of natural curiosities. The boy knew better, but concealed his knowledge.[52]

Goethe's mature scientific work covers the areas of geology, meteorology, osteology, botany and the study of colour. He was also an early exponent of the history of

science as a discipline in itself.[53] There are many complete historical accounts of Goethe's scientific work[54] and the purpose in hand is not to repeat them.

By drawing on these scientific works and Goethe's own reflection on his process of scientific enquiry I aim to delineate the distinctive features of Goethe's approach. For the purpose of exposition I shall separate these features into the sections below.

- ⌘ Goethe's attitude to theory.
- ⌘ A feeling for archetypes.

Because Goethe was writing on science in the eighteenth and nineteenth century some historical detail will be necessary to contextualize his comments. However, the main purpose is to set out his approach to science in such a way that the present interest in his method can be approached with the widest possible understanding of what that method was.

Goethe's Attitude to Theory

> If we would only stop looking for things behind phenomena; they themselves are the theory. *Jubilaüms xxxix* p.73.

Helmholtz in 1853 criticised Goethe to the extent of calling into question whether his work was scientific at all. He said that Goethe was "concerned solely with the 'beautiful show' which makes it possible to contemplate the ideal." For Helmholtz this was contrary to the purpose of science. For him the natural philosopher "tries to discover the levers, the cords, and the pulleys which work behind and shift the scenes."[55] The juxtaposition between exploring appearances as revealing and looking for the causes behind, and means to control, appearances is fundamental to Goethe's difficult position in the science of the late eighteenth and early nineteenth century.

One aspect of science on which Goethe wrote extensively was the movement into an over-reliance on theory. There are two forms of theorising which Goethe

criticises: the theory which reduces multifarious phenomena to an abstraction which can be quantified and the theory which overlays the phenomena with an adherence to a form of mysticism. In his earlier work Goethe assumes that both of these errors can be avoided simply by induction. The role of the mind is to arrange the phenomena in such a way that something of their nature is revealed. However, Goethe gradually becomes aware of the problematic nature of perception itself such that his later work recognizes the scientist's creative role in the process. Also through his historical studies, especially into the history of The Royal Society, he becomes aware of a shifting agenda for science such that it cannot be conceived of as an homogeneous effort for a clearly defined and agreed goal.[56]

Goethe's relationship to inductivism is complex and the common view that it can be fully explained in terms of an early naiveté and increasing sophistication over time does not, I think, capture all of the nuances.

There is throughout Goethe's life a continual passion for the phenomena of nature —a desire to see what is there, to in a sense, enter into the substance of the things— and when inductivism can be used to further or justify that aim he will invoke it. There is in Goethe no systematic allegiance to, or examination of, induction as a philosophical underpinning of scientific method, but there is a use and an adaptation of Francis Bacon's ideas.

When Goethe speaks in praise of Bacon it is to his development of the inductive method. Writing in the seventeenth century Bacon attempted to place science on a new foundation of an experiential and experimental method. This attempt was partly driven by the desire to make a fresh start and clear away the misleading metaphysics of Aristotle.[57] It is Bacon's awareness of the psychological tendency of preconceptions that Goethe is impressed by.[58]

The Idols

In the first volume of Bacon's *Novum Organum* he sets out what he terms "the Idols" which were preventing people from seeing the world of nature clearly. For Bacon they could be categorised into four types: the idols of the tribe, the cave, the market and the theatre. As pitfalls to the possibility of clear observation of the facts of the world they each cover different areas and causes of preconception. By the tribe he meant the predominance of the importance of the human in our observations and the tendency to organise things in nature as they relate to the human. The idols of the cave are those characteristic dispositions and the training instilled in us which prevent us from seeing things anew. The idols of the market are the effect of language —the way once particular words or phrases are applied to a phenomenon they become the reality and not the thing itself. The idols of the theatre refers mainly to the use of 'experiments' to demonstrate a theory rather than to find something new or attempt to disprove it.

The extent to which the concept of the idols informed Goethe's scientific work and his philosophy of science is discussed below. Clearing the seventeenth century scientific workspace of the preconceptions engendered by classical science was only one part of Bacon's innovation. His positive suggestion was to place at the centre of scientific endeavour a form of reasoning based on experience.

Inductive Reasoning

What was termed science prior to Bacon's critique was as likely to be drawn from texts as from things in nature. Thus it treated the two —the texts and the things— as if they are of the same order.[59] The form of reasoning used to manipulate this mass of things was primarily deductive. On the basis of deduction a conclusion is already contained in the premises it follows.

However, experimental evidence could call into question the validity of the premises. For the inductive method the internal validity of any argument is not enough to reach a conclusion. Instead of arranging valid inferences the inductive method attempts to present evidence for the probability of propositions which, when organised, suggest a conclusion which is not contained within the propositions themselves. It would be a feature of Baconian induction that any question would involve all the possible lines of enquiry that could be followed. Of primary importance to the inductive process is the empirical examination of the phenomenon in question.[60] The other features introduced by Bacon which are of interest when looking at Goethe's science are the tabulation of evidence and the use of negative instances.

Tabulation

If conclusions are to be drawn from large amounts of empirical data a way of ordering the material is essential. For Bacon, large amounts did not mean experimental results from one aspect of a phenomenon, but recording 'everything to do with' some fundamental feature of the world. Bacon's own example sets out how to discover the nature of heat:

> We are to begin by collecting all known instances of heat and describing the features present in each, even though the instances are quite different from each other. Indeed it is important for the success of the task that they should be , and that we make our collection 'without premature speculation, or any great amount of subtlety'. Having gathered and described examples of heat, ranging from the rays of the sun, through bodies rubbed violently, boiling liquid, compost and horse dung, to the effects on us of fortified spirits of wine and aromatic herbs, [61]

As can be seen from the above the scope of relevant phenomena was wide indeed. The list of "positive instances" —in this case occurrences of heat— is then tabulated by the scientist into those which share other features so that 'degrees of comparison' could be set out. From the process of tabulation other instances could be identified.

Occurrences where the phenomenon was present in a pure form not confused by other factors were termed ‘solitary instances’ and when of an intense form they were called by Bacon ‘glaring instances’. It is these solitary and glaring instances which are used by Bacon to move from the collection of facts about the world to choosing the most likely hypothesis which discloses the secret part of the nature of a particular phenomenon.

Negative Instances

Bacon’s awareness of the idols which can mislead the scientist prevent him from only using what are positive instances of a phenomenon. In order to thoroughly explore any phenomenon the scientist should use as a guide against error those instances which share something with some of the other instances but not the central phenomenon. One of his examples of a negative instance are the rays of the moon. Because the moon has rays like those of the sun and fire but without any heat he can conclude that rays are an incidental accompaniment to heat and not something essential to its nature. The introduction of negative instances is to counteract the human tendency to look only for proof of a preconception and to be satisfied with too few examples.

Experimentum Crucis

Bacon’s emphasis on negative processes carries through to his recommendation that experiments are used to test competing hypotheses rather than to prove one theory. Dennis Sepper in *Goethe Contra Newton* traces the development of the *experimentum crucis* back from Newton’s use of Robert Hooke’s conflation of Francis Bacon’s two forms of experiment: the *experimenta lucifera* and the *instantiae crucis*. For Bacon the experiment is not to confirm an hypothesis but to rule out some hypotheses. It should place the experimenter at a cross road and the experiment

should rule out one or more of the possible hypotheses and perhaps suggest new avenues to follow. Newton's presentation of his prismatic experiment as *experimentum crucis* shifts its meaning and with it the more open context of Baconian induction. As Sepper says:

> ..he accomplished a significant transformation of the Baconian method and placed the new concept of the crucial experiment at the centre of natural philosophy, at the centre of science...Newton's Letter, though quasi-Baconian in appearance, proceeds more positively than negatively in that it judges what is wrong from the perspective of what the theory requires; also the phenomena are selected to test the theories, rather than to provide a comprehensive array.[62]

The way in which Newton had distanced the scientist from the phenomena as they arise —in their interacting multiplicity— is the mainstay of Goethe's extended attack on Newtonian optics. To isolate a single complex experiment in order to prove a theory is for Goethe poor science. Although Goethe was by no means uncritical of Bacon. In Bacon's radical realigning of science with the world as experienced and his assumption that an entirely theory free observation was possible Goethe believed that Bacon had "thrown the baby out with the bath water"[63] The amassing of instances and the tabulation and ordering had to be a step towards something which was perhaps germinal in the first choices the scientist makes. The importance of examining those predispositions and the importance of using many instances as they occur in nature were the insights that Goethe took from Bacon, but he was by no means ignorant of the many criticisms of pure induction.

Criticisms of Induction

To quote Alfred North Whitehead's understatement:

> Induction has proved to be a somewhat more complex process than Bacon anticipated.[64]

Too Much Stuff

The most general case against induction, and the only one that I shall deal with here, is that without some preconception about what one is looking for there is just too much in the phenomenal realm to begin looking. To use a purely inductive approach would be like looking for a specific piece of hay in a haystack without any guide as to what is specific about it. So the primary problem would seem to be where to start. Even if certain common sense categories are applied to define an area of study the problem would then become when to stop. For example, the idea of varying the conditions under which an experiment is carried out is good inductive practice but, as Alan Chalmers points out, what counts as the conditions?

> When investigating the boiling-point of water, for instance, is it necessary to vary the pressure, the purity of the water, the method of heating and the time of day? The answer to the first two suggestions is "Yes" and to the second two it is "No". But what are the grounds for these answers? This question is important because the list of variations can be extended indefinitely by adding further variations such as colour of the container, the identity of the experimenter, the geographical location and so on.[65]

The 'relevant' variations to any situation are determined by theoretical knowledge of the kind of things which will make a difference. Only by making certain assumptions based on theory can any experimental enterprise be narrowed down to a manageable size.

The problem of 'too much stuff' is based on the idea that without theory or preconceived categories the phenomenal world is just too full of things. This view assumes that we can see all these things and the problem is one of selecting the relevant ones. However, it could be argued that induction faces a more deep seated problem in its assumption that we can see these things at all.

The Impossibility of Presuppositionless Observation

There are many versions of the argument which proposes that to see we need experience of what it is we are seeing. These arguments range from the strong version which implies that if we have no context of experience within which to place an object then we simply would not see it when it came within our visual field. The weaker version would maintain that although we see something until we have a some wider experience or a concept of what it is we cannot really mentally get hold of what it actually is and will make it look like something which we do know.

Experimental child psychology and the evidence from people who have acquired sight for the first time as adults[66] have contributed to the view that seeing is not just a passive receiving of a picture of the world but a combination of external stimuli ordered and imbued with meaning. The meaning being supplied by our own previous experience, habits of mind and cultural background.

For the present context of examining the problems of seeing phenomena with, as Goethe advises, "a certain purity of mind"[67] the famous Dürer rhinoceros example is helpful. In 1515 Dürer produced a woodcut of a rhinoceros based on second hand reports. As one might expect the drawing is full of detail supplied by Dürer having to fit this new animal into his own previous knowledge of animals. The armour and scales, E.H.Gombrich, suggests, were supplied by "what he had learned of the most famous of exotic beasts, the dragon with its armoured body." The persistence of learned images is then demonstrated by a drawing from life by Heath presented in James Bruce's *Travels to Discover the Source of the Nile* (1790). Bruce says of this engraving:

"...this is the first drawing of the rhinoceros with a double horn that has ever yet been presented to the public. The first figure of the Asiatic rhinoceros, the species having but one horn, was painted by Albert Dürer, from the life...it was wonderfully ill-executed in all its parts, and was the origin of all the monstrous forms under which that animal has been painted ever since..."[68]

Dürer: *Rhinocerus* 1515 Woodcut

However, as Gombrich points out the Heath engraving is not "free from preconceived prejudices and the all-pervading memory of Dürer's woodcut."[69] To our eyes the Heath representation, with its separate plate like folds of skin, is closer to the Dürer than to a photograph having lost only the scales and suggestion of rivets.

Heath: *Rhinocerus* 1789 Engraving

Rhinocerus. Photograph

Figure 3.1.

If even the very process of seeing is informed by previous seeing then in order to make sense of the world it would seem that we always require a previous experience of some kind with which to relate that which we see for the first time in order to see it as something. This presents a large problem for induction simply because we cannot start without experience and the experience will necessarily interfere with the idea of a presuppositionless observation. The heralded success of induction probably comes about because although sometimes the presupposition can later be seen because it is strange, as in the case of using dragons to see a rhinoceros, sometimes it pays off without leaving such obvious traces. Cases of conceptual presupposition as opposed to perceptual presupposition are sometimes of this type. The following case is given as an example of conceptual presupposition.

William Harvey (1578-1657) was praised by Bacon as a good example of the move toward an inductive experimental methodology. His *Anatomical Treatise on the Movement of the Heart and Blood in Animals* published in 1628 shows the use of dissection to see what is happening in the body as opposed to relying on classical texts. However, Harvey's observations were not a fortunate happening upon the circulation of the blood from a standpoint of open enquiry. He began his investigation with the preconception that the blood must circulate in the body. He wrote:

> I began to think whether there might not be a motion as it were in a circle, in the same way as Aristotle says that the air and rain emulate the circular motion of the superior bodies: ... And so in all likelihood does it come to pass in the body, through the circulation of blood.[70]

Thus one of the paradigmatic cases for the success of induction was actually closer to hypothetico-deduction. Harvey was using a received theory about how things in the human body work —they are a microcosmic reflection of the macrocosm— to inform his observation. The experiments he then performed were to test that hypothesis.

Goethe's Use of Baconian Ideas

The Idols of The Mind

Goethe used Bacon's idea of idols preventing clear observation in his own work. For example, in his essay 'Symbolism' the problem of language taking over from the reality it is used to express is cited:

> Neither things nor ourselves find full expression in our words. Something like a new world is created through language, one consisting of the essential and the incidental.[71]

And in conversation with Eckermann he returns to this theme of language serving human affairs and not necessarily being suitable for the task of describing natural phenomena.

> All languages have arisen from surrounding human necessities, human occupations, and the general feelings and views of man. If, now, a superior man gains insight into the secret operations of nature, the language which has been handed down to him is not sufficient to express anything so remote from human affairs. He ought to have at command the language of spirits to express adequately his peculiar perceptions. But as this is not so, he must, in his views of the extraordinary in nature, always grasp at human expressions; with which he almost always falls too short, lowering his subject, or even injuring and destroying it.[72]

The latter quotation from 1831 shows that Goethe was still using his own formulation of the Baconian idols of 'the tribe' and 'the market' long after he had rejected the absolute inductivism of Bacon.

However, it is the idol of the theatre which Goethe wants most forcefully to expose in his long-standing argument with Newtonian colour theory. The central place that is given, by Newton, to the prismatic experiment to demonstrate the refrangibility of light into the colour spectrum is roundly criticised by Goethe. In *Maxims and Reflections* [73] he lists the necessary conditions for the production of the spectrum to show how complex an experiment is required to extract the phenomenon from nature. In the polemical part of *Theory of Colours* there is an extended critique of Newtonian colour theory which uses the metaphor of a crumbling but well defended castle. It is probably the prismatic experiment as theatre that is referred to in the following extract.

> We always hear of its wonderful durability and delightful fittings. Pilgrims wend their way to it, hasty sketches are circulated in all the schools, and the impressionable young are urged to pay homage to it.[74]

It is possible to see here Goethe invoking the Baconian 'idol of the theatre' in his criticism of the complexity and then uncritical repetition of a complex and isolated experiment as the cornerstone of optical science.

Goethe's own work on colour could perhaps be used as an example of exactly how he thought science should be done. The *Theory of Colours* is often regarded as the most mature and thorough of Goethe's applications of his own method[75]. Within

its procedure can be found a considered, if somewhat idiosyncratic application of inductive methodology. However, it is in this work that we can also see that induction for Goethe meant varying conditions and not simple repetition and stability.

Empirical Processes

In the *Theory of Colours* Goethe shows the extent to which his thinking had developed on the question of prior preconceptions when he makes the statement:

> An extremely odd demand is often set forth but never met, even by those who make it: i.e., that empirical data should be presented without any theoretical context, leaving the reader, the student, to his own devices in judging it. This demand seems odd because it is useless simply to look at something. Every act of looking turns into observation, every act of observation into reflection, every act of reflection into the making of associations; thus it is evident that we theorise every time we look carefully at the world.[76]

Nevertheless the *Theory of Colours* is an attempt to look at colour in the broadest sense whilst holding the theorising mind in abeyance.

The enquiry into colour began for Goethe with a question about the aesthetic use of colour. To come to a real understanding about the nature of colour in order to answer that question he began collecting data. What counts as data for Goethe was not bounded by the dominant approach to colour theory, but is defined by the realm of colour as he experienced it. As well as the multiple experiments with prisms Goethe's study includes many things which were already beginning to look out of place for a nineteenth century study. The *Theory of Colours* includes very diverse material such as a section on the colours of worms, insects and fish and one on the relationship to the technology of dyeing and perhaps most controversially on the moral effect of colour. An extract of the latter will show something of the breadth of this sweep.

> Blue-Red
> The unsettling effect increases with further intensification, and we can say that wallpaper in a very pure, saturated blue-red would seem unbearable. This is why a very dilute and light form of this

> colour is used in clothing, ribbons, and other ornamentation: there it has a special charm in keeping with its nature.
>
> The higher clergy has taken this uneasy colour as its own; we might say that it seeks to climb the unsteady ladder of incessant intensification to achieve the cardinals purple.[77]

Observations on interior design, haberdashery and liturgical symbolism may not seem like relevant contributions to a science of colour, but the human use of colour is a part of the field which Goethe used.

The mass of material thus gathered is organised into groups which share some aspect. Finding the broad correspondences between a mass of observational material is reminiscent of Bacon's tabulation. However, Goethe's organisation into physiological, physical and chemical colours whilst a primary division of the broad field is already systematic with a specific conceptual sequence. Examples of these different colour experiences would be as follows. Looking at the light filled view through the window and then turning to face a white wall the resulting darker blue window shaped patches (after-images) are a physiological colour. The view of the distant hillside is blue even though if we were to go there the hillside would be as green as the one which is closer, this distant blue is a physical colour. And finally the blue of the curtains which keeps its appearance in all normal conditions except darkness is a chemical colour.

The *Theory of Colours* begins with the physiological colours. This is an unusual move as prior to Goethe these phenomena had been considered illusory even though they were known to be a non-pathological feature of vision. Goethe says of them:

> We have called them physiological colours because they are a property of the healthy eye. We consider them innate conditions for sight, evidence of the living interaction between its inner nature and the outer world.[78]

In the first instance it might appear that by including the physiological colours against the dominant theories of the time Goethe's was a pre-eminently empirical/inductive approach. However, although it appears that he really did attempt to bring in

everything the reason for the prominent position of the physiological colours is not inductive. Goethe's approach was informed by more wide reaching theories than either the dominant hypothetico-deductive procedure of the Newtonians or his appreciation of what he saw as the useful parts of Bacon's philosophy. For Goethe the human is both reader of the book of nature and a chapter in that book. His use of the physiological colours as foundational to his colour theory and the moral and aesthetic effects of colour as its pinnacle shows that his science was primarily that of a participant in phenomena not an onlooker. Although most explicit in the idea of physiological colours the idea of the world bringing forth the answer within us can be seen in all aspects of Goethe's science.

The problems, which have been discussed above: with Baconian induction, with observation and with theory in general are solved to Goethe's satisfaction by the proposition of what might be termed a new quasi-theory or insight about phenomena —the idea of archetypes.

A Feeling For The Archetypes

At the centre of Goethe's scientific work is the idea of the archetype (*Urphänomen)*. What the archetype is and how it is used by Goethe is not entirely clear. Looking to Goethe's work does not help to clarify the situation because the idea was obviously being continuously developed and refined. Also he uses the term in different contexts where it necessarily performs a different function. Nevertheless the foregoing does not mean that Goethe's idea of the archetype lacks clarity or meaning. It could be that the idea is complex and is necessarily always in the process of reaching articulation.

Another possibility is that we cannot now understand the archetype in the way that Goethe understood it because we are no longer asking, or even capable of understanding, the questions to which an archetype is the answer.

However, Goethe's scientific work and the concept of the Goethean archetype is arousing interest not only amongst historians of science but even some practising scientists —for example, the biologist Brian Goodwin and the physicist Arthur Zajonc. Although Zajonc's interest is supported by a commitment to anthroposophy Goodwin's is not. Moreover, in the case of Arthur Zajonc it can be seen from the autobiographical material given in *Catching The Light* that his interest in anthroposophy stems from an interest in the scientific work of Michael Wilson and through him from an interest in Goethe. So at least in some instances it could not be said that the scientists who are seeing explanatory value in the archetype idea are seeing that value only because of a prior commitment to the worldview in which it is embedded. At least in the case of Arthur Zajonc we have the occurrence of someone being drawn to the scientific ideas and through them to the worldview presumably because the ideas were, as he says providing an answer to his questions.[79]

Whether those seeing something valuable and explanatory in the archetype idea are understanding it in the same way as Goethe or using it to answer the same questions is doubtful. However, before approaching that debate it might be instructive to at least try to make sense of the archetype as Goethe presents it. Such an attempt could then provide the subject for that debate.

Rather than trace the genesis of the term in Goethe's work, which others have already done so well, cf. Nisbet *Goethe and the Scientific Tradition,* I will say what I think the archetype is for Goethe and then present the evidence to support that view. To clarify the idea I will set out three aspects of Goethe's archetype: the archetypal phenomena, archetypes in general and the concept of a single archetype.

Archetypal Phenomena

An archetypal phenomenon is a particular physical instance in which is revealed the key idea which makes that phenomenon and all those related to it what they are.

An example from Goethe would be the blue of the sky and the yellow of the sun. Appreciation of this polarity as an archetypal phenomenon and awareness of the changes it undergoes reveal to the observer that in this phenomenon is the key to understanding all colour phenomena. An example from the organic realm would be the discontinuous metamorphosis revealed in the transition of leaves of some plants.

The leaf metamorphosis as an example could be expanded upon to give a better sense of what an archetype does: how it operates conceptually and physically. Goethe's attempt to find the primal plant has been well documented. He was looking for something that would explain how plants are generated and organized and expected to find the answer in a particular species of plant. Alfred I. Tauber sets out the early stages of this thought with quotations from Goethe's *Italian Journey:*

> In Italy Goethe focused on the rich vegetation, and in his diary, amidst exuberant descriptions of the beauty in which he was enveloped (what he called "a new vision of grace"), he alludes to the inspiration for his studies: "I am on the way to establishing important new relations and discovering the manner in which Nature, with incomparable power, develops the greatest complexity from the simple". In "paradise" he clearly formulated his quest: "Among this multitude might I not discover the Primal Plant? There certainly must be one. Otherwise, how could I recognize that this or that form was a plant if all were not built on the same model?"[80]

Goethe appears to be looking for a species of plant which will be the basic or primal plant for all plants. However, the way in which the idea develops shows that what he found was not a progenitor plant but an insight into how nature does 'plant'. The story of the event is well recorded but a simple account is given by Agnes Arber

> One of his crucial experiences was his visit to the botanical garden at Padua. Here he saw a palm, *Chamaerops humilis* L., from which he collected a series of leaves, ranging from the early lanceolate

> forms, up to the mature fan, and then, by a sudden transition, to the spathe enclosing the inflorescence. These leaves he carefully preserved, and, thirty years later, he confesses to still regarding them as fetishes, because of the way in which they arrested his attention at a critical juncture."[81]

The movement and transition between the leaf shapes reveals the developmental process which can then be seen in the transition from leaf to flower to fruit. The seemingly very different parts can then be seen as being transformations of the same thing through the key of the different types of leaf on one plant.

In a letter to Herder about this inspiration Goethe is explicit about the conceptual nature of the archetype. He says:

> Furthermore I must confide in you that I am very close to discovering the secret of plant generation and organization, and that it is the simplest thing one could imagine ... the archetypal plant will be the most magnificent creation in the world, for which nature itself will envy me. ...The same law can be applied to all living things.[82] (my emphasis)

If nature can envy Goethe the archetypal plant then nature does not herself possess it. A relationship is thus inferred. The particular plant, or aspect of a particular plant makes apparent to the human mind approaching it, with that question, an organizational principle not only about plantness but also about organicness. The transforming leaves present an explicit demonstration of something of the way in which growing things come to be that which they are. The archetype can therefore be seen as not just an idea and not just an aspect of some plants. It is all aspects of 'plant', the idea, the plant and that which gives rise to the plant: the organizational and developmental principles. The plant and the mind together reveal that organizational principle. Goethe's question is perhaps best clarified by referring to the full title of the eventual publication of his findings which was *Versuch, die Metamorphos der Pflanzen zu erklären* (An Attempt to Explain the Metamorphosis of Plants).

Archetypes

The foregoing would seem to suggest that the archetype is something akin to an organizational principle in nature. The problem with that as the ultimate definition is that it implies not only a kind of mechanistic role to the archetype but also a mechanistic interpretation of nature.

An alternative interpretation is that the archetype is a kind of theory which once applied allows an intellectually imposed order to lay out the phenomena in such a way that the imposed order can be seen.

Both characterizations would, I propose, be an anathema to Goethe, not because they are badly wrong but because taken separately they suggest a gross over-simplification of what he can be interpreted as saying.

The archetype is in the thing, but not as a mechanistic causative principle separate from the thing itself. And it is an idea, but not the abstract invention of the human. For Goethe the phenomenon is the thing it is because of that aspect of archetypalness that it shares with all others of the same type. The human being is able to connect to the archetype of things because of the way in which all archetypes share something of the same including the human archetype. An aspect of the human archetype is thinking and so the act of creating theoretical constructs is not alien to the human nor to nature, it is part of us and therefore part of nature.

The Archetype

Archetypal phenomena are not only this plant or this animal as being particularly revealing about the nature of plants or animals but also specific parts. The vertebrae is the archetypal bone[83] and the leaf the archetypal part of a plant. In these examples it is possible to see the archetype as an indicator of nature's way of working —a process common to all aspects of nature. Nature adapts a single form to bring forth a complex organism. There is nothing in the vertebrae or leaf that makes them

necessarily the archetypal part it is just that conceptually speaking it is possible for us to see the other bones or flower parts as transformations of these. They are special because they reveal the clue. However, once the connection is made conceptually any bone can be transformed into any other or as Goethe said "backwards and forwards in the plant it is only leaf."[84] From the petal or the stamen we can move the form imaginatively through a morphological sequence back to the leaf.

The idea of archetypal parts draws us away from thinking of the archetype as connected to and ultimately defining particular species or any other level of classification of things in nature. Whilst the nature of species is naturally bounded and the natural boundaries between things are something that types reveal, the archetype becomes that which permeates nature revealing its process as a unified whole. The process was identified by Goethe as consisting of two activities polarity and intensification

The Perception of Archetypes

By 1794 the archetypal plant is for Goethe fully instantiated in the plant: it is there for everyone to 'see'. And so he feels that it is perfectly possible to sketch it out diagramatically for Schiller:

> I set forth in a lively manner the metamorphosis of plants, and with many characteristic strokes of the pen caused a symbolic plant to rise before his eyes. He perceived it all with great interest, with a decided power of comprehension; but when I finished he shook his head and said, "that is no observation, that is an idea."[85]

However, Schiller had not been in Padua, had not been through the same experiences as Goethe and so the sketch of a plant was for him not symbolic but simply a representation of a plant. The discontinuous metamorphosis of leaf shapes through which Goethe, using his imagination to see the continuous flow, perceived the archetype was not meaningful in the same way. The only interpretation which

Schiller can place on the archetype is that it is an idea, but for Goethe it is extant in the plant because he can see it in the plant. Thus he can answer:

> It can be anything but disagreeable to have ideas without knowing it, and even to see them with my own eyes.

The problem of 'seeing' ideas remained and although Goethe's thinking on the matter can be seen as becoming more sophisticated he is never entirely happy with the archetype as an idea.

The problems with perception that were raised earlier can now be discussed with reference to what Goethe was able to see but Schiller was only able to think.

These problems are:

1. Can we see anything without prior knowledge of it.
2. Can we see something 'as it is' or do we have to fit the perception to something previously perceived.
3. Does our perception have to be directed by concepts.

These are related points and the question which together they formulate for Goethe, for induction and for any science is: *can we make observations from nature which are drawn from the phenomena themselves and not just imposed patterns directed by perceptual habit or theoretical preconception?*

Goethe's answer to this one question is yes and no and yes. Yes, we can make observations from nature and he continually suggests that we should.[86] No, because not only are we prey to the idols identified by Bacon but because we must theorize in order to be human. And yet, yes, because we can become conscious of the idols and draw our theorizing from the central phenomenon: the archetype, of which our thinking is not only an integral part but the most enhanced part.

What arises from the claim that we can see the archetypes is perhaps one of the key questions to be answered. Henri Bortoft in *Goethe's Scientific Consciousness* gives a striking example of a non-sensory factor in cognition. A picture is presented which appears at first to be a random pattern of shapes. After some time of looking at

the shapes the head of a giraffe suddenly appears. The shapes are exactly as they were before there was a giraffe and yet now the observer can see something and also can no longer not see it. The sensory data —what is there on the page— is the same and thus our mind is demonstrated as having an active role in perception.

I would like to use a similar example and ask the reader to look at the picture below (figure 3.2.) to see if you can see a portrait of Goethe.

Figure 3.2.

Some of the approaches to the problematic nature of perception have emphasised the activity of the mind and have, I suggest, overstated its potential as a constructing organ. The figure above has everything going for it terms finding the thing we are looking for. Discussions of this type often have figures such as the duck/rabbit or the young woman/hag. So the exercise is fully embedded within the type of exercise with which the reader will be familiar. The reader will therefore have every expectation of eventually seeing Goethe. There is always a certain pressure to find the hidden image because it is frustrating to think it is there but not yet visible.

This pressure can be enhanced by presenting the figure to a group of people because each person does not want to be the last one to 'get the picture'.

As the reader has no doubt realized there is no image of Goethe at least not one put there intentionally. If you have found a representation then the argument falls immediately. If you have not found the expected image then it can, from your experience, be argued that even when the context (diagram in a discussion about the non-sensory contribution to perception) and the conditions (random patterns) are ripe for one's perceptual expectations to be filled the mind does not always comply.[87]

The argument that the theorizing mind cannot make just anything is important if one wishes to claim that we have access because to make something there must be something of it there to begin with. By acknowledging the impossibility of a perception free of the mind it becomes crucial to see how and what it is that the mind contributes if one wants, as Goethe did, to save the appearances: to say that what we can see is what there is.

An aspect of Goethe's way of perceiving would help to clarify the idea of appearances, such that we do not mistake Goethe's way of perceiving with what we might term the common sense view. Goethe's awareness of the Baconian idols would not allow him to represent seeing what is there as a common unconsidered acceptance.

Because the way of perceiving was so different from the practice of science in the eighteenth century it would be worth considering it in the context of Goethe's work on morphology.[88]

Time and a Sense of Mobility

To study the form of an organism meant for Goethe something different from many of his contemporaries. Firstly the form meant the whole form not its constituent parts. Goethe did watch and perform dissections for the valuable information they

yielded. But an organism was for him the whole thing and that whole had to be kept in mind even when one was looking in detail at a part. Secondly organisms were most fruitfully studied in their natural habitat. This was for Goethe particularly true of plants. These two points are not unrelated. Most botanists of Goethe's time collected plants, or had them collected, for study in herbariums detached from their environment. As Goethe was to discover, the environment in which a plant grows has some bearing on the form it will take. Therefore displacement from the environment is for the study of plants a kind of dissection.

Moreover, the herbarium samples were dead. The fact that this was a problem for Goethe's style of morphology shows that when he speaks of form he might mean something different from contemporaries such as Oken. Of dissection Goethe says:

> In observing objects of nature, especially those that are alive, we often think the best way of gaining an insight into the relationship between their inner nature and the effects they produce is to divide them into their constituent parts. Such an approach may, in fact, bring us a long way toward our goal. ... But these attempts at division also produce many adverse effects when carried to an extreme. To be sure, what is alive can be dissected into its component parts, but from these parts it will be impossible to restore it and bring it back to life. This is true even of many inorganic substances, to say nothing of things organic in nature.[89]

It is not the case that Goethe is concerned about restoring life to the individual specimen. He is not making a sentimental point about one instance, but a sympathetic point about the whole of nature. The idea of bringing it "back to life" he even extends to the inorganic. The life I think Goethe is referring to here is in the manner of apprehending the phenomenon not in the phenomenon itself.

The idea of a lively apprehending is necessary not only to see the whole form, but to understand that it is a whole. However, understanding the form —the aim of morphology— requires a very active kind of apprehending. The organic, for Goethe, has no fixed form and so whatever we see at any given moment is not the whole. To see the form in its organic state we have to see it in the process of change. Goethe

criticises the use of the term G*estalt* for the structured form of organisms because it excludes what is in a state of flux. He says:

> Thus in setting forth a morphology we should not speak of *Gestalt,* or if we use the term we should at least do so only in reference to the idea, the concept, or to an empirical element held fast for a mere moment in time.[90]

To understand the whole as a metamorphosing possibility we need to "remain as quick and flexible as nature and follow the example she gives"[91].

There are two forms of movement suggested. The change in the object studied and the movement in the thinking of the subject studying it. The ability to see the change in plants and to move from one's presuppositions that a particular species, a primal plant, will be the way to understand plants to an apprehending of the continuous metamorphosis in plants as the required perceptual/conceptual key demonstrates Goethe's ability to set his thinking in motion: to restore life.

Why and how he had enhanced perceptual abilities is a question I do not propose to answer. However, if we think of what he could, and current Goethean scientists can, do as enhanced perception, then an interesting correlation emerges when this is compared to the faculties of the congenitally blind.

M. von Senden in his studies of the congenitally blind attempts to resolve the problem of what sense of space a blind person has. He concludes that any sense of the environment that the blind person has is very actively constructed from the other senses. He says:

> The blind man's schema gets its special structure from the property peculiar to all his sensory impressions. Nothing is given to him simultaneously, either by touch or the other senses; everything is resolved into successions. From a single tactile impression he can learn nothing at all. He has to have a multiplicity of impressions, and is obliged to create this multiplicity for himself. He is therefore in need of a continual variety of impressions and has a strong tendency to activity. For only the variety provided by a temporally ordered sequence of experiences can furnish him with knowledge....Time alone enables him to arrive at a general qualitative judgement about a route or an object, because it permits

> him to discover how the separate impressions hang together as past, present and future.[92]

The addition of time to sensory perceptions is what brings the world to the blind person: sequences ordered in time actively create the necessary connection to the world.

The bridge which Goethe uses to make the sequential connection from one instance to another, from one leaf to another, from one plant to another etc. is that of the human imagination. It is in the sequential gathering of data, rather than the ordering by difference, and the use of imagination to connect that sequence into a flow that sets Goethe's work apart from his contemporaries. The sense in which his exploration of the development of plants attempts to capture a living process with the mind is explicit in the following quotation from his notebooks:

> When I closed my eyes and bent my head representing to myself a flower right at the centre of the organ of sight, new flowers sprung out of this heart, with coloured petals and green leaves...There was no way of stopping the effusion, that went on as long as my contemplation lasted, neither slowing nor accelerating.[93]

What Goethe is proposing in relating this experience is what he calls elsewhere "our participation in creation". Not only can we create hypothetical plants which could exist we can by the same process create theories. Such theories are not detached from phenomena and as such are, like the experience above, drawn from phenomena which do exist in two ways. a) The theory only comes about through a thorough examination of things in nature and b) the trained and self reflective use of the human mind means that "pure perception" —which is perception and conception brought together— is possible and is in fact the theory. This does not mean that the thing, the plant etc., is its own theory but the human perception of the phenomenon can be theory. Theories can be wrong and mistakes made not because of human interference in the seeing of the thing, but because of a lack of awareness about the presuppositions which usually determine the nature of the interference. However, the possibility of pure perception —perception guided only by human intuition and not

presuppositions of the "idols" type— is, as Goethe suggests, a future goal and not something that was necessarily possible then or even now. He said:

> There is a delicate empiricism which makes itself utterly identical with the object, thereby becoming true theory. But this enhancement of our mental powers belongs to a highly evolved age.[94]

Conclusion

The foregoing would seem to suggest that there are true theories. That a theory which comes about through the application of Goethe's method will be an accurate reflection not just of single organisms but of whole systems within nature. However, it should also be clear that Goethe's idea of pure perception is not a naive recapitulation of an extreme inductivism nor is it a vague idealism. In his own scientific work and in his entreaties to the scientific community there is a drive to work with the things in nature, to accept their appearance, their form, as revealing rather than seeing in the appearances only the effects of mechanical forces which must be dissected to reveal their workings. And a crucial part of that working with nature is working on, by observing and critically correcting, the perceptual, the conceptual and the moral qualities of the inquirer.[95]

The emphasis Goethe places on the activity of the mind in its putting together of phenomena to reveal something more than the individual instances shares something with Kant's exposition of the role of the intellect. Kant held that the mind performed an act of synthesis, without which the basis for experience remained conceptually inchoate and for that reason utterly inaccessible. Goethe accepted the essential role of the mind's activity in rendering experience meaningful. However, he disagreed with Kant's contention that what is revealed by the mind is not the things as they are in themselves but only their appearances to the human intellect. Although Goethe recognized the many failings of our usual means to know the world he did believe that

a knowledge utterly in tune with the nature of things in the world was possible. It was this knowledge, whilst fully cognizant of the difficulties involved, that his science was striving towards.

Chapter Four

Method

"It requires not only to be read and studied but to be *done*..."[96]

Using the method as taught on the Life Science Seminars this chapter presents the four stages or modes of perception which are central to the modern practice of Goethean science. These are: exact sense perception, exact sensorial fantasy, seeing in beholding and being one with the object. I shall be using my own and other participants' experiences as well as the way these stages are represented in texts to explain their separation and final combination in the attempt to 'meet a phenomenon' .

Introduction

It should be noted that what is here represented as *the method* is one interpretation of Goethe's methodology as developed by Rudolf Steiner and being practised in Britain. As it has been suggested in the preceding chapter and will be developed further elsewhere the Goethean approach to science is experiential and aims to reach a deeper understanding of phenomena. Although both its way of doing that and that aim itself sounds somewhat vague there are identifiable practices. These are based on the model of human consciousness, suggested by Goethe and further articulated by Rudolf Steiner, which sees the means to any scientific endeavour in the development of new 'organs of perception'. To aid the development of these new organs a four-fold approach to phenomena is used and it is to these four stages or modes of perception that I shall now turn.

In order to clarify the different stages I shall be using the way in which this approach to science is taught. However, in the teaching, the perceptual modes are more sharply distinguished than they are when used by its experienced practitioners. Beginning to separate these different perceptual modes, to experience their qualities, is a large part of what is distinctive about this approach. Once the observer can consciously experience these processes they can again flow into one another in a less truncated way.

As well as using the pedagogical representation of Goethean science where these modes as clearly distinguishable I will be using the experiences of course participants who are in the process of learning how to bring to consciousness these different modes. The courses referred to are those run by the Life Science Seminars (for details see chapter one). It should be noted that this is not a complete training and the only such training available is in Switzerland which is an intensive year course for those already qualified to degree level in a science. Also, even in Britain the type of work undertaken on the Life Science Seminars is not without its critics and

one should not assume that there is a consensus amongst all interested parties as to what Goethean science actually is. This is discussed further in chapter six.

Beginning With First Impressions

Before the first stage of Goethean observation an aspect of our ordinary encounter with things is acknowledged and recorded. Care is taken to note the first impression that a thing creates in ourselves as observers. These, often strange, impressions are recorded. This allows what is often a very apposite observation some status. Coming to a thing fresh, seeing it for the first time, is said to open a window to see the thing as it is. That "intuitive preconception"[97] which the first encounter allows fades only to return as conscious intuition at the end of the whole process.

Recording and sharing first impressions acknowledges the observer as coming to the thing with a history of other perceptions and memories. It is also something we can all do and no one else can be more of an expert on one's own first impression.

One aspect of this 'first meeting' with the phenomenon is also used to chose what to study. It is when one is struck by something; positively, negatively or with curiosity, that the beginning of a penetrating observation can come. This is spoken of as being drawn to or being spoken to by the thing: Something about it engages us and we want to know it better. As one participant on a plant observation course said: "Something has to jar or surprise me to make me really look".[98]

This starting point engages us as subjective observers, we bring something to the thing and in its speaking to us that personal interaction is acknowledged as a link. This means that there can be no arbitrariness about the object of study. The common experience of being able to study better that which attracts, repels or fascinates than something to which we bring no feeling at all is acknowledged and used in Goethean science.

Exactly what it is like to be 'spoken to' by a phenomenon such as a plant or a part of the skeleton is difficult to describe. Many course participants speak of having a rough idea of what they will choose to study and that conscious choice being overturned when they are suddenly struck by something else. The prior choice is spoken of as a pragmatic or thought out decision whereas the final one is something of a recognition or even resignation. An example of this would be the participant who said:

> All my life as a farmer I have been locked in a battle with this dock. I expected to spend this time studying some beautiful or useful plant and what do I find —here I am, its me and this dock again![99]

Being able to find the thing that it would be fruitful for one to study is not only a matter of waiting to be 'spoken to': It requires a degree of patience and receptivity which does not necessarily come easily. The receptivity required could be described as child-like, as in this instruction from a course leader:

> Before looking we have to get rid of the anxiety about getting it right. We have to enter a realm of wonder, like a child, and be open and receiving and [be willing to] not know.[100]

The First Stage

The personal encounter that recording and valuing first impressions allows is challenged in the first stage where the observer attempts to approach the object from a much cleaner, more objective standpoint.

The aim of this stage is to perceive and record as many 'facts' about the phenomenon as possible. Ambiguities about the status of facts are sometimes acknowledged, but the directive of this way of seeing is to see what is there in this thing as a static object. An aspect of this practice from Goethe's own work would be his extraordinarily detailed observations of colour phenomena. Rather than draw hypotheses or work from a theory his painstaking investigations followed every conceivable avenue of experimentation.[101]

In Jochen Bockemühl's use of the classical system of elements[102] to characterise these stages this first one would be the earth stage. Like the roots of a plant this is a taking in stage and one must attempt as far as possible not to bring to the thing prior conceptions about it. Drawing the phenomenon can be a useful tool at this stage, because in drawing our attention is brought to previously unnoticed detail or angles or roughness etc. The aim is to see, for example, this rose and not an artefact created by our usual mode perception —— useful as such shortcuts are in everyday life. The drawing exercises used can be such things as drawing the outline without looking at the paper, drawing from memory, using shading for depth with no regard for actual shades or shadows etc., or drawing from the outside as if chipping the form out of a block. These were taught on the Skeleton Course by everyone drawing the same thing, in this case a hippo's skull, and then using the same techniques on our chosen parts of the skeleton.

Drawing from memory was also used extensively. The experience of thinking that one knows everything about the appearance of a thing only to have all of that assumed knowledge disappear the moment the object is hidden from view and one is asked to draw it was shared by all the participants. (See figure 4.1. for the example of a blackberry branch drawn from memory in the morning before each day's study. This is taken from my own notes of a study undertaken alone. At the time I felt that, after overemphasising forgotten aspects the next day, in the final picture there was a sense of the phenomenon arriving on the paper.) The use of memory is important in all the stages and relates to the concept of developing new organs of perception. Exercises such as rebuilding in the imagination before sleep the phenomenon one is studying were encouraged and did prove extremely helpful. As can be seen from the timetable of the skeleton course (see appendix A) the first main session is observation and this always began with the exercise of rebuilding as a group an account of what had been established in the observation session of the day before.

figure 4.1 28.8.93

29.8.93

30.8.93

31.8.93

Another tool used is to ignore some knowledge, for example the names of things, such that they can be seen and described outside of some of our learned classifications. This restriction on names is used throughout the shared observation sessions. The experience of having to find another word to describe the part you are indicating to someone else does lead to a looking again, a trying to find a similarity with something or the suggestion of a geometrical shape. It also means that in taking turns to move around a phenomenon complete attention and connecting to the last speaker becomes essential. From the Human Skeleton course:

> We should not be saying things like fragility or even saying head and rib cage we must be more disciplined. I will start again and we will go around the room [taking turns] and down the skeleton. At the very top is a smooth round part and under that two holes to the left and right of a central axis and a third hole further down across that central axis and more triangular in shape the base of which ends where a protuberance begins. [Next speaker] Under the protuberance, just mentioned, there is an angled plane across with small square shapes embedded in it...[103]

Some other words resorted to were: stripy cage, knobbly ends, bowl shape and some dimensions were calculated in numbers of heads or thigh bones. This was from the first session and the group became much better at it, but the quality of perception could be related in inverse proportion to the skill of describing in this manner. It seems to be in the effort to find a word that one is struck by relationships previously unnoticed. I was particularly struck on this occasion by just how three dimensional the skeleton was. The way the bones past through planes and how they enclosed spaces. When the skeleton was drawn from memory the next day several people had the experience of being able to remember well the part they had described even if the rest was a blur.

The emphasis in the above has been on sight, but in this first stage all the senses are used. With some phenomena, for example plants, the sense of smell will be helpful and touch which also proved very illuminating with the skeleton.

This stage was called by Goethe exact sense perception and is characterised by a detailed observation of all the 'bare facts' of the phenomenon. It is an attempt to see what is there with as little input from ourselves as possible. All our theories and feelings about a thing must be held back in order to "let the facts speak for themselves". The problematic nature of this has been discussed in chapter three. Moreover, it should be noted that it is not usually raised as an issue by the participants.

Some participants really enjoy this stage and even if it seems a little dull to begin with it is not when they are collecting the facts about *their* phenomenon —the specific thing they have chosen to study as an individual project. Then there is not enough time and each day brings more questions. A participant writing about the experience said:

> Contrary to my usual undifferentiated observation, the task of each day was to enter more and more fully the precise detail of the tree. If I had imagined this boring, four days of sitting under that tree for two hour stretches completely dispelled that reaction. There wasn't enough time to notice everything that was happening in my tree.[104]

Some people have spoken of this experience of dealing only with the thing as it is as a healing or cleansing experience particularly if they rarely have the opportunity to study in this way. The task of recording precise details without interpreting or having to do anything about them is both endless and somehow refreshing.

However, it would not be possible to stay in exact sense perception forever. The accuracy of it is, in one sense, too much as all the minor fluctuations of light, heat, weather, mood etc. become apparent and to carry on would be as Goethe said "like trying to drink the sea dry."[105] Just amassing facts about the phenomenon as a static object at the moment in time at which we are looking at it will not allow us to really see what it is or come to any firm idea of it. Exact sense perception, the 'earth' stage, is only the foundation on which the following stages rest and to which they

return when necessary to verify conclusions reached by other means. What those other means are is the subject of the following sections.

The Second Stage

If the major activity of the previous stage was perception then the activity which this stage calls for would be imagination. However, that requires very careful explanation so that it is understood that the type of imagination required is fully grounded in the phenomenon. This imaginative activity Goethe called "exact sensorial fantasy" *Exakte sinnliche Phantasie*. The aim of this activity is to perceive the time-life of the phenomenon; to see it as a phenomenon in time. This means no longer seeing the thing in an objective frozen present but as a thing with a history. That history can be drawn from the phenomenon with the use of the imaginative faculty, but this requires training. With the same faculty we can make connections. For example, the relationship between the different parts of an animal skeleton or one animal skeleton and another. These relationships can become apparent when we focus on movements which are not apparent in the static activity of 'exact sense perception'

The process of exact sensorial fantasy probably needs more explanation, so I will describe a very simple activity of a similar type which is not difficult to imagine and then go on to explain how exact sensorial fantasy can be used. An everyday example of how we approach this mode of imagining would be a banana that you are aware is not perfect but is actually a few days past its peak condition for eating and the skin is soft and is beginning to develop black spots. Now instead of eating it, just reflect for a moment what this banana was like when it was a few days younger. Actively, in the imagination, take the banana back in time to when it was in perfect condition. If you can wish you ate it three days ago without the wishing or the liking for just ripe bananas you are experiencing something like exact sensorial fantasy.

An example of how this technique can be acquired is given by Ernst Lehrs[106] where he describes looking at different leaf forms of one plant. Many plants produce a sequence of different leaves often beginning with a simple shape, becoming more differentiated and then contracting to a more pointed form. One way in which the Goethean scientist will use exact sensorial fantasy is to produce, imaginatively, the forms in between those which are evident in the plant. This helps to shed light on the process of metamorphosis in the "doing" of the plant as opposed to recording only its form. Jochen Bockemühl, whose work makes extensive use of leaf sequences, explains the process and shows just how different this kind of perception is in the following passage:

> With the mode of observation corresponding to the watery element, it becomes possible to go beyond the single elements of form and reach a realm not directly accessible to sense perception; here the sequence of forms appears as formative movement, and the formative forces can be experienced. If something is observed as an *object,* it is always seen from the outside, it is seen separately and seemingly from all sides at once. There, one's own standpoint is unimportant. The object exists without me. If, however, one begins to become aware of the formative forces in the way described, one's own inner activity (intentionality) and one's own position within the whole becomes significant.[107]

This is experienced with the leaf sequence as if one is living in the changing forms of the leaf rather than seeing the individual static representations.

It is easier to see how this approach can give one a sense of the time-life of a phenomenon when that phenomenon is one that so typically exhibits growth and development as a plant. Other sequences can be used, such as in figure 4.2.

figure 4.2.

The drawing exercises that were used on the skeleton course moved from the more rigid means of representation to a freer style that 'lived into' and imagined a continuation of the curves of the form to find its inherent movement. My field notes from this time when we had to change from the first mode of perception to the second are very indicative of the sense of dealing in a different quality so I will quote from them verbatim:

> Drawing the hippo again!!
> Drew it as if in a block and had to chip away what wasn't there - only straight lines and most important to get the perspective right. Called earth, solid way. Then had to draw it again by going with the flowing lines - watery way. First follow hippo but carry on with lines and curves etc. Then do another as if the hippo was emerging - not yet there in the water - water shaping the hippo. Had strong image of real hippo with mouth open wide streaming up through the water. Had aspects of whale and fish in it. Very pleased with it, Axel said it looked like a baby or embryo hippo.
> The angular one almost painful to do - very frustrating and felt fed up and tired, barely able to stand. Watery one lovely, couldn't wait to do it, practically started before Axel had finished speaking and did it very fast - both the water ones very fast, perspective didn't matter capturing something else.

What should be emerging from these accounts is a sense of what this second stage is like and the quality of the information gained through the use of the imaginative faculties. By using the imagination to experience the phenomenon in a way not open to ordinary sense perception one is attempting to get behind the initial appearance to something of the dynamic nature of the phenomenon. This watery perception as a departure from the earth stage is described thus, by Bockemühl:

> It is evident that here we are no longer only concerned with sense percepts. Our attention is directed to processes which play themselves out between sense perception and inner soul experience. It is also evident that we seldom become conscious of this. The separate appearances swim into our awareness and link themselves together as in a dream. Before we are aware of what is happening, the process is held in our consciousness as a frozen picture of a completed process. [108]

This flowing dreamlike stage is well characterised as water as the watery metaphors in the above show. Everyone has access to these meanings because they are so evident in the language.

However, the taxing and difficult part of this way of seeing is to bring to awareness these flowing processes in, for example, the plant without freezing them with the solid nature of the exact sense perception. The aim is not to venture into this territory and drag back the remnants of exact sensorial fantasy which the first stage can record and dissect, but to take those solid objective qualities from the first stage into the new realm of water and place them in the service of this fluid element.

Some people are very eager to get to this stage, finding the earth stage laborious and uninspiring, whilst others could revel in the 'bare facts' forever finding its objectivity a welcome release from a confusing engagement with the world in which all is in a state of flux. An example from Goethe's own writings where he appears to be using this imaginative perception to see the time-life of the phenomenon would be his essay 'On Granite':

> ...in the vast depths the taller peaks were shaped from the debris of primeval mountains, while newer more distant mountains were formed from the ruins of those peaks and the remains of what lived in the depths. Now the moss has started to spread, the shell-covered creatures of the sea become fewer, the water recedes, the taller peaks grow green, everywhere life begins to burgeon.[109]

These first two stages could both be characterised as an engagement with the phenomena, first by objectively seeing its outer static appearance and then by experiencing something of its inner processes.

The Third Stage

The observer is very active in the previous stages and it is a feature of the differentiation between stages that one becomes aware of how much the observer defines what is observed. However, the third stage attempts to go beyond that

interactive construction of the phenomenon by absenting the observer as much as possible. This involves a stilling of one's active perceptive processes to allow the thing to express itself through the observer. It steps outside of what has gone before and makes a space for the thing to be articulate in its own way. For many people the only way to express that which is perceived whilst at this stage is in the form of poetry or painting, by expressing a particular mood or colour.

In the plant the stage of development that equates most strongly with this phase would be when the leaves are most differentiated. They no longer bear the similarity with many other species like the early smoother and thicker leaves. This differentiation is described by air, it is the spaces in the form which characterise it and the substance itself is finer.

The observer has to act like air in its defining quality, not flowing through the forms like water, but making them visible. It is what Bockemühl calls "the element of acquiescence"[110] in another passage he makes clear how much these elemental stages are not just a way of looking for particular characteristics in a thing, but describes the way the observer must be:

> It is characteristic of air to expand in all directions, offering its own being and activity in order that the being and activity of another can appear.
>
> Insofar as we move inwardly in accordance with this image of air, we reach the cognitional attitude corresponding to the air element. An inner readiness is thus created for that which manifests in the world to reveal itself in us, as an image which discloses a being.[111]

This is a particularly difficult part of the process as the insights which come can be counter to one's usual thoughts. It is also exhilarating as what comes can seem so foreign to oneself, it feels given and not self-made.

This inspirational stage is expressed in emotional language although it is paradoxically said to be the furthest from the subjective of those stages that I have described. What is expressed is the being of the phenomenon, something of its

essential nature. This "seeing in beholding" as the stage is called or "heart-felt getting to know" can be expressed in many ways, but its inspirational nature is usually reflected in the use of various art forms. Of a landscape study Colquhoun and Day have written:

> What words sound forth from this place? What colour or soul expression? Perhaps a poem will appear. What activity or inner mood does it suggest and how is this reflected in the land form, the vegetation and so on? If the quality we have come to in each place has truth in it then it will ring true to all who are open to it and especially to those who have accompanied the process that each individual has gone through in "getting to know" his or her place.[112]

Poetry, music, painting or sculpture have all been used on the courses I have attended These are thought to be the best tools for expressing the inner mood of the phenomenon. An account from the skeleton course can explore another aspect of seeing in beholding. For this stage we were looking at a static object not just as it obviously presents itself, but as an object which is exhibiting motion. In order to help the participants on the course to be able to see this we were first shown a variety of jars (see figure 4.3.). These were various shapes and we were asked to say what direction of movement they each suggested.

Figure 4.3

The first jar we agreed had both an upward and a downward motion although the upward was slightly stronger. The second one had more of a downward or resting quality to it and the third was definitely upwards. There was more or less a consensus about these especially when the third one which most people had said was strongly upwards was turned upside down to test that conclusion and those who had doubted could now see that this clearly reversed the motion. This was relatively easy with the jars as we seemed to be using something akin to an aesthetic sense. It was like making conscious the kind of tacit judgement one would make in choosing the right vase for flowers. Having established that it is possible to see movement in static objects we then looked again at the skeleton. One disagreement which arose during this process I want to discuss in detail for four reasons. It will give a sense of how disagreement is negotiated. It will reiterate the idea mentioned above that in this stage one is attempting to experience the phenomenon from an inside perspective. It is a good example of testing an observation by trying to 'think it otherwise' (for more

detail see the treatment of Husserl's 'critical reflection' in the final chapter). And it shows the results of that thought experiment coming from the other senses.

We had worked our way up to the femur and as a group been reasonably in agreement about the movement when it was either up or down and taken a little longer to decide when it had something of both or was relatively static. However, with the femur, of the sixteen people present about twelve felt that it was up some were undecided and one felt that it was definitely down. The course leaders had been allowing us to come to a decision but here one of them intervened and suggested that we should all stand up. When everyone was standing we were asked to imagine that the movement in the femur was up and then to imagine that it was down. When imagining that it was down my experience was of an immense weight bearing down and a sudden pain in my knees. Looking around the group I concluded that most people had experienced a similar sensation and the one dissenting person had clearly changed his mind. This was not the first time that we had tried an experiment of this kind[113] and we were also constantly reminded, with regard to the skeleton, that "we all had one" to observe and to experiment with. Looking back at the skeleton we could see that the scroll shapes at the base of the femur suggest a powerful gathering and then fast upward motion. If we try to see this as downward motion the scroll shapes would be pounding into the other bones which form the knee.

Experiencing this inherent movement can also be felt in one's own body when the phenomenon studied is not so close, even a plant can suggest a movement which can be felt in an inner recapitulation of the gesture that the plant is "speaking".

The term "gesture" is used extensively in this field to describe something of the nature of what is observed of the phenomenon at this stage of seeing in beholding. However, its use suggests a uniformity in understanding its meaning which is not necessarily the case. The word gesture is used in several contexts in the literature of Goethean science. At first this seems confusing but a combination of its uses does

supply a better picture of a term which perhaps cannot be reduced to a single phrase. Of the three forms of 'gesture' in *Collins Dictionary*: motion of the hands etc. formal indication or intention and "manner in which a person bears themselves", it is the third, now obsolete, form which comes closest to its uses in these texts. Ernst Lehrs speaks of the "two gestures of nature", contraction and expansion.[114] And so two chemical elements silica and calcium can be said to represent in themselves these two polarities. These elements and there respective gestures can be found in the human organism, e.g., silicon in the hair and calcium in the bones. And they can be expressed by the human, e.g., in the eurythmy gestures of 'Ah' and 'A'. This suggests four possible interpretations of the term gesture:

1. A fundamental aspect of nature.
2. The characteristic of a chemical element.
3. The position and function of an element in an organism
4. A means of expressing and thereby intensifying the feeling for what, e.g., expansion is.

Rather than suggesting that there is some confusion here about what the term is used for I suggest that it is used in all these ways and that they interrelate. Therefore the term gesture has many dimensions. Moreover, it is only by remaining fluid in one's interpretation of the term that the central core of its meaning can be grasped.

Bockemühl, on the plant, also uses the word for different purposes. When studying the changing forms of the leaf in a plant we could speak of one leaf exemplifying a spreading gesture and another having a stemming gesture. What that means can be approached by thinking of gesture as expressing how in that part of the plant the forces of contraction and expansion have been resolved for that moment. The plant as a whole will also express that resolution in another way, both made up by the gestures of its parts and expressing its totality and its part in expressing the gesture of the environment in which it is growing. However, to experience that gesture of the

plant requires a human gesture of "self-dissipation". This is a holding back of our own activity, a form of attentiveness which offers the plant a chance to express its gesture. Other uses include for example the way "light in the landscape expresses the gesture of the local climatic conditions in interplay with the character of the season."[115] and "how the vortex reconciles the rest/unrest relationship...manifesting the archetypal gesture of streaming"[116]. From these examples it is possible to see that although gesture is a broad term it is always used in connection to polarity. It can express an extreme of contraction or expansion or the characteristic way in which the phenomenon deals with the interplay of these two forces.

What this beholding the gesture calls for is a means of expression. Participants on the course, when presenting their individual projects, used various art forms to communicate what they had seen as the gesture of the phenomenon they had studied. This was often spoken of as an inspirational flash or Aha! and what was then perceived was "so obvious" it was "there all the time", "why had I never seen the connection before"[117].

The stages worked through thus far require different activities or ways of thinking and these could be characterised as using perception to see the form, using imagination to perceive the formative forces and inviting inspiration to reveal the gesture. The forth stage uses intuition to both combine and go beyond the previous stages.

The Fourth Stage

In terms of a Goethean methodology each of the stages is dependent upon those which precede it. Therefore it is not surprising that each stage is more difficult to explain outside of the context of having experienced the previous stages.

The fourth stage has several names each of which could be explored to come to a picture of the experience. These names are 'being one with the object', 'the warmth stage', 'seeing with the heart' and 'intuitive judgement'.

Being One With the Object: In the previous stage the observer attempts to quiet their own input to the perception of the phenomenon so that it can express itself through the feeling that it engenders in the observer. This sets the human ability of expression in the service of the phenomenon. In the fourth stage the human ability to conceptualise is what is at the service of the thing. However, as the phenomena being explored do not have this ability it is the most participatory part of Goethean observation. This reveals the importance of a thorough knowledge of the phenomenon drawn from the previous stages. Our ability to create and to initiate is what is being used and so the dangers of abstract creation not tied to a phenomenon are great.

What becomes possible at this stage of perception is, in the inorganic realm, the appreciation of laws and, in the organic realm, the appreciation of type. Type is, for Goethe, more than a descriptive plan shared by plants or animals and thus requires more than an exploration of the outer form and its constituent parts. Being one with the object allows an appreciation of the content or meaning of the form as well as the form itself. This content is only available to thinking as only in the process of thinking can the outer appearance of the thing and its inner content be combined by conceptualisation. When Rudolf Steiner describes this process he emphasises the degree of human participation involved.

> ...the mind must work with far greater intensity in apprehending the type than in grasping the natural law. It must create the content with the form. It must take upon itself an activity which is the function of the senses in inorganic science and which we call perception (*Anschuung*). The mind itself must be perceptive on this higher plane. Our power of judgement must perceive in thinking and think in perceiving.[118]

At this stage of the process of Goethean observation it is acknowledged that the phenomenon is at its least independent of human reason.

The Warmth Stage: In the plant the part most expressive of this mode of perception is the seed. When the plant makes a seed, particularly annuals, the rest of the plant is dying away and this most contracted point contains all the possibilities of future plants. The seed is the most physically contracted but contains the most potential. Whilst still a seed it could become the kind of plant it is in any of that plant's manifest forms. The mode of perception connected to this fourth stage is also the most physically abstract —having the least connection to the outer appearance of the phenomenon. However, that abstraction from the specific allows the perception of what is essential to the inner nature of the thing. Bockemühl calls this an experience of the "being's beingness". He expresses the warmth stage thus:

> We are here at the limit of what can be called a mode of observation. The warmth enters us - our inner activity itself becomes an organ. We do not experience the outer expression of a being, we become aware of its inner impulse.[119]

This connection to the inner impulse of the thing comes about through our own inner impulse to action. At this point we are prompted to action, not only in the sense of wanting to express something of the thing as in the third stage, but to do something about it. Although this is the most intrusive part of the process, because of the journey which precedes it, that intrusiveness is not a subjective expression of will. The intention is to combine the being of the phenomenon with the human ability to both think and to act in the world.

Seeing With The Heart:[120] The moral implication of being empowered to act by having an intimate knowledge of another being is often experienced as an awesome responsibility. However, it can be expressed very simply and in a way that resonates with how many people feel about this experience in the words "it is just seeing that this has something to do with me and I have something to do with it"[121].

In the landscape survey at Pishwanton the impulse to action which characterises this experience was expressed as an almost irresistible force.

> It is at this point that we realise how very connected each of us has become with the "own place" —it is painful if someone suggests something inappropriate. We have "*become one with* it. It is often at this point that it becomes almost impossible to not do in one's place —not to clear away rubbish, move a dead tree ....[122]

Again this impulse to action could be described as a warmth reaction. This is especially apparent when people feel 'fired up' about encroaching rhododendrons etc.

Although resulting in a desire for action the very centre of this fourth stage is said to be the use of thought in the service of the phenomenon.[123]

Chapter Five

Pishwanton

The aim of this chapter is to demonstrate the use of the Goethean method in a real life, rather than a purely teaching, situation. Before delving into the application of Goethean observation to a landscape I will outline an approach to ethnography which captures something of what I am attempting to do. By comparing Clifford Geertz's idea of "thick description" to other types of ethnography I outline why the approach adopted was chosen as specifically appropriate to the situation.

As well as giving a sense of what it feels like the material from Pishwanton mainly raises questions about how this approach sits with other environmental or ecological positions.

Introduction

> We shall not cease from exploration
> And the end of all our exploring
> Will be to arrive where we started
> And know the place for the first time.
> T.S. Eliot

The previous section has dealt with the various stages of Goethean observation and although they have been related to a particular phenomenon throughout it has been, perhaps, too differentiated and distanced from the real practice. This is helpful in explaining the ideas behind the practices of Goethean science in Britain, but is not the best way to give the reader a sense of what it is like to participate in those practices. In this section I want to describe a piece of ongoing Goethean research in as descriptive a form as possible.

In the discipline of anthropology the established technique which I felt would be both sympathetic to and usefully interpretative of the phenomenon in question is Clifford Geertz's development of "thick description".

Geertz's Thick Description

For Geertz anthropology is not "an experimental science in search of law, but an interpretative one in search of meaning".[124] And so all the ethnographer's tools are employed to the end of saying something about that meaning. The term 'thick description' is taken from Gilbert Ryle's *Collected Papers Vol.2.* Geertz uses the distinctions which Ryle draws out to explain why it is necessary to look and to describe in depth.

Ryle uses the example of winking to explain the way in which we need to know the meaning behind actions in order to understand the actions. In Ryle's example of an increasingly convoluted scenario —a snapshot of playground mischief— the layers of meaning behind a simple act are unravelled. To the uninformed observer a wink and a twitch could be the same thing. However, if we know the codes of

winking, which Geertz extrapolates as "deliberate, to someone in particular, to impart a particular message, according to a socially established code and without cognisance of the rest of the company"[125] then we know it is a wink and not an involuntary contraction of the eyelid. The informed observer sees both the physical action and the meaning. Ryle goes on to elaborate the story such that one of the boys parodies the first boy's wink in order to further amuse the others by suggesting that the first boy was an amateur at conspiratorial winking. He will parody by the socially accepted code of exaggerating the clumsiness of the first wink and thus the meaning changes from conspiracy to ridicule whilst still being only a contraction of the eyelid. This snapshot could go on and indeed Ryle takes it further to the point that one boy is alone in front of a mirror. The thin description of what he is doing is 'winking' whereas the thick description is "practising a burlesque of a friend faking a wink to deceive an innocent into thinking that a conspiracy is in motion."[126]

Faced with these layers of meaning, Geertz believes that it is the ethnographer's task to find their way through the "piled-up structures" of the culture they are exploring. The two types of approach that he rejects are (a) the systematising of the phenomenon by applying an over precise theoretical structure and (b) the failure to interpret, to pretend that we approach the phenomenon with no ideas at all. It is the former approach that I will now address.

The danger of applying a prior theoretical framework has been discussed in the previous chapters and Geertz has similar reservations. He says:

> To set forth symmetrical crystals of significance, purified of the material complexity in which they are located, and then attribute their existence to autogenous principles of order, universal properties of mind, or vast a priori *weltanschauungen,* is to pretend a science that does not exist and imagine a reality that cannot be found.[127]

His critique of other ethnographic studies applies to two versions of the overly theoretical approach, these he calls the "teacup and cloud chamber"[128] analogies.

Teacups: Ethnographic studies are, of necessity, small scale. The temptation is there to say that what happens in this small town or commune or factory canteen is in some sense emblematic of wider social trends or human nature or unconscious desire etc. The assumption is that we can infer from the microscopic study a macrocosmic reality. I would not be quite as scathing as Geertz, who calls this "palpable nonsense"[129], but it has to be remembered that what one is studying is a phenomenon and only in the mind of the interpreter of that phenomenon can it be an instance of something wider. For example, to study Goethean science as a feminist science or a reaction to a dominant reductionistic scientism etc. is to risk setting up those crystalline structures. This might not only fail to distinguish between the burlesqued wink and the conspiratorial wink, but will see winking where there was only twitching.

Cloud chamber: The cloud chamber or case study format presents what is the study of the particular as a natural experiment. This view is misleading as it suggests that the ethnographer, as if in a laboratory, has some control over the parameters. The scientific language used in such case studies is even stronger than when ethnographers infer from teacups. The implication is not only that the ethnographer is presenting pure data, but that it can be analysed now that light has been thrown on the situation by the ethnographer's activity of looking at it.

To return to the original criticisms of (a) the theory over systematising and (b) the failure to interpret at all it could be said that thick description is treading a very thin path between the principal errors of saying something that is wrong because it is too general or saying something insightful about something too limited to be of interest. But how does it do this? The ethnographer using thick description can use all the usual tools of anthropology —informants, tape recorder, field notes, diaries etc. What makes it thick description as opposed to discourse analysis or ethnomethodology is the way it is written up. Observation in the field is the stuff of

ethnography, but how it is later represented is the product of a writer at a desk. Knowing how you intend to 'write up' will effect what you do in the field, but the final representation is the product of the writer reconstructing events for their own purposes. However, by intensely detailed description the ethnographer or historian[130] attempts to place the reader in the field, to give the reader the vantage point of being there, seeing what it is like and possibly drawing their own rather than the writer's conclusions.

This heavily descriptive method of representing the field appeared to me to be particularly applicable to Goethean science: Thick description attempts to give a sense of what it is like to be there, to give the reader a share in the experience. The experience is the crux of Goethean science and only a glimpse of that will help to show to what extent it requires an immersion in the experience, particularly in the senses. One of the strongest aspects of that experience is the sense of time slowing down, of there being no short cuts. Goethean observation takes time —vast tracts of time— and if you try to speed up the process it does not work. Detailed description helps to get that experience across by, quite literally, slowing down the rate of representation. The type of events that normally reach accounts are spread out by the usually silent detail of the everyday which makes up the medium of the events. If observation can begin with detailed description then there seems to be a very neat parallel between the style of ethnography and the style of study valued by people engaged in the phenomenon it is studying. However, this apparent similarity is problematic.

The criticisms of thick description are of two main types. Either the description is just description in which case it has no analytical content or it is deceptively interpretative. It would be nice to think that these two criticisms actually cancel one another out and so one only need to put those who think it is just "*belle lettres*"[131] in touch with those who think it is authority laden rhetoric. However, there is probably

some truth in both criticisms and what is needed is an awareness of the issue without that awareness becoming disabling. Perhaps we need to describe "with irony".

The Problem of Describing The Field

The various ways that ethnographers use description could be classified into three main types although they do overlap and shift and are occasionally unclassifiable. I want to use, for the sake of clarity, John Van Maanen's terms for three major strands. These are the Realist, the Confessional and the Impressionist.[132]

To summarise the difference I will begin with the realist ethnography. It is the most obvious and the traditional which makes it that to which newer forms are a response. To write a realist text the ethnographer goes to the field, typically a very 'other' culture, and gathers information about the activities of the participants in whatever the cultural setting and then writes a description of what happened with as much explanation as is necessary drawn from the researcher's wider experience in that culture. The text is authoritative and often in the 3rd person to clearly distance the person of the writer though not their authority. —— What they saw is what we would have seen although we would not have had the expertise to interpret it. The realist text also glosses over the problem of representing others and the use of quotation from the 'other' is to underline the universality of the writers interpretation rather than to give voice to the other for the reader to hear. 'I'm the expert this is what these people do', or in the words of Malinowski "they are my natives".[133]

This is obviously problematic and it is in response to the tradition of realism that the more recent trends in ethnography have developed. Acknowledging the most obvious limitation of the realist text, that it represents personal perceptions as universal, has developed into the confessional ethnography.

Here the ethnographer is overt about the uncertainties involved in not just their interpretation of others but even their perception. 'I saw 'x' but who am I to say what it means or even that it really happened'.

To acknowledge the personal in all perception the confessional ethnographer gives you the reader the inside story. All the problems and uncertainties in the whole research project are shared. The text is personal so that you the reader get to know the writer as well as what they describe. It is written in the first person although often in the past tense, eschewing the anthropological present to tell the story of personal transformation more clearly. So the confessional account is personal, particular and problematized and it attempts to be open. However, the openness of the text functions, not as a rejection of realism, in a sense, it is a making more real. In the confessional tale we the readers do not only learn that ethnographers are real people we also read their texts as real. Although this is not the expressed intention of confessional ethnographies an effect is that our critical interpretative antenna —now so used to decoding sham 'realism'— can be lulled into a possibly false sense of security that this person who writes so disarmingly is giving us facts. The aim is openness; by declaring their temperament or interests or failings the ethnographer allows us to read them out of the text to leave the facts.

The use of confessional ethnographies could be criticised as narcissistic and self absorbed, but even realist texts now reveal more about the author: What might have been glimpsed in the acknowledgements is now given a chapter —— why they chose this place and how they have changed etc. This is sometimes dealt with in an autobiographical section where the changes, which contact with the 'other' has brought about, are charted. This acknowledgement of change could be seen as throwing out the last vestiges of empiricism, but is it? Beneath the fluidity of a personalised account lurk the facts harder than ever. The attempt is for more realism

than realist in much the same way that stream of consciousness novels are more real than classic realist ones.

The third category of ethnographies, also shares something with stream of consciousness this is the impressionist ethnography. Here time scales are not collapsed and the anthropological present is stretched with the first or third person present tense description of the moment. Here the anthropologist records everything rather than imposing a personal or interpretative filter on the moment. By giving the reader everything to the best of their ability the ethnographer allows multiple interpretations whilst still forwarding some of their own. A common criticism of this form of ethnography is that there is nothing virtuous in the description of trivia. However, in anthropology this is usually overcome by the ethnographer's choice of the moments they decide to describe. Of course there is a return of authority in not having every day summarised but five minutes laid out in minute detail, but who would want to read six months worth of thick description? The impressionist ethnographer does what we all do when we tell stories we give the listener a snapshot of what it was like. We don't chose the mundane or necessarily the most personal but perhaps a typical or an exciting episode. Likewise the ethnographer uses their expertise in the field to identify what is typical or unusual and therefore warrants description.[134] The aim of the description is not to convince you of an interpretation but to give you what it was like so that you can be there as well. So impressionist accounts are detailed with no intrusive interpretation and they are often literary in style, but does that actually give the reader an open text?

Thick description, at least for Clifford Geertz, is not an attempt at pure impressionistic realism. The ethnographer does not write in order to describe, they describe in order to say something. Their aim is not really to give you the whole picture just those parts which address their question. As Geertz says:

> Anthropologists don't study villages (tribes, towns, neighbourhoods...); they study *in* villages. You can study different

> things in different places, and some things - for example, what colonial domination does to established frames of moral expectation - you can best study in confined localities.[135]

Although the ethnographer is focusing on a question and interpreting from their contact in the field, the thick description should engage the reader in enough depth of story to know what is winking and what is burlesqued winking and what they could be winking about.

The intention of my use of thick description, below, is slightly wider in that it attempts to give the reader a sense of the experience. To that end I have not been overly focused, but my choice of events is not random: the focus of my question is the method and how it is practised with particular reference to error. How is error understood, handled and used in Goethean science?

Beginning With a Preparatory Practice

It is a bright though cold morning and Margaret's little cottage is warm and comfortable we sit over coffee reasonably sure that the others will be late. The sunlight is reflecting in dazzling points from the various crystals and warm smoothness from the stones artistically scattered around the deep window sill. Genet, the shy tortoise-shell cat, has been unsettled since her recent sojourn at the cattery and worries to be let out having only just come back in. The living room is almost cluttered in that way that books, papers, and musical instruments can never quite manage to suggest clutter no matter how densely they line the walls and encroach across the floor. I clear the breakfast things away, Margaret says, "leave them, we ought to get ready, we'll need to start as soon as they're here, I thought we should start with some plant observation, it will help to focus on the method and not everyone has done it." I put out some newspaper to protect the large table - still no sign of Lynda and Jimmy or Philip, who I have never met - I change some of the papers to obscure the more distracting pages. A car pulls into the parking area of the

yellow stone church just across the bridge. Margaret is somewhere in the wilderness area of her garden, I call, “they’ve come”, and slip on my boots to meet them.

Lynda and Jimmy are both ecologists by training. Lynda works for Scottish Heritage cataloguing plant species and Jimmy works on a fish farm. Lynda and I are friends from attending two Life Science Seminars together. Their news is that they are both thinking of going to the Goetheanum in the spring to begin the one year training in natural science. Lynda looks tired and excited at the same time, its a big decision to move to Switzerland for so long especially as they have a three year old daughter.

“We must get out to Pishwanton while the weather holds” is the general aim, but first an exercise with the plant. Margaret gives us each a complete groundsel as we sit around the table. The roots drip soil and moisture onto the newspaper, for a few moments that is the only sound as we each examine our plant. Margaret says, “lets start at the base of the stem and describe this thing we are holding”. “Well”, begins Lynda in her precise Edinburgh accent, “there is a definite disjunction in my plant between a pale green to yellow narrowing part beneath which it splays out in lots of white string like things, but I’m looking at the area of this disjunction and there are lots of things going in there. Above the pale green is a much darker green and in a kind of skin-like covering which peels away from this strong horizontal axis there is a stripe of a dark pink colour with the edge of this peeling away part - well, more papery and almost transparent. The central axis, which is cylindrical, also has this mixture of dark pink and green and adjacent to the peeling away part there is a similar one although this still has whoops! sorry, this has a sort of stringy brown thing attached, no not attached it extends into a stringy brown bit.” Lynda sighs and looks to me as I am sitting to her left. “I’ll go from this tapering pale part of the cylindrical central axis which Lynda mentioned and below that, well on mine, there is a thickening and into that thickening there are lots of string like things. Again

cylindrical but tapering from their point of origin, sorry, near the central axis they are almost as thick as thin string and very white, they splay out from the central bit and are as thin as cotton at the ends with even thinner pieces coming off. One of them is more of a pale yellow colour and more rigid but with more wiggles and just hairs, can I say hairs? well anyway those instead of long threads. The length of these stringy bits is about one third the length of the whole and they splay out to about two thirds the width of the plant at its widest point. Is that it?" Margaret asks, "are any of them broken?" "Yes, and inside is a thinner, even whiter and more rigid strand a bit like wire in a cable, the outer covering is a bit squashy, juicy, and inside it is very firm. Philip continues, "Yes, er from the central axis going upwards after the area Lynda talked about the next leaf is still on mine, Lynda interrupts "Sorry Philip but we are supposed to avoid the usual names for things" "Oh yes sorry, I find this so difficult, well OK the first horizontal appendage to the central axis is straight and thin and then comes out into an almost symmetrical form an indented oval, the next one, going up the axis comes out about 45 degrees further around the central part and is not so horizontal, and in my one where that emerges you can see a new shoot, no another tiny appendage kind of bursting out, it is held in this place but you can well really see the whole thing is very vibrant." A slight shuffling of feet can be detected from Lynda and Jimmy's end of the table and Margaret intervenes. "Remember we are trying to describe this as a static object, all we have is what is in front of us, we must not use suppositions about how something behaves over time or prior knowledge to stop us seeing what is there, bare facts remember." "Yes sorry, but it is so hard." "Yes you're right it is hard especially with the plant, that's why the plant is so good to do the next stage with it's that sense of growth which is so strong in the plant its not surprising you find it hard." I was brought back from the plant for a moment by this very careful handling of error, this sense that we are all struggling and every slip

allows the possibility to find out more if examined. This dogmatism over method also implies a faith that by sticking to the format we get to the truth.

When the descriptive first stage was complete we moved on to use a leaf sequence to see the changing form of the leaf as the plant travels through all its stages of growth towards the flower.

”We are rushing this a bit, but the daylight is so short and we need a few hours outside. So lets go straight on to looking at the leaf sequence, you all know this, yes that’s right just the central stem and right up to the top”. Everyone is intently bent over their plant, carefully removing the leaves and setting them in order on the paper. There is a hushed fascination around this procedure and a tense concentrated effort that is almost tangible. Margaret whispers to Philip “one row is better, more of a continuum”, he re-arranges his leaves. Margaret asked how we approached this in Wales and I said “we either clapped or sung the rhythm that our own sequence suggested.” “Yes that’s a good way to get people’s thinking to shift into this next mode, but lets just talk it through today, Philip you start, just describe the flow of forms” “The first one of my sequence is about a quarter the size of the biggest one and it is the most rounded the next one has a longer stem and ——” Philip is aware that the others around the table are barely able to contain their amusement. “I’m doing it wrong again aren’t I”, Lynda says, “you were desperate to get into the plant as a living form just now, well this is your chance”. Philip joins in the joke “Sorry I was stuck at that last stage, right well, In my sequence there is a very strong streaming out from a simple contained form and then back again. The largest and most differentiated leaves appear vibrant next to the early ones which are, well fading, but the last few are really vibrant and contained more pointed triangles really, not like these smooth leaves at the beginning.” Jimmy continued “Yes mine has that same movement out and then to an even more contracted form, and the stem just disappears, its like the leaf travels down it until at the end the blade of the leaf is just

at the base of this little triangle" Lynda's last leaves particularly display this thin pointed form and she suggested "its a bit like they have been turned round - the first leaves are thin then spread out the last ones are spread out where they join the stalk and then become thin like stems" We all look at Lynda's sequence which is a particularly good example of a form changing completely around through gentle transformations. My middle section leaves are particularly well developed and so I guide the others through the movement towards symmetry which one of the larger leaves achieves before it begins to contract back into the more pointed forms "I can't help thinking that the plant really achieves something at that point it's sort of the leafiest leaf before it contracts towards expressing itself in the flower."

The Pishwanton Project

Pishwanton is the name of a place, it means 'much water' and the Pishwanton project is an initiative to conduct a Goethean landscape survey with the possibility of using the site as a future base for Goethean style research. The piece of land is approximately 60 acres and lies at the foot of the north-facing slopes of the Lammermuir Hills 20 miles east of Edinburgh and 12 from Dunbar. A description of the project by two of its principal organisers says:

> In this exercise we sought, by careful and methodologically sequential study on different levels of experience of the accessible phenomena, to gain insight into the spiritual being of the place (Pishwanton Wood) i.e., to approach what is commonly known as the *Genius Loci.* Then, by progressively condensing the spirit of the initiative (Goethean Study Centre), finding out which aspects of this could happen and where, we endeavoured to bring it down into physical substance.[136]

I have been following the progress of this initiative from a distance since its inception and in December 1992 took part in a weekend of observation there as part of the ongoing study.

Describing Pishwanton

I arrived in Edinburgh and was driven straight to the site in order that I could have my own first impressions. My driver and guide, Steve, said nothing other than to explain the boundaries of the sixty acres and so I was left to lead the way around the site following whatever contours I chose.

The road borders the site near to its highest point. A rusty metal gate marks the way through an open woodland of scots pines to the right and denser conifers near the fence to the left giving way to birches. In silence we skirted the pines to the summit where there was a dip surrounded by the tall scots pines and a few larch. One of the larch had fallen some years ago but was proceeding to grow in a horizontal position. The land was also dotted with the remains of tree stumps broken up with age. The sea was just visible to the north east. Moving down this slope we passed a small area of recently planted birch trees. In the low winter sunlight this was a sea of apricot trunks and dark twigs. Some horses roamed on the lower rough pasture. The land appeared to be crossed by many gullies some running with water and others just boggy. The driest area curved around to the east and the edge of the tree covered hill side was marked by some large beech trees, very deep orange and gold on the trees and underneath.

The mood of the place changed dramatically around these trees and I was reminded that I should be absorbing such things and observing my first impressions.

The whole place presented to me the word precarious — this I later discovered had cropped up before, but usually with regard to the natural habitat — to me its precariousness was more of a direct sensation of being on the top of a surface even though the land was quite sharply contoured. The whole area of the Lammermuir Hills had something of this quality, but Pishwanton seemed to express it. If the whole felt like being on a table top then Pishwanton felt like being near the edge of the table. Anther strong impression was its lack of 'earthiness': An expression I can only explain

by comparing it to the way it feels to walk in the Eden Vale. Some places just feel heavy and fixed which can be very calming, it was not like that here which perhaps contributed to its precariousness.

Knowing that I would be expected to contribute my first impressions meant that these almost indefinable feelings about a place had to be observed and remembered. This requirement of at least effort if not some results meant that walking and thinking had to be combined and not two disjointed activities.

So what was the shift, the difference about the feel of the area around the beech trees? The beeches looked like an avenue across a park. However, the whole site seemed to contain many parts — something ancient about the hill top under the pines and the flatter areas had an abandoned feel. The strongest shift was between the beeches and the lower rough pasture and bog that stretched from the foot of the hill to the stream and the boundary fence.

We retraced our steps to the car by which time rooks were beginning to wheel about the scots pines closest to the road.

The next morning when all the people who were taking part that weekend had gathered and practised the first stage of observation we got onto leaf sequences. Each participant made a leaf sequence from all the leaves of the main stem from cotyledon to sepal removing them from the plant and laying them out in sequence. This was a condensed version of the technique as we were looking at the plant in two ways to remind ourselves of the process we were about to use to view the landscape. We experimented with looking at the sequence after two of the leaves had been switched to experience the disharmony that is then so starkly evident. Margaret spoke about how in the first stage we are looking at what is there. However, what is there in the plant is intimately connected with the earth and the past; what grew last year and how the soil was treated dictates a large part of what the plant will be like. In this sense the plant is built out of the past. An appreciation of this connection between seeing

‘what’ is and in seeing what is what was done in the past was the quality of perception we would be using at Pishwanton that afternoon.

And so after lunch five people, on a very windy afternoon, stood on the lower ground of Pishwanton using a first impression to say what aspect of the circumscribed area they would be observing. (The ability to divide a place into parts and sub-parts is difficult to describe, but obvious when you are there. See figure 5.1. a diagram constructed from memory by the participants on a previous week’s study.)

figure 5.1.

One boundary of the area chosen was the row of large beeches and so I spoke about my impression of a shift in the feel of the place around these trees and expressed an interest in looking further at the ‘what is’ from ‘what was’ of this area. Margaret was to study entrances and exits to and from the area, Jimmie the stream, Linda the area around a row of alders and Philip the flatter area on the western side.

I began by walking the length of the beech trees and back again to see the lie of the land from both directions. I was feeling totally lost at this point faced only with my ignorance of landscapes, geology, farming and well everything. However, I made a start with the ‘facts’ stage, at least I knew the tree species and so I recorded the species and position of each tree and also whatever evidence there was of a fence. Pieces of old wire embedded in tree trunks and rotting fence posts amongst the leaf litter dotted the whole length of this tree lined ridge. From this I was able to include a fence in the land’s more recent use. The few very mature hawthorns under the beeches suggested a hedgerow, perhaps some of the beeches were left to grow after a hedge was removed. They were now magnificent with smooth green/grey trunks, massive yet sinuous. (See figure 5.2.)

The ridge itself had probably, at some time, been a path. Now its original route was hard to follow as some of the branches were bowing down across it and the hawthorn was straggly.

Although I was supposed to be objectively recording I was still struck by something about the area and decided to view it from across the stream. From there my strange feeling crystallised into a realisation of the trees as an anomaly. It reminded me of the test of the misplaced leaves in a sequence — the later leaf early in the sequence breaks up the flow but the early leaf late in the sequence is more of a negative anomaly it was, as I had expressed earlier that day, an impostor. Then things became personally difficult: the trees did not fit, they did not belong there, but the huge implication of that certainty weighed very heavily. Until that moment I had always considered all trees as beneficial — to me trees just were good. Apart from reeling from the awareness of my own naiveté I also began to worry about how I was to relate this to the others. Assuming that they would also feel protective towards trees how would they receive my findings. Perhaps others had also felt this, if I was right then surely they will have done, but then my observation might be the final evidence and at some time in the future they would be felled because of it. I tried to see them as fitting as a natural development of the landscape to test my impression, but it did not work. I realised that the indigestion I had suddenly developed could come from looking at these misplaced trees. Walking back across the rough pasture I realised part of the striking effect was due to the break in continuity between the colours which blended so well between the marshy sedges and the bracken and trees beyond the beeches. To round off the historical reconstruction I examined the trees for evidence of pollarding and surmised that they may have been left from the original hedge for providing fire wood and more recently utilized as fence supports.

We returned to the car to the raucous screeching of the rooks and continued working until late evening. We shared our findings and pieced together a picture of

the land since the ice age. Linda and Jimmie's knowledge of plant species meant that the more recent centuries could be quite precise. We also used eighteenth and nineteenth century maps. From these the straightness and speed of the burn was explained by the presence of a mill further down the valley. The burn had been straightened across the whole length of the Pishwanton land and then diverted at its south east side. The water reverted to its burn-like meandering from the fence.

It was decided to approach the land from that side the next day to see the site of the mill and to enter our area for observation from a different direction.

On Saturday morning the same group began with a collection of leaves and flowers and we tried to say in what way the flower was the expression of the plant and if we could see that expression dormant in the leaf. In this way we made the transition from looking from present to past to looking from present to future. Out on the site we would be trying to perceive in what way the landscape was trying to express its possible future. That is, what developments could be drawn from the "gesture" of this particular place and brought to fruition by human intervention. Having so recently been disabused of the notion of an easy hands off approach the element of responsibility that development implies still troubled me. However, this idea of inherent 'gesture', whilst increasing the responsibility, did offer a potential way of sharing that responsibility albeit with the landscape itself.

We made our way from the road on the south-east side across farmland. The only evidence of the mill was a grill where the water would have begun its descent to the wheel. Following the burn we could see clearly what Margaret had been studying the day before. How the land which swept into the area under Pishwanton wood was very artificially broken up by the clearance of trees on the hill side and the fence which was the present boundary. It should be noted from the historical maps that the division of the land was a long standing one. (See figure 5.3.)

Figure 5.3.

Not having the money for the sixty acres in question did not daunt those present from speculating how we could buy this connecting tract of farmland in order to return the valley to its lost wholeness. Before climbing the fence and entering Pishwanton Linda and I watched a fox disappearing through the gorse. The burn made a large sweep at this point and standing on its gravel bank I had the strong impression of children playing there. Margaret shared this and I think we assumed it was connected to future plans although I later wondered how we knew this rather than assuming it was from the past.

Back at the beech trees I walked up and down behind and in front of the trees finding the original path. In the terms of the leaf sequence I was trying to fill the spaces between the leaves and to see the landscape in the flow of time. Using the hints of past use that were around I formed the impression that this was at one time quite a busy link between the neighbouring hill forts. The original path lay between the hill and the beeches and was used as a dry wide track way. I tried drawing it before the trees were planted and could not resist adding a person driving cattle along, some of which were investigating the slopes down from the path and the wetter marshland. Where a nearly dry gully cut across the pathway I added a stream and small bridge of the type we had seen further up the valley. This all seemed very speculative but it helped to experience transforming it in some way before taking it forward in time. Moving the site in my imagination through the planting of a hedge and attempts at draining the pasture then the clearance of some wood and the hedge falling into disrepair, another fencing off the hill side from the lower ground for grazing and the removal of wood. In this way I brought the area through about two hundred years and with that momentum of changing took it forward into the future. Here of course the enormity of removing the trees was my main concern, could any be saved. The very first tree, slightly apart from the rather cramped row, stood near to the gully a place which had been, in my scenarios, a natural resting place on the path

through the valley. A single large tree here could, I felt, well express that change in activity. It could function both as a sign and practically as a place to stop, to rest, to think, and to meet. The other beeches only detracted from that. Turning to the centre of the part we were all studying it was possible to discern a clearer drier area that was a perfect circle. This circle could be accentuated by whatever was to be there and if it included any building then perhaps some of the beech wood could be used.

We shared our findings out in the field and there was a consensus about clearly defining the natural bowl area, either by returning the burn to a more wriggling course which would skirt it or cultivating the land up to the approach to it but leaving the burn and that area completely untouched for study. My idea of a round building was not popular but its modification into an open air meeting area was well received. There was more consensus about it being artificially disconnected from the adjoining land and that any development would have to take into account the desire to reconnect it at some time so that development would have to fit what was there and what it could be like with the extra piece.

My earliest impressions came back to me as we made our way back to the car, it did seem that this piece of land had been subject to many failed attempts at taking it into farming profitability. In a sense it had always been experimented with which could bode well for the proposal to set up a centre there.

On Sunday Margaret and I discussed further the latest threat to the plans, the proposed development of a neighbouring hill side and farm into a leisure centre with off-road driving, clay pigeon shooting and laser warfare. The noise of this would make study of the kind we had been engaged in impossible. The news of this development was greeted with what I can only term calm dismay by the other participants. It was decided that objections would be raised, but it might be necessary to find somewhere more remote, with all the implications of difficult access that it would entail. Pishwanton does seem ideally suited if it is to be used for short courses

as well as ongoing research being only a one hour drive from Edinburgh. I offered to find out as much as I could about bodies to approach who might be interested in objecting to this development, but the local opinion was that it would be difficult to stop. Part of the stoicism of the other participants, particularly Margaret who has invested such a lot of work in to Pishwanton, could be attributed to its experimental nature: Whatever happens a lot about the method of doing this kind of research will have been learnt which can be transferred to somewhere else. The trust fund which has been set up is also worded so as not to be tied to any particular place.

More Intensive Work at Pishwanton.

Apart from the occasional weekend studies there have been two, week long studies conducted by a larger group of people. The first of these was in the summer of 1991 and the second a year later. On these occasions the whole group camped at Pishwanton and followed the stages of observation detailed above.

Three illustrations from those studies follow. Figure 5.4. is an example of the first stage exact observation of what is there by Lynda Hepburn. Figure 5.5. is a map by David Heaf of bird song heard during the summer 91 study. And figure 5.6. is a future plan from the summer 94 study by Christopher Day.

Figure 5.4

Figure 5.5.

Figure 5.6.

A smaller scale study was conducted in the spring of 1994. This took place after the planning permission for the Quarryford estate development had been turned down, but while planning permission for the Life Science Trust's development was still pending.

Pishwanton Revisited

The proposal for these three days was to continue work at Pishwanton. All of the participants had learnt the method of Goethean science on previous courses and so were to some extent implementing as well as learning more. All those participating had been at a larger meeting of the Friends of the School of Life Science the day before when to some extent the schedule and pattern of these three days was worked out. At the meeting the issue of fund raising to buy the land and the slow development of the project had been raised.

First Day. We met at a pub in Gifford and began by sharing what we each expected or hoped for the days ahead. My own concern was to observe others using this approach and to perhaps reach an answer to the unresolved problem of my last time spent at Pishwanton. We also discussed an idea about how to proceed with the work. Because we all knew the basic steps of the method and four of us had been to Pishwanton before Margaret proposed we, to some extent play with the approach and experiment further. She had discussed this with me several days earlier and I had encouraged her in what was planned and the night before we had developed the idea further when discussing it with Warren. The experiment involved role play; we were to approach the land as a character who had a very specific pre-set idea of what should be developed there. We should maintain our characters as fully as possible for as long as possible of the first morning. However, whilst seeing the land through those eyes we should also be recording what that felt like and when we felt an overpowering resistance to our character. The primary intention was to allow the land

to, in a sense, answer back. (This was a new development of a technique I will discuss further in chapter eight where it is termed “thinking it otherwise”.) By imposing a set idea we hoped for a strong response from within ourselves, that is a response from our non role playing self’s ability to empathise with the land. This was seen as a way of answering the question what should be here? —that is by seeing what should not be here.

There was some resistance to this approach; from Ilona, who did not see this as a development of the method as she understood it, and from Peter, who had not seen the land before. They agreed to try it but on arriving at the site had not fixed on characters to play.

Another aspect of these particular three days was emphasised by Warren. He suggested that in this particular time of year, between Easter and Ascension, we should be focusing on “making real the ideal —of realizing the distant plans in some way”. There might have seemed a disjunction between this reminder of our task as a spiritual one and the suggestion of playing with and stretching the, usually more formally represented, method. I made the suggestion that the figure of Thomas who doubted until he could touch Christ’s wounds was a way of seeing the two aspects as connected. What we were looking for was a definite response in ourselves drawn from the land and if by using our imaginative faculties that could be felt and recognized in some very definite way we could perhaps see a more definite way forward.

The experience of one of the previous participants on the summer projects was an indication of how this could be. He had seen very definite possibilities for the land and had gone almost straight into feasibility studies etc. of first managing the whole as coppiced woodland and then of developing a commercial venture of growing native and exotic water plants. Both plans entailed a single thing which could be the whole plan. Only after not being able to really see it there even though it appeared possible

was he able to recognize an aspect of the essential nature of the place which is that of great diversity in a small space.

When we gathered at the gate of Pishwanton those who had devised characters shared who they were going to be.

Margaret (a Goethean scientist and teacher) played a new age vicar who wanted to set up stone circles.

Gordon Clarke (an architect) played someone who was "just out for what they could get".

Warren Bouwer (a speech and drama student) played someone who wanted to build an arts centre.

Isis Brook (a philosophy student) played an eco/feminist.

The plan was to spend about two hours on a silent walk around the place keeping within sight of one another but exploring where we wanted. At the end of the walk we would be sharing our experiences of imposing an agenda on the place.

My choice of eco/feminist was a deliberate attempt to come to some resolution of the problem of my previous time studying there. This was the question of what one does about mature trees which one's intuition indicates are in the wrong place. My role model was drawn from various people I have met rather than from a definite knowledge about the various positions and arguments in deep ecology and feminism. (italics denotes character speaking) *I was determined that nature knew best and nothing we could do would be 'for the place'. Any plans other than excluding people would just bring more desecration and I even felt guilty about walking on the grass there and was very careful to avoid stepping on any other plants. After a brief interchange with the "typical man" who was 'out for what he could get' I shunned the other people.*

The first problem with the role was that I had to leave my camera behind (I would no doubt be a vegan and photographic film contains gelatine) and Peter pointed

out that I would probably go barefoot rather than in wellingtons *(but I maintained that wellingtons helped to support rubber tappers in the Amazonian rain forests and was thus supporting a sustainable industry.)*

Near the start of the walk where a very definite path rises to the tall scots pines a large branch had fallen across the path I had to check my instinct to move it over *—if that is where it fell it should stay there: no doubt whole colonies of insects were already incorporating it into their communal structures.* And yet it felt very strange to walk off the path to skirt around it. *That is just an inclination to bring a human sense of order where it is out of place, you just want things to be tidy!* I was finding it very hard to sustain the role. When I seriously tried to see through different eyes the results seemed a barren kind of thinking and a frustrating impotence. I also felt that I should be permeated with anger and this I just could not sustain. However, the double bind was that if my real self was supportive of human intervention and valuing human skills as a partner with nature then I should be more respectful of, and try harder to listen to, the position of my role person rather than just constructing a stereotype.

I was unable to sustain the character much longer and just continued the walk observing many instances where human intervention had been poorly thought through or else deserted leaving nature to adapt to deserted developments. One striking example of the adaptive or redemptive power of nature was in an abandoned hedge. A beech and hawthorn had grown in the same space. The beech semi-enclosed the hawthorn such that it looked like a beech with one quarter of its trunk made from hawthorn.

When everyone was in the same clearing near the gate we sat in the late sun and exchanged our experiences of trying to impose an idea on the place. Everyone had found it difficult to sustain the role play for any length of time and so we focused on what had made us stop/brought us back to ourselves etc. Gordon's account was that his developer person had noticed first and foremost the views and "views are

saleable" he could see a holiday development here with the pines on the highest point forming an adventure playground. But the crunch came for him as he relates:

> Then I went for a pee and standing against this tree I had a flash of seeing initials carved in it and then I noticed the lichen. It was so intricate, so delicate, I then realized that I had only been drawn to the big things, the expanses and not the small and subtle aspects of the place. The suddenness of this brought me to a sense of the untouchableness of some things. Once I was looking at the small detail I couldn't be this person anymore.

Margaret's new age vicar did not last long either because he was not really interested in the reality of the place, the physical substance and yet the place seemed to be asking for intervention in very practical ways. Each time she has visited it has appeared more derelict and her impulse now is to begin the task of clearing it up.

We discussed the plan for the next days. The intention had been to all agree on an area, as in the previous study above, to then study each person taking a different perspective. The area we had decided on was the south west corner. This had not been looked at in great detail by a group although there was already a detailed map (each tree plotted) by a previous participant. We left Pishwanton having arranged to meet there at 10 am the next day.

Second Day. We sat on an area of dry bracken and exchanged our reflections on how the day before had been and what aspect of the chosen area we would be studying. (I should point out that one of the reasons for choosing the south west corner was because the south boundary was the only one which bordered a road. It was, therefore, one of the few externally dictated aspects of any plan that the entrance to Pishwanton would continue to be there. Vehicular access to any development could not remain in its present position which would contravene bylaws pertaining to visibility.) Warren, Margaret and myself had individually come to a very similar position. On the previous day we had been drawn to the relationship of the various parts and the way it was mediated. Margaret wanted to look at the various water channels: streams, ditches etc. but would end up in this south west area after seeing

water in the whole. Warren wanted to look at the directions, what each aspect of the site looked out onto and saw that as a way of finding the special gesture of each boundary. I wanted to look at the network of paths around the place and only when a sense of the whole network was achieved would I then focus on the entrance and how people would arrive and connect to the whole. Peter chose the various areas of trees and the spaces between them. And Ilona wanted to "crystallise the whole plan" to come to a sense of what the role or duty of Pishwanton is. "People will need shelter so I will find where is the place that it can be" (The problem with Ilona's choice of a starting point will emerge later.)

Gordon was also impatient and wanting to decide on the place for the first building, a site hut, something that would help all further work from a very early stage.

So we each began first recording the 'what is there' —physically visible— aspects of the place. It is only really my own journey through the following days that I will be able to relate.

Pathways

Beginning with the paths was relatively easy. I followed where the most obvious and visible paths were. Walking along them, watching where they took me and noting the condition and degree of definiteness about them. Some were well worn paths with little vegetation over the rock and earth, others were meandering lines of shorter grass that weaved between the gorse and young birch trees. Another path that I had not seen before was a recent development (post 1960s) of railway sleepers forming a vehicle track from the main path up to the corrugated sheds. This path although the widest was already covered with quite tall grasses. Its lack of a path-like-feel drew my attention to the different qualities I had felt on the other paths. And so I began again, this time focusing more on what each path felt like. Moving away from the

purely physical attributes of each path allowed me to see where they had probably continued when they were more used rather than having to stop when the physical signs petered out. In my field notes I had recorded:

> Paths feel very different some carry one along—drawing one forward. Some feel more like a clear space between things even when there is nothing there to set the boundary of the path. Others are animal tracks which move in a jerky meander whereas the 1st type is a sweep or curve.

I also tried walking off the paths. In some areas this was hard or almost impossible because of obstructions. However, even in open areas it is just harder to walk 'not on a path' not because of long grass or boggy areas but because there is a constant decision making process going on. It felt as if when we move through a landscape on its paths we are drawn through it not just by the structure of the land itself but by the ease of repeating the actions of people who had passed through the land previously.

I recorded on a map the place and condition of each of the paths and made a few notes about the very different feel of each and the changes as one moved along it and from each direction. The dominant impression I gained through all of the procedures was that paths were linked to time in a fundamental way. The relationship to time seemed to span their immediate use —speeding one's way— an intermediate time dimension in their development out of long established patterns and an almost eternal aspect of their connection to the underlying rock. The focus on patterns in time was suggesting possible answers —or means to answers— to the two issues at hand. 1. The development of an entrance to the place and 2. how to approach the problem of the beech trees.

My conclusion from the survey of paths so far was that when it came to deciding on an entrance and the sites for various activities an account had to be taken of where the paths were now. Such a consideration would have to go further than immediate practical utility. The paths seemed emblematic of the crux of the question

which pervades this whole approach to landscape and one side of which was caricatured by my temporary persona of ecofeminist. How much of the given must be retained and how much can be placed on top? Paths which do not connect to past uses will perhaps not be successful and those that are more entrenched in the geological aspect of the place will always exert a pull. Would people always be drawn to retrace the steps of others? Or can we impress a definite stamp on the landscape which reshapes whatever it is that draws us along well worn paths?

The power of pathways to elucidate the pattern of the landscape was becoming clearer to me and with it a clarity about why the beech trees seemed so misplaced. The beeches, now a row of eight mature trees, were planted perhaps 200 years ago as a hedge to skirt what might have been the principle track way through the valley and perhaps at one time a boundary between the hillside land and the valley bottom. Now the line of the hedge and boundary and the track itself is obscured by the breadth of the fully grown trees. However, felling the trees would not reinstate a pathway because the land is now divided across its length. The sense of a way of passing through the valley along this line is still strong although the actual path is obscured by the trees and its line through the valley obstructed by a fence. There is perhaps no better example of something symptomatic of this piece of land as it is now: the many projects started and never continued so that their legacy, often semi-redeemed by nature, but unguided by further human intervention now presents problems.

Third Day We began by sharing where we had reached in our individual work. This was mainly a very positive coming together with each persons' contribution bringing a new angle and yet resonating with what we were each feeling. Out of these contributions the aspects that could be construed as shared were: a) the gesture of the place being multifarious, b) the need for positive human action and c) the need to start in a small but very planned way so as not to fall into the same errors as before. Examples of a) were expressions such as "patches of difference", "because it holds so

many different things it prevents one thing incarnating" and "the fluidity can be kept by lots of things going on with no centre or one thing"[137]. An example which combines both a) and b) is the following:

> There is such a strong sense of a cross and four points and the connection to the periphery. It connects to the surrounding nature but needs man's activity. These are strong basic gestures here but they need us to make them conscious and express them. This is a place for humans of different interests — so there is a separateness and a joining.[138]

It had never occurred to me to look out from the site at each of its boundaries to see how it sits in the wider landscape. Warren's recording, which eventually took the form of four poems, of the very different nature of each view of the horizon is a good example of how, in working as a group, people can bring very different ideas and yet their results cohere with the joint picture.

However, the mornings rebuilding and sharing where we had come to was not without some tension and surprise. Although all of those participating were aware of the steps we should each be taking it had already seemed apparent that Ilona was not being as rigorous about the first stages of seeing what is physically there and imagining its development through time. The contributions she had brought to the previous joint sessions had lacked any concrete descriptions or pictures that would help us to see the process through which she was working. On the previous day she had suggested that there was no area which was not precious in its own right and that perhaps people should only come here to study and not make any changes. This conclusion was so utterly different to the ideas that we and previous groups had come to that she was questioned then as to how much 'looking at what is there' she had done. On this occasion she rather shocked everyone else by suggesting that the car park for Pishwanton should be in the very south west corner and up onto the hillside. This was suggested so that the cars would be kept, as much as possible, out of the main area. The idea was to see the boundary as a kind of sieve to determine "what

should come in and what should be kept out". The response to this was a very controlled but nevertheless physically visible disagreement from the rest of the group and even "but you can't possibly put a car park there!" from Margaret. Ilona had come to the conclusion that the piece of woodland on the south west boundary was a quiet place and should be preserved as it was. This was in direct conflict with the impressions the rest of us had of this small plantation of larch and scots pine. The reasons behind our resistance to the idea of a car park on the south west corner were twofold: the suggested place was a) the only immediately usable 'good' pasture in the whole of Pishwanton and b) it is also the first thing that is seen when you approach the place from the road and is visible from almost every other place. It was suggested to Ilona that she spend more time up on the far south west corner and look across to it from the other two mounds.

I had planned spend the day reaching some definite idea of where the new entrance should be and how to connect it to the strongest existing footpath. Gordon was helpful in this because his contribution had been to talk about the gesture as being expressed in the curves of the land and where straight lines had been imposed, such as the plantation fence, these were the jarring aspects of its present state.

I did look again at the small larch plantation before beginning to sketch out future plans. Having selected one of the few places an entrance could be I drew it as it is. Doing this made me even surer that the beeches here, along the road, which had been coppiced long ago and were now beautifully serpentine made a perfect boundary and so the entrance should be in the one place where their line is already broken by larches. I then drew the boundary again but this time with a greater variety of shrubs than just the gorse on the bank in front of the trees and a wide entranced leading into the woodland now thinned such that the higher ground can be seen beyond the trees and areas for individual cars between the more vigorous trees that remain. At this point Gordon appeared and we exchanged ideas, finding that the entrances we had

chosen were within a few feet and the car parking was arranged in the same way. I then tried to find the place for a path to link the car park and entrance to the older track. Doing this was harder but the line I chose curved round and helped to break up where trees had been planted in straight lines.

At the end of the day we guided each other around where we had been working and a reasonably consensual plan for that particular corner of the land emerged. Again Ilona was somewhat out of line with everyone else as she disagreed with the place for the first building. However, she later admitted to seeing that she was not working through the method diligently. Her impatience to come to the final picture was preventing her from really seeing clearly. Having someone so out of step with the process was interesting in that it held us back somewhat and emphasised how we needed to be very careful at the planning stage. We had checked our original perceptions of areas because of the lack of agreement. Also it seemed to me indicative of the method working. Especially as Ilona later agreed that she had not stuck to the method and she was the one person whose perceptions of the place were so different that they could not be reconciled with the broadly similar conclusions the others had reached.

When Margaret, Warren and I later reviewed the three days Warren and I felt we needed a stricter guide to keep us in line. I was particularly disappointed with my own reticence to get down to some drawing when I know from past experience how useful it is. Making oneself structure a long expanse of time into a constructive pattern and keeping one's attention on the task in hand is extremely difficult. Now I could quite happily go back and spend a week just on one path.

Conclusion

Sheltering under pine
I gaze
Through windows of wood
toward a Southern sky
and behold
Hills laid low against a grey sky.
Undulating horizon or
Hedge of naked birch and canopied pine
—along a road that pretends to be our boundary—,
or fringe of needled branch
above my head
Embracing my smallest space;
Where are my borders?
Where the line dividing
I and World?[139]

What emerged from the three days, which is expressed here in one of Warren's poems, is the dissolving boundary between place and person. The questions that arise from that interaction are always focused in some way on the interaction itself. So apart from a slow movement towards consolidating the future plans for Pishwanton each of the participants learnt something about the nature of our relationship to place.

My own impression from the work was to see more clearly the activity of time both in the process and in the landscape itself. Placing time closer to the centre of one's consciousness when viewing the landscape helps to unravel the discordances that are apparent and should help in planning for the future.

Something that became very clear about Pishwanton was the way in which ***the relationship between time and trees is instantiated in this place****:* in the harmonies

and in the discordances. The time scale of tree growth is beyond human lives and yet somehow not beyond our living imagination. The trees seem to act not just as a record to a broader than human time span but also as indicators of that process of imagining time outside of ourselves, our lives, our futures. In this way they form a key to processes which can then be extended even beyond the time scale of individual trees.

The paths were another instance of the integration of human action on all aspects of the natural world. They follow a line partly dictated by rock and yet also shape not just the plants and animal patterns but also the rock itself. And yet the paths mediate not just our relationship to the 'natural aspects' of place but also our relationship to its past human inhabitants. The patterns they moulded from, and back into, the land draw us along a laid out route, a set passage through this place. That pull seems stronger than fifty year old land divisions or two hundred year old trees and yet there has been a complete break of human use. We have not been raised in the habitual patterns of this particular place or initiated into its past uses by older inhabitants. The feel of the patterns of passage seem like what Seamon describes as place ballet.[140] However, the habits of movement they draw us into are not our own personal ones but some kind of universal recapitulation of the resonances of humans moving through place.

Every aspect at Pishwanton seems to point to further study of the human landscape interaction and a transcending of the concept of interaction to one of a mutual integration. My experience of the study as a whole, the efforts of those involved, the transformation of one's feelings toward a place together with an awareness of the shifting appearance and then the solid reality of it bring to mind a line from those of T.S.Eliot which opened this section.

> ...to arrive where we started
> And to know the place for the first time.

Chapter Six

Tradition

Using Alasdair MacIntyre's interpretation of tradition we can view Goethean science as a dynamic tradition. By looking at the aims and practices of those involved we get a sense of not just its history, but how its history is being used to mediate controversies and define itself in a fluid rather than rigid form. The use of leaf sequences is taken as a practical example of the development of a practice within the tradition. And finally the moral development of the scientist is outlined as the central guiding ethos of the tradition.

Introduction

It is possible to show that even the name *Goethean* science is not without its critics amongst those here represented as using Goethean science.[141] However, there are common strands which run through all of the initiatives discussed. Two of these strands are:

- The use and development of the practices used by Goethe and Steiner as well as past and present leading anthroposophists.
- An acceptance of the concept of personal development.

These two points suggest a uniformity of approach beneath the differing views. Moreover, the differences which exist could be seen as a strength of Goethean science in Britain. Using Alasdair MacIntyre's view of traditions it could be said that debates, such as those between the mathematicians and the other streams, help to define Goethean science as a tradition.

> ...when a tradition is in good order it is always partially constituted by an argument about the goods the pursuit of which gives to that tradition its particular point and purpose. So when an institution - a university, say, or a farm, or a hospital - is the bearer of a tradition of practice or practices, its common life will be partly, but in a centrally important way, constituted by a continuous argument as to what a university is. Traditions, when vital, embody continuities of conflict.[142]

By looking at the continual constitution of practices and the debate they engender we can see the dynamic of a tradition. And through the extrapolation of the essential points on which all the parties converge we can see that tradition as having a single, though multi-faceted identity.

Practices and 'Goods' as Indicators of a Tradition.

The term 'goods', outside of the context of MacIntyre's discussion of a new Aristotelianism, carries a strangely materialistic notion. However, what is meant is

the ‘internal goods’ which are the product of the practices used to acquire them. These goods are the defining *raison d’être* of the tradition.[143]

MacIntyre explores the idea of internal goods with the example of a child being taught how to play chess.[144] At first the child will play for a reward and play to win for a bigger reward. The reward, e.g., sweets, is not internal to either the winning or the playing it is external. When the child enjoys playing chess regardless of the external reward the goods s/he is receiving are internal to the practice of chess. In fact the term ‘receiving’ is no longer appropriate as the goods are dependent on engagement in the *activity* of the practice.

However, activity within a practice has to be of a specific kind and directed towards a specific goal. If the aims of the participants in a practice differ widely this could call into doubt the existence of that practice. For example, if in the case of chess only external goods are sought then there is no reason for a person not to cheat if they can do so unseen. The rules would appear arbitrary and irrational. If I cheat at chess and my partner resigns I have not won at chess I have won some other game which allows a knight to move four squares. As no such game exists and my partner was certainly not playing it I have won nothing. To be initiated into a practice is to accept the rules and standards of excellence within which it operates. But, paradoxically, it is also to engage in the debate about what the aim is and what practices will best lead to it.

How those rules or standards of excellence develop and change over time is what makes something a tradition rather than an institution. And so the telling of how the tradition has developed —the reiteration of its own history is part of the process of defining itself. For an example of a consciousness within the tradition of the need to speak one’s history see Arthur Zajonc’s comment on page 199. below.

MacIntyre is clear on the point of the importance of history to any dynamic tradition.

> A living tradition then is an historically extended, socially embodied argument, and an argument precisely in part about the goods which constitute that tradition. Within a tradition the pursuit of goods extends through generations, sometimes through many generations. ... Once again the narrative phenomenon of embedding is crucial: the history of a practice in our time is generally and characteristically embedded in and made intelligible in terms of a larger and longer history of the tradition through which the practice in its present form is conveyed to us;[145]

Tracing that embeddedness is the focus of this section. I will follow the apparent aims of the people involved now in Goethean science in Britain and relate those to the people and texts which have been the authority behind the tradition.

Although one might expect to look to the Goethean Science Foundation for the main impetus in Britain this is no longer influential. Britain has always relied very heavily on Germany and Switzerland to provide the authority in Goethean research. However, the present awakening of interest is not the first attempt to set up a place for Goethean research in Britain. The Goethean Science Foundation was established in Clent near Birmingham in 1947. Its founding members were George Adams, Michael Wilson and Olive Whicher. (Of whom only Olive Whicher is still alive.) In Clent, in the grounds of a Sunfield children's home they found a quiet place to live and work. The two areas of specialization were projective geometry, as applied to the plant world, and colour. Adams and Whicher saw their work on plants as "a further development of Goethe's Theory of the Metamorphosis of Plants."[146] This work on plants had begun in London and an account of the process will show to what extent they relied on the authority of Steiner and Goethe to direct their way of working.

> For years we had watched the plants, knowing that the secret was there, but knowing also that there is no spiritual reality in superimposing a theory on the phenomenon. As followers of Rudolf Steiner's Goetheanistic methods, we knew that the phenomenon must reveal its secret, its underlying Idea, to the awakened eye.[147]

Wilson's work also developed in a characteristically anthroposophical way in Clent. Zajonc records his first meeting when as an American graduate student he visited Clent.

> Some thirty years before, Wilson and a few dedicated friends [Friedrich Geuter] had founded a home for mentally handicapped children that had since grown into a large residential community. I had become accustomed to "centres of excellence", staffed entirely with brilliant, high-strung scientists and technicians. At Sunfield I found another tempo and style of investigation, one guided by compassion rather than grant deadlines or scientific rivalry. ... Michael Wilson answered my questions in his book-crammed study... In doing so, he took me back to the dawn of the nineteenth century, and to the German poet Goethe.[148]

Although Adams' work and his and Wilson's publications are still influential all that remains of this first British initiative as a working centre is Olive Whicher's teaching of projective geometry at Emerson College and her own research into spiritual science.

The current main authority stems from the Research Laboratory at the Goetheanum in Dornach. The people who have trained there and are working in Britain were taught mainly by Jochen Bockemühl and Georg Maier, a biologist and physicist respectively. Both men are research scientists as well as teachers. Dr Bockemühl uses the work of such figures as Hermann Poppelbaum, Gerbert Grohmann and Wolfgang Schad (all of whom worked from an Anthroposophical standpoint) to develop his ideas further as well as using directly ideas from Rudolf Steiner and from Goethe.

Transmission of Practice

An example of the transmission and development of practices would be the use of leaf sequences. In the chapter on theory, I showed to what extent observing the plasticity of the leaf was an important experience for Goethe. Also the use of sequences of leaves in the present teaching has been discussed in the second stage of the method (see page 120.) and in the preparatory exercise for work on Pishwanton (see page 141.) The building of a tradition will now be explored through this phenomenon of leaves laid out on the page.

Although the changing shape of the leaf form on individual plants had been noted before, Goethe was one of the first people to see this sequence as interesting and informative as regards the activity of the plant.[149]

From Goethe's initial observation the development of these sequences within Goethean science is both one of increasing complexity and a retention of the simplicity of the primary experience. Figure 6.1. is a sketch from one of Goethe's notebooks[150] . This instance appears on a page of notes and sketches on insects so is perhaps no more than a doodle, but even here it clearly shows the discontinuous metamorphosis of the leaves that Goethe found so instructive. Rudolf Steiner[151] uses a more diagrammatic form to help describe the process of formative forces as made evident in the plant (see figure 6.2).

figure 6. 1.

Gerbert Grohmann, in a book first published in 1929[152], shows the leaves separated from the plant and set out to display the changing shape. Here they are illustrations of a particular plant's leaves rather

figure 6.2.

than a schematic diagram and their separation is to display better the shift in form and thereby the movement in the plant's development (see figure 6.3). In Ernst Lehrs' *Man or Matter*, first published in 1950, the sequence of leaves is used to suggest the necessary movement in thinking that is required to understand the plant as a living being but also to explain the practice of imaginary participation in general.[153] Jochen Bockemühl takes further the work of 'getting to know plant-ness' by further developments of this basic idea of discontinuous metamorphosis as important to both a) understand the plant and b) understand the dynamic of the process of observing living things as living. In the single volume *In Partnership With Nature* sequences are used which show the following:

figure 6.3.

I. The standard sequence of a single plant from cotyledon to flower with the added description of the process as containing the four stages of stemming, spreading, differentiating and pointing. These four stages were discussed in the chapter on method. Figure 6.4. is my own diagram, taken from groundsel, to show the movement through these stages.

figure 6.4.

stemming *spreading* *differentiating* *pointing.*

II. Figure 6.5. shows the changing form of the leaf from its origin in the meristem and is thus a sequence in time following the growth process of an individual leaf. This example, which is an early leaf of the hairy bittercress (cardamine hirsuta), shows that the first leaves in their individual growth reverse the path of the stages through which the separate leaves of the plant move. In the early individual leaf the movement is from pointing to differentiating to spreading to stemming.

figure6.5.

III. Figure 6.6. is a sequence which shows the development of each leaf and the sequence of all the leaves in their final form (in the outer ring).[154] In this example it shows that whilst the earliest leaves go through the sequence as above those that will exemplify spreading miss the stemming stage and those that will differentiate miss both stemming and spreading and the final leaves move straight from pointing in the

figure 6.6.

meristem to pointing in their final, visible to the naked eye, form. The plant depicted is nipplewort (lapsana communis).

IV. Figure 6.7. shows the comparison of sequences of the same species, in this case groundsel (senecio vulgaris), when planted at different times of the year in order to experience the nature of the changing times through the year.

figure 6.7.(Roman numerals denote the month in which the seed was planted.)

V. Figure 6.8. shows the exploration of the nature of heredity in the plant world. It demonstrates the characteristics passed from mother plant to those raised from its seed notwithstanding the time rhythm of the different planting times for each row which is also evidenced.[155]

figure 6.8.

mother plants *successive monthly plantings*

(Letter denotes original plant and its progeny. Roman numeral denotes month)

VI. Bockemühl also uses sequences to investigate the growth of biannual and perennial plants[156] where the fluctuating rhythms of each year and the whole life of the plant are super-imposed one upon another and the techniques of 'reading' them become more complex and also rely on the intuitive level of interpretation. See figure 6.9. for the sequence from germination over two years of the life of a dandelion.[157]

figure 6.9.

The increasing complexity of the use of sequences displays a development of tradition whist the maintenance of the form —leaves on a page— demonstrates an adherence to a tradition. This 'development and adherence' feature of the work can be seen as a complexity which is never distanced from the phenomenon being studied. Thus the adherence is not just to the outward form but also to the underlying aim of the tradition.

The final illustration (6.10.) in this sequence of sequences is my own (after Colquhoun) which is a diagrammatic exemplification of the interpenetration of the four elemental stages in a single plant. This was used in teaching to get across the mutability of the four stages rather than seeing them as rigid categories as that would defeat the purpose of using the sequences and the elemental flow of characteristics to grasp the livingness of the plant out of its static forms. Encoded in the diagram is not only the plant itself, but also the stress on the discontinuous metamorphosis of the leaf shapes (from Goethe), the connection to the elements (from Steiner via Grohmann) further elaboration of four stages (from Bockemühl), and the graphic clarity of the interpenetration of those four forces (from Colquhoun).

figure 6.10.

Fire (pointing)

Air (differentiating)

Water (spreading)

Earth (stemming)

The Theme of Self Development

> There is a delicate empiricism which makes itself utterly identical with the object, thereby becoming true theory. But this enhancement of our mental powers belongs to a highly evolved age.[158]

To anyone encountering people looking at nature from a Goethean perspective it will be apparent that another strand of what is going on - another reason for doing these things - is that of self development. I would seek to show that this is not an additional benefit but the central 'internal good' of the tradition. A good which is seen as both moral and scientific.

The explicit demand of self-development would seem to connect courses such as the Life Science Seminars to the broader social trend of the human potential movement. However, it should not be assumed that this is just a modern niche for an alternative science or something built onto an established tradition to make it attractive to a contemporary scene. By tracing back through the development of this tradition I aim to show that the concept of self development has always been an intrinsic part of its being. And furthermore that the use of objective subjectivity, as discussed in the final chapter on phenomenology, is dependent on that development.

Exercises and More Exercises

The means to the goods of Goethean science can be seen as clearly based on the practice of exercises. I have written about the drawing and memory exercises that participants on the courses undertake. The examples given were those which best explored the differentiation between the stages, but there are many others. One way of exploring this dimension of a course would be to go through a typical day on a Life Science Seminar focusing on any activity which has a bearing on the idea of self development.

Each day begins with a reading of Rudolf Steiner's *Calendar of the Soul*. This is a short verse which is used as a meditation. There are fifty two verses and so the same one is read for a week in both German and English translation. A succinct explanation of their purpose, given by Steiner, is:

> The verse given for each week is intended to help the soul into an experience of that week as part of the life of the whole year. The Calendar is designed to express all that echoes in the soul when it unites itself with that life. It aims at creating a healthy feeling of at-one-ness with the goings-on of nature, and consequently a strong self-discovery.[159]

Although many of the participants will have come across this before and for some it would be a part of their day, for others it was a new experience. This set the tone of each morning's work.

The session then begins with a rebuilding exercise. For this the group has to rebuild in the imagination the thing observed in detail the day before. On the Plant course this was a dead-nettle which we had described in detail following the procedure of exact sense perception the day before. We were asked after that session to remember before going to sleep that night to visualise the plant again in as much detail as possible. The next morning when we were asked to close our eyes and see the plant again, for me, it was extremely vivid. The plant is then described again by taking turns to build it together in much the same way as before, but this time without it being there. We were asked to also observe how the plant in our imagination changed as other people added detail that we had failed to put in. I had forgotten the dead leaves at the bottom of the stem and it was a shock to have such a complete picture and yet with something missing. In this way the group begins to work together using the way we notice different things to build a whole. The whole that is built is also not as tied to the specific instance of dead-nettle, but approaches what is characteristic of all dead-nettle. A similar experience happens when drawing from memory as Bockemühl explains:

> Drawing and painting from memory is of great value as we seek to come closer to the 'element of infinity in an object'. From the darkness of our forgetting, the 'night side' of our consciousness, we recall elements that went[sic] there when we made our direct observations. These are not the original details noted, however, for they have to be redeveloped out of a more or less diffuse feeling for what they were. It is like growing a new plant from seed. Experience has shown that any image produced in this way is much more harmonious and true to character than any drawing made from nature, though this, too, involves the inner life. A good image will often show only a few details, but these are truly 'in character', telling us more than a detailed copy of what our eyes have seen.[160]

Some drawing exercises are more abstract explorations of polarity. Such as the flowing form of a lemniscate to explore the movement and polarity between expansion and contraction and inside and outside. See figure 6.11. for an example of a plain lemniscate, several interlocked and then a flowing form which is several drawn with a continuous line. It is also possible to remove the top half of one of these to reveal a bud shape but still remain conscious of the expanded space above its point into which it will grow.[161] These very specific exercises are then used to help us to a more individual representation of leaves.

figure 6.11.

The drawing sessions were always followed by lunch and even this cannot be left out of the exercise structure of the day. Although one person was in charge of providing the food an awareness of tasks to be done is expected of all the participants such that eventually sitting down to a meal was another group built activity. Eating was always preceded by grace, usually a sung version, with the intention of permeating with consciousness the activity of eating. Clearing away and washing up was also shared evenly across the days by the participants without recourse to a rota or a formalised structure. To need a rota or conversely to all be crowded into the kitchen would have been a tacit acceptance of a failure to be conscious.

The afternoon session was left open for individual projects where people worked independently. At four p.m. we gathered again for another artistic activity, this time modelling. A typical session would involve making from clay a morphological sequence. One such sequence was a shape which contained both a convex and a concave. We had, on the previous day, made an individual one which was an attempt at a perfect balance of these two with a gradual transition. Now we attempted to make a whole sequence which exhibited the extreme concave and the extreme convex and all the forms in-between. This was done by each participant starting with the same amount of clay and then making the form which was a believable step from the one to their left towards the one to their right. Also during this exercise we moved around so that the form one had been working on had to be relinquished to another. This whole exercise is one of the most powerful group experiences I have had. A similar exercise was used on the colour course which is illustrated below (figure 6.12.).

figure 6.12.

The accuracy of the sequence —how well the forms flow from one to another— is entirely dependent on each person being conscious of the rest of the group and serving to mediate between the people on either side. Silence is encouraged during this

process, but it is never without humour. What happens during this process is that one becomes less conscious of one's individual ego, but aware of how it is being used to build a task directed group ego.

The evening is either relaxed with musical activities or more intellectually demanding with lectures/talks. However, as well as the recommended rebuilding the plant in the imagination before sleep there was also the exercise of drawing a bud every day as it slowly opened.

The exercises mentioned mainly focus on aspects of the plant and deal with reaching a broader understanding of that kingdom. Moreover, they all aim to build new organs of perception. Even the approach to food requires a heightened sensitivity not only in the sharing of tasks, but also to the source of the food.

The Anthroposophical Background

As was suggested by the first meditation —using the *Calendar of the Soul*— the source of and reasoning behind many of the exercises is anthroposophical. Very few participants come to these courses without some knowledge of Rudolf Steiner's work. This is partly attributable to their not being widely advertised outside of the anthroposophical network. It is therefore not surprising that the personal development aspect of Goethean science is accepted and indeed is the focus of many people's interest. These are a few quotations from participants which express this view.

> I hadn't known what to expect - Steiner was so far an ideas man of impenetrable complexity, Goethe a poet (I thought) of the dim and distant Enlightenment. As the ten-day course progressed I could see that any expectation was open to shattering, for this was simply the opening of our own experience. Starting in puzzlement, questioning, incoherence, by the end of the course each of us had their own discovery of unity which also welded us as a group.[162]

> ...I am also interested in the self-developmental nature of the course..[163]

> It is about the way we can meet a plant and the changes, the emphasis we have to alter in ourselves in order for that meeting to occur.[164]

Becoming more receptive to phenomena is dependent on the development of the sense abilities. This entails an evolution of self which places the process at the heart of the anthroposophical endeavour. The exercises discussed above (though focused here on the plant) all resonate with exercises given by Steiner as a means of developing "super-sensible" perception.

The phrase to describe this enhancement is "developing new organs of perception". This could suggest something physical or quasi-physical, but nothing of the sort should be inferred. Both the exercises and the abilities which they are said to engender are *activities*. It is this sense of activity which allows one to relate the skills learned to the idea of 'goods internal to the practices' as discussed earlier.

Rudolf Steiner gives many such exercises in his books and published lectures. The most basic or foundational set of exercises are called the six "subsidiary" or "accessory" exercises.[165] An examination of these exercises will give a sense of the kind of tradition of self development on which the present practitioners of Goethean science are drawing.

The Subsidiary Exercises[166]

The first exercise is concerned with the development of the student's thinking abilities. It involves the disciplined concentration on the physical facts of an object, ideally a manufactured object such as a pin or pencil. This should be carried out for only a few minutes each day. "Stability and capacity to adhere firmly to a once chosen subject are what the pupil's thinking has to acquire."[167]

The second exercise aims to strengthen the will. Again this is facilitated by a very short but definite act each day. For this the student makes a decision to perform an action at a specific time of day. The action must be easily attainable and it does not matter how trivial, for example, untying and tying one's shoe laces.[168]

The third exercise is related to the realm of feelings. The first move towards developing a sustainable sense of equanimity is to control outward expression of extreme feelings. This should not be an attempt to prevent such feelings. It relies on a close observation of the internal effect of feelings.

The fourth exercise is to educate the thinking and feeling and is called positivity. To develop this the student must overcome feelings of dislike or disgust to be able to see the good or the beautiful that might be in a thing. Rather than making one indiscriminate the intention is to lead to a greater degree of discrimination which is not swayed by outer appearances.

The fifth exercise combines thinking and willing. The student must make a deliberate resolve to allow, at some point in the day, whatever they meet to tell them something new. This exercise requires both the first and second exercise to have already strengthened the thinking and willing. This will mean that the thinking is open but not undirected. And the will is able to make the act of being open actually happen.

The sixth exercise is the culmination of the practice of the other five. Each of these will have been slowly developed until the student can practice two and then several at the same time. It is then the sixth exercise to bring them into a harmonious balance suited to the individual student.

The effect of these exercises and their necessity to the type of personal development advocated in Steiner's writings should also be given. The advice about these and many other exercises advocated in anthroposophical literature revolves around the concept of objectivity. The thinking exercise is seen as foundational because it schools the thinking in the facts of the physical world. This is thought to ensure that when the student moves to thinking 'between the spaces', as it were, there is not the danger of thought becoming fanciful. By schooling the will students become able to set realistic and fully examined aims and to carry them through out of

their own initiative. The equanimity exercise develops in the student the ability to view their own feelings as if those of another. They should still be felt deeply, but equanimity allows the student to examine them objectively. Positivity is a check on our conditioned responses especially in the feeling realm. And openness functions similarly in the area of opinions forcing a rethinking of old ideas or set responses.

The story of how Rudolf Steiner came to develop these and similar exercises, and why he should want to, brings this narrative of a tradition back to Goethe.

Work On The Goethe And Schiller Archives

Rudolf Steiner claimed to have been, from childhood, able to perceive the super-sensible world. As he grew up he was able to discriminate between those perceptions which he could share with others and those which would draw blank looks. However, the super-sensible realms remained for him the more real. As a student in Vienna the problems of equating the scientific theories he was being taught with his own way of perceiving became a problem. Two such areas were Darwinian evolution and the wave theory of light. What he was expected to learn was in direct contradiction to what he could perceive. Starting from a firm belief that an unprejudiced examination of phenomena would yield the truth and thus solve these contradictions Steiner began a detailed study of light and colour. Professor Karl Schröer, who had already shared his enthusiasm for Goethe's poetry with Steiner, was able to see that the ideas this student was developing were close to those in Goethe's *Theory of Colours*. Thus began Steiner's life long interest and interpretation of Goethe's scientific work. A.P. Shepard's biography of Steiner deals concisely with this starting point.

> Through this door Steiner entered upon his life-study of Goethe's writings on natural science. But he was in no way ready to accept Goethe's theory, until he had tested his own ideas by experiment...he set up the apparatus to test further his own and Goethe's ideas. From this he was led to make similar studies in

> anatomy and physiology, and as a result of these he arrived independently at Goethe's theory of metamorphosis.[169]

However, Steiner was also reading Schiller at this time and drawing from him the idea of differing stages of consciousness. This Steiner used to suggest that the impassable limits of science were only impassable in an ordinary state of consciousness. If other states could be actively used and schooled in the same rigour that he believed to be foundational to science then a science of the spiritual could be developed. The key to that training he saw in the way in which Goethe had approached physical phenomena.

So Goethe was for Steiner not only another who was able to perceive something of the super-sensible realms, but one who could show how to perceive them by penetrating physical phenomena. This would mean that the way was open for others to share in Steiner's way of seeing even if they were not born with the ability. In fact in his later writings, for example, *Knowledge of Higher Worlds,* Steiner is very critical of what he terms the "old clairvoyance" which some people still had. This he sees as not being part of the conscious life and as an obstacle to be overcome before the new organs of perception can be consciously won. The process of interpreting Goethe's ideas and working through his method was for Steiner a part of his own development. He says:

> Thus by means of my Goethe task I experienced the difference between a state of soul in which the spiritual world manifests itself, so to speak, as an act of grace, and one in which step by step the soul first makes its own inner self like the spirit, in order that, when the soul experiences itself as true spirit, it may then stand within the spiritual of the world. But in this standing-within man first realises that the human spirit and the spiritual world may come into union one with the other within the human soul.[170]

It is, of course, a valid question to ask if Goethe was seeing glimpses of the same world. Some historians, such as Karl Fink, see in Steiner's work on Goethe a one-sided or overemphasised view which does not equate with the bulk of Goethe's scientific work.[171] However, for the present purpose of tracing the development of a

tradition it only requires that the participants in that tradition can make sense of their own narrative history. Which they undoubtedly do.

Goethe and the Moral Development of the Scientist

A link between moral development and scientific expertise, or at least the perceptual abilities that aid scientific expertise, is explicit in Goethe's writings, in their development by Steiner and in the aims of present practitioners and participants on courses such as The Life Science Seminars. Such a suggestion is at complete variance with an orthodox idea of science as objective and independent of the moral qualities of the practitioner. Indeed when I mentioned the idea to scientists they could only understand it in terms of avoiding fraud. This they saw as better achieved by taking as much of the data gathering operations as possible out of the hands of people. In this way, not only active fraud, but also careless inaccuracies are avoided.

However, the way in which Goethe writes on this issue suggests something more than the reliability and sense of fair play of the Mertonian ideal scientist.[172] The question of what he does mean can begin to be approached by the examination of his relationship to the English meteorologist Luke Howard (1772-1864). Luke Howard was for Goethe an exemplar of the 'good' scientist. Goethe's championing of Howard precedes his knowledge of the man and was inspired by his *Essay on the Modifications of Clouds* (1802). This, Goethe felt, was scientific work of the highest order.[173] Several aspects of Howard's work can be highlighted as contributing toward Goethe's imprimatur. These are:

- His close and long term observation,
- His use of, and regard for, lay knowledge,
- His classification drawn from the phenomena.

Although these strands can be identified in Howard's work it was probably the tenor of the essay as a whole which impressed upon Goethe the idea that here was someone

using the same approach to phenomena as he did himself. Moreover, Howard's choice of names for the four main types of clouds he identified —the cirrus, cumulus, stratus and nimbus nomenclature which is still in use— is given by Goethe as an example of 'correct' naming [174]. The names and the classification itself is thus understood as having been read from nature rather than imposed by an abstract theory.[175]

Seeing value in Howard's essay and his approach Goethe also wanted to know something of the man behind it. When he writes of a desire for such knowledge it is clear that he is implying that there should be a correlation between excellence of scientific observation and conceptualization with strength of moral character:

> I have become increasingly convinced that everything done by the hand of man ought to be looked at in an ethical sense. But moral value can be judged only through biography, so I asked Mr Hüttner, my able corespondent in London, to see if he could obtain even the barest outline of Howard's life for me. Thus I could see how such a mind took form, and how it was led to view nature in a natural way, give itself over to her, recognize her laws, and then act in a way both natural and human as it prescribed such laws to her.[176]

Once Howard had been convinced that the request was not a hoax, he wrote a short autobiographical sketch for Goethe. The letter, presumably from modesty, fails to mention Howard's pioneering Quaker relief work in east Germany[177] which was acknowledged by the city of Magdeburg, the King of Prussia and the King of Saxony. Nevertheless, Goethe can see in its diligent scientific quest, honesty and commitment to the practical Christian life exactly the moral profile he would have expected from the work. He says:

> There is probably no finer example of a spirit to whom nature shows herself without reserve, a soul with which she is inclined to hold the most intimate communion. [178]

Cause or effect. Although the preceding story might suggest that Goethe understood moral character to be a prerequisite of the good scientist the link he makes is not a simple one of cause and effect. To argue that an innate quality of character makes it

possible for good scientific observation to be carried out would mean that good scientists are born and not made. The Romantic redefining of the self as an active force, both implicit in Goethe's literary works and the currency of the times, cannot allow such an interpretation.[179]

When Goethe sets out to place the sciences within an historical framework he uses the biographies of individual scientists as the reagents to their socio/cultural times. As Karl Fink points out:

> Goethe's scientific biographies follow a pattern in which the individual's personality and stages of development are related to his scientific contributions. And these dimensions, namely personality, stages of growth, and scientific activity, are usually cloaked in external materials, in information on the individual's environment, on his habit, and on his social context, for Goethe thought it is the climate of the times that conditions the scientist and his work.[180]

However, it would be easy to overstate Goethe's idea of the active socio/cultural influence on the development of a scientist's work because of the early formulation of what has become a truism of modern science studies: that social pressure, authority and dogma shape the course of science. But one should not see Goethe as proposing the scientist's role as passive.

Interaction. The *interaction* of a developing individual responding to changing times is clear. The key figures he uses are not represented as heroes driving science forward, but neither are they merely chance individuals responding to a more collective current of scientific development.

The biographies of some individuals could be likened to the growth of plants. The individual is seen as gradually becoming closer to that which is their potential through a process of refinement, but the specific form their scientific work takes will be partially determined by the geographical and social environment in which they are living and working.

So 'good' scientists are neither entirely born nor entirely self made but come about through the interaction of two active processes, the socio/cultural context and

the individual development of one's potential. The same claim of interaction can be made about the moral development of the scientist and the quality of the science they produce. However, the connection between, what Goethe calls, "ethical striving" and scientific excellence is not of the same nature as that between individual and environment. It is not that two forces are at work shaping a single product, for Goethe the ethical and the scientific are the same force in different forms. Thus for Goethe the practice of science, in the manner he prescribes, is a moral task and the fruits of it are moral fruits which are also scientific fruits. It is not that one activity assists another, they are one and the same thing. And not only are the activities of science and morality the same, but the single product whether we see it as scientific or as moral is also activity.

In Goethe's writing we are faced with someone who sometimes appears to use science to be guided towards moral development and sometimes with the idea that only the morally developed character can approach nature scientifically. Occasionally they come together in the same passage:

> Without my attempts in natural science, I should never have learned to know mankind as it is. In nothing else can we so closely approach pure contemplation and thought, so closely observe the errors of the senses and of the understanding, the weak and the strong points of character. ... The man incapable of appreciating her she despises; and only to the apt, the pure and the true, does she resign herself, and reveal her secrets. [181]

It is only through the idea of science and moral development as activities and an appreciation of Goethe's ideas about the development of new organs of perception and intuitive judgement that these things begin to make sense. The shift in our ordinary thinking that it is necessary to make is that the science is a science of qualities which requires a keen ability to listen to one's intuitive responses to phenomena and the morality is one driven by the ideal of self knowledge.

However, just as we have had to adjust our understanding of what science is to understand Goethe's science so it might be necessary to adjust our understanding of self knowledge.

Idea of self development.

> I must admit that I have long been suspicious of the great and important-sounding task: "know-thyself." This has always seemed to me a deception practised by a secret order of priests who wished to confuse humanity with impossible demands, to divert attention from activity in the outer world to some false, inner speculation. The human being knows himself only insofar as he knows the world; he perceives the world only in himself, and himself only in the world. Every new object clearly seen, opens up a new organ of perception in us.[182]

Thus Goethe first abjures the task of inner development and then presents it in a new light. A light which breaks the dualism of inner and outer and brings the activity of the scientist —to know nature— to the sanctum of the temple Goethe seeks to vanquish, a temple of non-physical abstraction. In knowing the world we come to know that which is knowing the world and particularly the aspects it shares with what it finds. Speculations without that engagement with the physical world —the place in which we find ourselves— he sees as a diversion from the task of being human. But the task is not just to know the self it is to use that knowledge, those observations, to bring about transformation.

Moral Development in the Tradition

As it has been shown above people attracted to learn a Goethean approach to science see the idea of self development as an integral and desirable part of the process. Its presence in current practice is, therefore, not merely a vestigial trapping of an eighteenth century science. And as has been shown above the aim of self development implicit in Goethean science is not a new addition stemming from the wider popularity of the human potential movement. It is still central and has been

throughout the entire development of the tradition. Ernst Lehrs, writing in the 1950's, even uses it as the distinctive marker:

> We have found as a distinguishing mark of the Goethean method of research that a true knowledge of nature cannot be achieved without making oneself —in Goethe's words— worthy of it; that is, not without ethical striving by the investigator. [183]

Goethean science is still seen as being bound up with an ethical approach to the world. And the liveliness of this part of the tradition is evidenced by the debate that still surrounds the issue.

"A Community of Aspirants"

A sense of the range and points of agreement and disagreement around the issue of the moral development of the scientist can be conveyed by focusing on the debate that took place between twenty three people over a weekend. This not only demonstrates the tradition in the process of defining itself but exemplifies the centrality of ethics to the goods of Goethean science.

At a conference in Oxford entitled 'Goethe and Modern Science' in May 1993 a large proportion of both plenary sessions were taken up with discussing various aspects of the question 'is Goethean science inherently moral?' The same points emerged in this debate as have been discussed in understanding Goethe's reference to the moral qualities of those to whom "nature reveals her secrets". These points are:

1.a) does a training in Goethean science necessarily lead to an enhancement of moral qualities?

1.b) Is a moral character a prerequisite for an ability to do Goethean science?

1.c) The mobile nature of the inner change that is required.

A more contemporary theme also emerged which is possibly predominant in the thinking of those present due to the emphasis in Rudolf Steiner's work on freedom. This could be identified as the questions:

2.a) Does the moral quality of the meeting between scientist and phenomenon guarantee the morality of the scientific or technological outcomes of their practice?
2.b) Does the ethical necessity of freedom compromise the guarantee of an ethical product?
2.c) What kind of social forms or training are possible given the necessity of individual effort on one's moral being.
The questions above are given as pointers as a focus for the discussion to follow. Here they have been artificially separated for clarification. But below they will be recombined to reflect the interpenetration and play of ideas as they emerged in the dialogue that took place, after presentations and over lunch as well as in the plenary sessions.

Although all the speakers had mentioned the moral dimension at some point in their presentations the first speaker Arthur Zajonc had made it central. His schematic presentation of the issue in terms of two dimensions is quite useful.

He presented the orthodox approach to science as operating in just a horizontal dimension whereas Goethean science adds a vertical dimension. However, it should not be misconstrued as an ethical gloss to the same way of understanding a particular phenomenon as in the purely horizontal mode. Meeting the phenomena requires that one is changed by that meeting, and that requires a responsiveness that is already part of the vertical journey. Arthur explained how he understood the depth of understanding behind Goethe's work with colour. The archetypal phenomenon of the sunset he described, using Ralph Waldo Emerson's term, as emblematic. To understand it as emblematic we have to see that which it is emblematic of —the way in which colour is in the world— which Goethe described as "the deeds and sufferings of light"[184]. However, we can see a sunset and not see that of which it is emblematic. We can even see the sunset and know the theory and still not 'see' it. To explain what was necessary Arthur used the idea, which has been mentioned above, of

an “inner movement”. It is this movement which could facilitate, what he spoke of as, the leap out of the horizontal dimension of science as we are taught it is and into the vertical dimension of a “sensory moral reality”. The distance between these dimensions and the positive act that is being asked for is clear from the following quotation from the Oxford conference.

> I need the movement, the flexibility within myself to move that, to make that inner transformation, make that change and then I can make the bridge between two sides of existence that have long been kept apart namely the scientific and the religious. Here was the link for Goethe. He doesn’t articulate it fully I think, its picked up by Steiner who does articulate it more clearly...[185]

A distinctive feature of the vertical dimension was identified by Arthur and others in the ensuing discussion. It was seen as not “compelling” in the same way that logical argument is in the horizontal dimension. This means that no one can argue anyone into it. The “leap” was seen as a solitary act and likewise the personal practice which leads to the transformation necessary to take that step.

The communal nature of the effort, as those present had experienced it, was also acknowledged as an important feature of their experience. The support that others gave, by sharing their experiences, was seen as crucial. This sharing could take two forms: i) collaboration on a specific piece of research or elaboration of method and ii) discussion of the experience of self development. However, the older structures, e.g., university training etc. were seen as incompatible and new forms had to be made. Arthur used the term a “community of aspirants” to describe the type of supportive structure that would be necessary to the development of Goethean science.

What that community would look like, how it would be constituted and under what type of authority it would operate were key issues and became the focus for more discussion. The concept of a lack of compulsion and the freedom that has to be present does mean that structures in which there is a teacher who has all the right answers and it is the student’s task to reach them under guidance becomes

problematized. A strong theme, generally formulated as advice, was to just get on with it. Examples from the plenary session were "Where ever you are just start by looking at something"[186] and "There is a lot to be said for just doing it"[187] Although this would certainly be representative of the experiential nature of Goethean science it does not reflect what was expressed as an aspect of its strength: that in each of its perceptual modes it is exactingly rigorous. The problem both with 'going it alone' and with recognizing who can help you was expressed by a Dutch participant who asked: "But when you are at the beginning who, and with what authority, is helping you to get on the right track?[188]" When the "right track" includes moral development and when moral development is implicit in having expertise, the question of who are the teachers and how is a training recognized becomes more complex. The way out of the inquisitorial labyrinth that would seem to threaten is to, as Goethe insists, go to the phenomenon. It is the interaction with nature and the self examination necessary to contact nature which is the vehicle of and the measure of moral being in this context. The practices are seen as directed to moral growth. For example, the degree of patience required and the sense in which one has to slow down was seen as a cornerstone of becoming more conscious. "Just slowing down enough to do this will have a moral effect on the person."[189] As with Goethe in the section above the practices and the tools necessary to carry them out are seen as being reciprocally rather than causally related. And the initial end point of observation is also seen as morally checked by the phenomenon itself. As one participant said:

> "Its not a projection of the self so what one gets from the phenomenon is inherently ethical because it is only when one dedicates oneself to the phenomenon that it can be known, that act is an ethical act,"[190]

Again here the reciprocity of the relationship infers, but does not compel a moral response.

The idea that community is important even though each individual is ultimately responsible for themselves was a common theme. Not always just to provide the necessary training. The necessity of a community to maintain a tradition was also expressed: " How do you find the 5 people? It doesn't have to be 500 or 100 just 5 people so that in 20 years time when you are forgetting your own storyline someone is there who remembers it better."[191] Another connected strand to this was to emphasise the links to other groups and traditions. Two aspects of this emerged. One was the sense of enrolling people, "...we have to go out and make links with others, like at the Edinburgh Science Festival to tell people about it, just to say 'Hey we are doing this and it is really great come and try it'."[192] The other was to say we need to know about these other approaches with which we share something, "There are certain schools of thought which are very coherent with what we understand as Goethean science, based on the Kuhnian tradition, and a really important trend is the re-introduction of values into science."[193]

Freedom. The juxtaposition of individual quest and community effort does not effect just the social forms or manner of working it is an essential ethical question concerning the whole venture of Goethean science: the question of freedom. The idea that ultimately we stand alone before a phenomenon: that the ability to let it speak is won by hard individual effort and a moment of free choice certainly struck a chord with those present. The lack of compulsion was seen as both a useful control and indicative of the nature of the science as ethical. As the debate developed the key anthroposophical text *The Philosophy of Freedom*[194] was used to support the idea that only a free act has the possibility of being ethical[195]. The same text was also used to counter the idea that we are free in all our acts.[196] The problem that freedom presents for Goethean science is that it is essential if the approach is to be inherently ethical and yet freedom also means that it has to be possible to subvert the science or its outcomes. A question raised was, "Is there anything inherent in a new intellectual or

cognitive framework that will keep it from abusing its fellow man?"[197] If we are free then the answer must be no, but again the way in which people construed meeting the phenomenon suggested the very edge of choice and compulsion.

> If it [the plant perception] has truth in it then there is no way that we can do anything against the truth of that being... experientially you cannot partake of its truth without it being in you and then it is asking you to be an altruistic vehicle for it.

However, from the foregoing it is also possible to conclude that even though a degree of moral being is necessary to reach that meeting of the phenomenon the findings or the technology developed etc. can be subverted either by oneself or others. This dimension of Goethean science as an ethical science does not, on examination, offer the guarantees that the requirement of moral/self development might at first suggest. The human accomplishment of freedom which makes Goethean science possible is also seen as the factor which removes the possibility of absolute guarantees about the use of its accomplishments.

Chapter Seven

Common Ground

The nature of Goethean science is further explored through instances in which similar practices occur.
The simplicity of the techniques is highlighted by a comparison with the pressure group Common Ground's parish maps project. This shows that the experience of deepening one's observations is both active and common place.
The experience of 'meeting the being of an organism' is explored through the work of the cytogeneticist Barbara McClintock.
Finally a brief picture is given of the work of some geographers and architects who are attempting to use a phenomenological approach to develop a sense of place. In their work on explicating the taken-for-granted nature of our interaction with place they combine the commonsensical amateur approach of the parish maps and the exacting expertise of training one's perceptions of the phenomenon and thus represent what is possibly the closest academic field to the type of Goethean science that is developing in Britain.

Introduction

The methods and practices of Goethean science as I have set them out, will seem strangely complicated, difficult and at times tortuously pedantic. However, it is essential to keep in mind that the method (or at least large elements of it) and the findings are obvious and extremely simple. The experience of seeing the commonplace but *really seeing it* for the first time is typical of Goethean observation. So what can sound like the uncovering of nature's mysteries is in fact observing exactly what has always been observed, but never clearly seen. The experience of seeing in a thing something that was not apparent before is not exclusive to Goethean science and can occur at any time. Exploring possible parallels will help to see, what could be termed a deepening of perception in other contexts.

The Pressure Group Common Ground

The first parallel and the one that will be explored in most detail is an instance of where aspects of what has been presented as Goethean observation occur in a less specialised area.

The Incitement to Value

The charity Common Ground has as one of its aims the preservation and development of local distinctiveness. In promotional material they say:

> Common Ground is embarking on a campaign for locality and distinctiveness, emphasising the intimate relationship between environment and culture. We want to help people hold on to what is valued in the old, to demand the best of the new and to add to local identity. But first we need to recognise the differences and detail that enrich our places.[198]

The project which best typifies their approach is that of the parish maps. In 1985 a number of local communities were asked to make maps, in any format, to show what they valued in their locality. What went into the maps therefore were not just

representations of the physical sites but also their history, their development and their unquantifiable value to the people who live there.

What emerged —though the identification of what was valuable was left very much to the local community— was a strong demand for the preservation of what made each place distinctive.

Enough has been said to begin a comparison between the map project and Goethean science. The Parish maps are congenial to the Goethean perspective simply in the way they are not just physical representations of physical facts via an authoritative system of agreed symbols —but rather what might be called a *collaboration* of the landscape and the people who live in it.

However, I would argue for another similarity which relates to the question of process. What I want to do to bring this out is to explore the question of seeing for the first time that which in a sense we have seen many times before.

It appears from accounts of the way many of the parish maps are developed that feelings about the value of a local feature are intensified just by being asked about it.[199] When they are invited to look, the vague liking a person may have had for a particular bridge, say, or solitary oak becomes a real desire to have an *enhanced* view of it: and, beyond that, there grows the desire to preserve its existence.

Articulating such desires to oneself can then lead to communicating our enthusiasms. And in enunciating to others, "I like this wall, the way it curves out and the ferns that grow on it" —our own feeling intensifies. And if this is done in any kind of group context, there is further nourishment from the group process itself for an individual's feelings and convictions.

Perhaps it would be more accurate to say that Common Ground do not just encourage thinking and feeling along certain lines, they positively incite communities into action. But the appeal to action is distinctive. It is not like that of the pressure group which identifies the object of its campaign at the outset. It is not based on the

premise for example that such-and-such a species is rare and thus must be defended. Common Ground begins by asking us to pose the question to ourselves: What do I value and why do I value it? And this demands a real engagement with one's place. The approach is non-directive which leaves the what and why to be supplied by 'ordinary' people: not by experts or those trying to preserve by exclusion. The "expertise" being looked for is the insight involved in knowing that something familiar plays an important part in one's life.

I have indicated some of the parallels to be drawn between the approach of Common Ground and the approach of Goethean science, particularly as concerns landscape. These could be itemised as follows:

- Seeing people as an integral part of place.
- Not applying universal values but drawing values from the place.
- Seeing history as a dynamic part of the present.
- Understanding that seeing and valuing are processes.

It is the last point, which is not emphasised by Common Ground, that I will explore further.

The Parish Maps Project

What are parish maps and who makes them? In a leaflet describing many of Common Ground's activities they are explained thus:

> The PARISH MAPS project is enabling hundreds of communities to chart what they value in their own place. The maps - by women's groups, parish councils, civic societies, schools and individuals - are taking many forms, including wall hangings, posters, newspapers, jigsaws, performance and music. Many have given confidence to people to embark on practical conservation activities such as opening footpaths, protecting open spaces in cities and towns, recreating wildflower meadows and arguing for sympathetic development. [200]

The model presented in the leaflets is that of an impetus from outside unlocking the reservoir of values for a locality that previously lay unexpressed. From the

perspective of Goethean science this model does not fully explore the dynamic of observation as a process. The Goethean science perspective would agree in seeing the local people as having values, but before engaging with the question of what it is they value it would take into account that these are for many at the level of vague feeling or inklings of what is there. One's values, are articulated, or the articulation strengthened, by the process of looking at an object with a question in mind. A parallel thing is true of perception: having a reason to look at something will always yield more detail or pattern.

This enhancement of experience can come about by encountering expertise. For example, it only takes a few moments of walking with a geologist to realise that this person is not seeing the rocks and lie of the land in the same way as oneself and a few moments of explanation can yield a tremendous change in one's own perspective. Any expertise will do this, woodlands and hedgerows look very different once experienced with a craftsperson who makes walking sticks.

In these cases, having a reason to notice would seem to be the activating force. And it is this reason to notice that the parish maps project has provided. What is then noticed is more than before, not it would seem, by engaging with 'scientific' expertise, but by engaging with the language of values and seeing oneself as an integral part of place.

Although the language of values would seem to add complication it is not necessarily problematized by the people expressing the values. When asked 'what do you value?' the answer is always going to be 'that which I value', be it a meadow, a bridge or a pub. There is a simplicity about this which belies the sophistication of the thinking behind Common Ground's projects. By asking the question, not giving the answer, the projects draw on the strength of the experience of empowerment without explicitly engaging in that discourse.

Although Common Ground promulgates questions not dogmas, it has to be said that the projects it inspires are hardly disparate. There are persistent themes of the rural, the natural and the old (even though some of the responses are from the city). This does not necessarily imply that there is an unacknowledged agenda which dictates the responses that are appropriate. It could of course be that there is a consensus about values.

The role of distinctiveness in the Common Ground programme is similar to the role performed in Goethean science by the doctrine that your approach to a phenomenon should be determined by the phenomenon itself.

There is another thing in Goethean science which has a similar role to that of distinctiveness. It is the idea in its approach to landscape of identifying the *genius loci*. On a very practical level this Goethean principle connects to the reason bio-dynamic farmers keep the type of cows that were traditionally bred for the area they are farming. There is no bio-dynamic cow —there are only breeds well suited to their environment. The diversity is not maintained for reasons of "quaintness", nor because mere conservation is a desirable thing, but because it is part of sound animal husbandry. Likewise, from the Goethean perspective, there is no right way to build a stile. 'Meeting the *genius loci'* involves connecting to the past and this will encourage the efficient use of available materials. The Goethean perspective thus leads to local distinctiveness and diversity, not for their own sake, but because they make good common-sense.

The active character of ordinary perception.

There are obviously many differences between the work of Common Ground and that of Goethean science. But the shared part which I am using Common Ground to focus on is THE SIMPLICITY OF IT ALL.

It is very easy to get caught up in the complexities and forget that what it is about is seeing what is there. The early stages of Goethean science are known by other names and practised by many people because the experience of seeing something for the first time which was seen everyday is not uncommon. To help that experience along Sue Clifford and Angela King make the following suggestion:

> When we attempt to write about or paint our surroundings ourselves our powers of observation increase enormously; we see shapes, outlines, details, colours which we never noticed before or make connections we had missed. For this reason alone it is worth the effort - apart from any sense of achievement and enjoyment it may also bring.[201]

This seems strikingly familiar. Of course it should be! Because it works many people will discover it. What it means, that it works, and just how simple and obvious the new observations are is explored in the following example.

(It is unfortunate that the shift in observation in this example is facilitated by a scientific expert, but the earlier 'seeking potential walking sticks' with a craftsman was also a real example.) Whilst visiting Britain with his exhibition 'Awakening to Landscape' Jochen Bockemühl walked with a group of people, from the Royal Observatory over Blackford Hill and through the Hermitage. This walk was rich in experiences of seeing the common place not as items but open to interpretation as to their response to and part in the whole landscape. Just how simple all this is can be shown by the experience which was for me the most powerful. Near the end of the walk we could see a group of trees about one hundred yards away in a field, Bockemühl said, "this is a good example of the way trees form a whole". This was of interest to me as I was engaged in an attempt to learn how to identify the common British species. Learning to identify trees especially in winter was proving more difficult than I had foreseen although I had not worked out why. It was something to do with how they did not look as they are supposed to in the books, but that was as far as I had reached. This simple observation, that in groups they form wholes, is so

obvious once someone has said it that it seems a confession of stupidity to say that I had never noticed. Once identified the phenomenon of groups of trees, not just as groups, but as wholes is available to ordinary observation everywhere there are groups of trees. In fact on returning home I found that I had been surrounded by perfect examples of this.

What I want to do to bring this out is to explore this experience of seeing for the first time that which in another sense we see every day.

What it means, that trees form wholes, I have left until now so that the reader could have tried to actively reach an understanding; this is an attempt to induce a weak simulation of having a question about it. A tree growing on its own (which is in fact uncommon) in specific environmental conditions, achieves the characteristic form of its species, i.e., that given in field guides, in this situation one could say that it is its own whole. Where trees grow together or where the weather and environmental conditions are not those that prevail in, e.g. a Guilford park, that 'characteristic' form will never be reached. However, a characteristic form will be reached such as 'one of three hawthorns, the remains of a hedge, on a north facing slope with a prevailing easterly wind on limestone, open to grazing animals' etc. All these elements are expressed in the form, but it is still a hawthorn because that is how hawthorns are in those conditions. A group of trees regardless of species, but especially of mixed species, will also respond to the environment which includes each other in a very similar way, they form wholes: Those near the edge of the group do not reach their potential height whilst those in the centre will exceed it. Those around the edge, regardless of species, will produce a full covering of branches on the side which is open and less on the inside. The very central trees will bare very few branches in the space they share but produce a good crown at their tops. These crowns can also be seen as the crown of the whole group just as the luxuriant side branches of the edge are the side branches of the whole group.(figure 7.1.) This responding and forming a

whole can be seen in very small groups or even pairs of trees and where there are abrupt edges or spaces in the canopy something of the history of the group is revealed.(figure 7.2.)

Returning to Lancaster in early spring the prior inadequacy of my own observation was brought home to me as I could now see, in all the groups of two or three trees of different species where one was coming into leaf earlier than the other(s), an explicit statement of this responding —an example of the phenomenon so graphic that it is hard to believe I had seen this every year without seeing it.

figure 7.2.

figure 7.1.

Perhaps with more time and more diligence I could have seen this phenomenon without the help of an expert. Asking the question ‘why are the sycamores here not

like the ones in the field guide' is half way there and the people making parish maps are seeing patterns and intensifying their perceptions of place often without such help.

Common Ground at Work: the Parish Mapping Project as an example.

One example of a parish map which encapsulates these strands of intensification of perception and finding out more about one's own area and also generating interest and action in others is that which was embarked on by a women's sewing group in Redlynch, Wiltshire.[202] These women had previously gathered together to be sociable whilst they were sewing, on hearing about the parish maps project they decided to make something together. The problem they discovered was that they did not really know their own area and so began walking their parish, getting to know it and making connections between places they had not seen as connected. What they made after much discussion of what was special about Redlynch was a beautiful quilt. But things did not stop there: Other women who had not been participants pointed out that they were on the edge of this quilt and wanted to be involved and so one side had to be unpicked so that the new participants could add their area. This growing and spreading of the maps is a common feature and many are presented as unfinished - to be added to by anyone with something to add. Not only did the quilt of Redlynch and the women's knowledge of their locality grow, but there were other spin offs. One woman wrote a book and the women who owned but could not afford to repair a barn, which it turned out was widely valued by the community, was helped by fund-raising.

The History of Mapping Reflects Different Perspectives

> The point about doing the map yourself is, of course, that you have tremendous power...it doesn't matter what the experts value, what someone from the architecture department might want to list or what somebody coming in with lots of degrees in nature conservation might tell you is a site of special scientific interest.

> What do you value, what is important to you in this place and why not make a map of it and do it in a social way negotiate with others.[203]

Many of maps that emerged, like the one of Redlynch, are imbued with values. They aim not to abstract the human from the locality and produce a value free objective representation of place but seek to represent what the place means to the people who made the maps. They include the history, the stories and the dreams of their makers and are a powerful tool to awaken and deepen that sense of value. Many of the representative forms that were used in the parish maps suggest earlier forms of cartography. This is not entirely surprising as the value ladeness of old maps is, to us now, more explicit. By expressing what they feel about a place the parish mapers use an older language of representation. A language which in at least one explicit sense takes the human standpoint.

The Representation of Values in Earlier Map-making

From a contemporary perspective looking back at the standard forms of representation and their changes over time, the central problem of cartography would seem to be, crudely speaking 'how to make it flat'. Dennis Wood in *The Power of Maps*[204] charts the development of how to represent a hill. See figure 7.3.

figure 7.3.

However, this is not just a question of technical know-how and invention. Maps are drawn to represent the interests of those who draw them. Over time the perspective that the cartographer has taken to place has quite literally moved. This example from the sixteenth century is not only drawn from a place which any reader of the map could stand and see what the map depicts, but the cartographer, Hans Lautensack, is also depicted in the process of making it (see figure 7.4). The map is both descriptive and celebratory, it says this is what Nuremberg is like and isn't it majestic. The map is peopled and there is a definite time, a season. Therefore the impression is conveyed that this it is an orderly place where one could do business.

Although Lautensack's stated reason for the figures in his maps was not to depict a pastoral ideal:

> As stated in Book 1, he believed, rather optimistically, that his plans would not be scrutinised for military secrets by the Turks, as their religion forbade them from looking on representations of the human form.[205]

figure 7.4.

But this also serves to show that what goes into any map depends on the purposes it serves and reflects the concerns of its time. As well as gleaning information about the physical features of a place in a different century we can also retrospectively interpret the concerns and attitudes of the map makers and their audience from their maps.

The idea that, what to us appears to be, a picture of a place with names added to it could yield military secrets seems strange and probably would have done to the Turks who had already been using completely flat maps for several centuries. It is not the case that the Islamic cartographers were 'ahead of the game', they just had a reason for depicting their cities from above: the geometric design of the city and the centrality of the mosque can only be represented if you look from above, and as both features venerate God it would be wrong to depict them otherwise. The mandalic style of representation accurately maps the place lived in, just as Lautensack accurately maps the kind of place inhabited by the sixteenth century citizens of Nuremberg.

figure 7.5.

The Plan de Paris[206] from the eighteenth century, part of which is reproduced as figure 7.5., shows a kind of halfway house. It is drawn from a particular vantage point, but not one where one could stand. Unlike Lautensack's map we do not need a different one to approach the city from the other side. However, it is still very much a pictorial representation, apart from the shift in perspective the reader does not need to learn a new set of symbols to see in the map what is seen on the ground. Although the streets are empty of people and

remarkably clean, the detail in the buildings shows that this is what the visitor or Parisian wanted to know about.

From the same century and now reduced to the bare facts of what needs to be known is this road map from London to Slough[207]. See figure 7.6. The purpose is no longer the veneration of the city although remnants of that remain, it is a practical guide to get the traveller from London to Slough or, it should be noted, from Slough to London. Only a flat map can be used either way as it has no privileged position.

figure 7.6.

What the places en route are like is lost although in this example the text replaces

something of that detail, such that we are told Brantford has “a good market on Tuesdays”.

The story from there is one of increasing accuracy and increasing abstraction. However, the value ladeness of maps does in one sense remain. Someone has to decide what goes in and with increasing standardisation that decision gets further from the people who live in the place. Dennis Wood gives a good example of this when he tries to find his own house on a map:

> I can see well enough where the house *should* stand, directly under the second “a” in “Cabarrus”. There is the road all right, but not the shifting shade or even the cars that despite the early Sunday morning hour do not hesitate to hustle down the road. The house is there on the larger scale insurance maps that Sanborn used to make: at 1:600, these give its footprint and distinguishes porch and address. They even show the garage we took down the day we moved in. But they don’t note the squirrels or the pecan tree they nest in, though this is larger (and in the long run more important) than the house.[208]

Insurance companies are not interested in trees, at least they were not then, and it makes no sense to record what is not of interest to you, what does not serve your purpose. This would be fine if we know and remember at every moment that maps record the interests of the people who make them, but we don’t. They carry no warnings, the ordinance survey do not say ‘this is how we see it but you go and look too’. The abstraction from the place and the reduction to symbols which have to be decoded by the reader all distance the place from its representation whilst, paradoxically they claim the accuracy of a value free perspective. However, the accuracy is an accuracy of measurement, it is the measurement that counts that is what is valued.

It is not really surprising that the parish maps bear some resemblance to modern maps as we have come to know them because that is ‘what maps are’. Nor is it surprising that they also diverge from that abstract ideal into a re-evaluation of place. What that shift is and why they resemble old maps is because they return the human

to the place. The perspective is once again the human perspective[209], not the authoritative view, the establishment view, not the birds eye view or God's view, but *this is how it looks from where we stand.* And how it looks is imbued with local distinctiveness.

Conclusion

In the activities of Common Ground, especially in their mobilization of peoples' perceptions, values and actions, some of the processes used in Goethean science are activated. Also in the thinking and feeling behind their initiative is a similar fundamental approach to place —each place is distinctive and what it is can only be seen if we begin to look at place in a qualitative way.

However, it must be said that Goethean science does differ from Common Ground's approach in several ways. One would be its valuing of expertise (although not necessarily the kind of expertise criticised by Common Ground). Also the adherence to a particular method is obviously more rigorous than the way in which, e.g., the parish maps are made. But, perhaps, the most important difference is the centrality of the phenomenon. That is, this place including its people, rather than beginning with the people or the personal perception.

Other Common Grounds

The account of the parish maps has helped to highlight the sense in which the intensified perceptual process experienced within Goethean science is something that can occur with any 'placing of one's attention' on the phenomenon. In this arena with the main players as the general public, the simplicity and obviousness has been pronounced.

However, there are other fields which touch on similar experiences and one that is quite striking is the similarity between Goethean scientists and some 'orthodox'

scientists. By exploring this area the emphasis is moved from the experience as ordinary to the experience as occurring within other styles of specialism.

Barbara McClintock's Understanding of Organisms

Barbara McClintock's work on maize, as presented in Evelyn Fox Keller's biography, shares many features of a Goethean approach. Both the way she went about her work —her practice— and her concept of the task of science could be described as Goethean. The key similarity, which she so clearly exemplified, was her aim and her ability to 'get to know' the organism with which she worked. It is this aspect of her approach that I will focus on primarily.

Barbara McClintock's career spans many changes in the field of genetics. When she began her life in science the maize plant was the currency of cytology. The colours of the kernels on a cob of maize display genetic traits very clearly. Thus a yearly crop of this complex higher plant was seen as the obvious choice in an older style of biological research which still focused on whole organisms. Although genetics moved on apace into the examination of simpler organisms with more rigid theoretical models about the behaviour of genes McClintock continued her study of the cytology of maize. Her determination to stick to a higher organism and older styles of research[210] was finally vindicated when her work became widely acknowledged as a twenty year precursor of where genetics had reached by the late seventies.

As an examination of the pressures at play in the world of science McClintock's story is an interesting one. However, the present use of her story is as an example of someone working with a plant for sixty years and coming to know it. Fox Keller asks the question "What enabled McClintock to see further and deeper into the mysteries of genetics than her colleagues?" And answers that question with the following:

> Her answer is simple. Over and over again, she tells us one must have the time to look, the patience to "hear what the material has to

> say to you," the openness to "let it come to you." Above all one must have "a feeling for the organism."[211]

McClintock's work involved the microscopic examination of chromosomes, but her work in the field gathering the cobs to be tested allowed the opportunity to 'guess' what their later examination would show. She became adept at 'seeing' in the plant what a microscopic examination would later reveal. The kind of seeing she recounts was not fully conscious:

> It is done with complete confidence, complete understanding. I understood every plant. Without being able to know what it was I was integrating, I *understood* the phenotype.[212]

It could be suggested that she was, through her engagement with the plant, 'developing new organs of perception'. McClintock in her experience with maize demonstrates the ideal of really engaging with the phenomenon. Engaging not just with the end product on the bench, but the living organism through its whole cycle many many times.

Her ability with this one plant could also be seen as a training of her observation powers in general. Once she knew she could trust the intuitive flashes of insight she could apply her abilities to a new problem. In 1944 she helped out a colleague by working for a time on *Neurospora* (a mould) with chromosomes so small that they had not been individually identifiable. Once in her stride with this new organism McClintock was able to work with them and her account is revealing in terms of 'being one with the organism'. She said:

> I found the more I worked with them the bigger and bigger [they] got, and when I was really working with them I wasn't outside I was down there. I was part of the system. I was right down there with them, and everything got big. I even was able to see the internal parts of the chromosomes—actually everything was there. It surprised me because I actually felt as if I were right down there and these were my friends.[213]

Once connected to the new organism in this way she could recognize and follow the development of chromosomes through the meiotic cycle.

I have brought in a scientist working in an orthodox framework mainly to see this phenomenon of the blurring of a subject/object distinction occurring within that framework. However, McClintock's credentials as a scientist, whilst eventually vindicated by her results being collaborated by others, were sometimes doubted. She was working against the flow of developments in genetics and seen as personally eccentric. If we examine her outlook on science in general it is possible to find other resonances with Goethe's approach. I shall briefly outline five points which demonstrate a concurrence in their approaches to science which could explain why McClintock's "feeling for the organism" sounds 'Goethean'. These are:

1. The recognition of models as models
2. An openness of approach
3. Dealing with whole organisms
4. Using an emotional engagement with phenomena
5. Putting mobility into observations of a static series

1. McClintock's was resistant to the what she saw as dogmas in genetics. Examples of these would be the integrity of genes, the usefulness of bacteriophage because it is simple and one can apply the laws revealed to higher organisms, and the inability of the environment to effect the genome. She had a deep mistrust of theoretical models when they are used as more than, as Goethe would say, the temporary scaffolding. As Fox Keller explains:

> For McClintock it was what she calls "tacit assumptions" —an explicit adherence to models that prevents people from looking at data with a fresh mind. These tacit assumptions impose unconscious boundaries between what is thinkable and what is not. Even glaring lapses in logic become invisible: "They didn't know they were bound to a model and you couldn't show them"[214]

2. Connected to that wariness of models was also an openness of approach. Not only was McClintock open to the organism as a part of her practice she also advocated a more open approach to other ideas as necessary for science. This is particularly clear

from her criticism of her colleagues dismissal of a presentation on extrasensory perception. She said, "If they were as ignorant of the subject as I was, they had no reason to complain."[215]

3.

> Basically everything is one. There is no way in which you draw a line between things. What we [normally] do is to make these subdivisions, but they're not real.[216]

The holism of her approach can be seen in the way she professed to a strong sense of the oneness of all nature. On a practical level in her work with the whole cycle of the plant the sense of engagement with a continuous process comes through. She felt that it was an important aspect of science that one had the wider picture.

4. Part of the openness to the organism which she cultivated was dependent on an emotional engagement with the object of study, but also a distancing of self. The exacting rigor of her work seems to come from a respect for the organism studied rather than an idealized distancing of the 'less objective' aspects of the scientist. Of the creative points in her life, the intuitive flashes, she says that they come about with an emotional intensity and a losing of one's self. It is as if, as she says "I am not there". An account of the experience which Fox Keller cites is as follows:

> Beneath these trees she found a bench where she could sit and think. She sat for half an hour. "Suddenly I jumped up, I couldn't wait to get back to the laboratory. I knew I was going to solve it"...She doesn't quite know what she did as she sat under those trees. She remembers she "let the tears roll a little", but mainly, "I must have done this very intense subconscious thinking. And suddenly I knew everything was going to be just fine."[217]

5. Her understanding of the maize plant was aided by her approach to it as a whole developing growing organism. Seeing things in process rather than as static results perhaps contributed to her ability to see genetic processes as dynamic, as life in the process of living rather than as mechanism. In the work with the *Neurospora* it is possible to see her expressing this in Fox Keller's account of her watching the meiotic cycle.

> Her description of what she had seen thirty five years earlier still has a vivid narrative quality. It is easy to forget that she had to reconstruct the process from separate slides, that she did not see it unfolding in "live action".[218]

These five interlocking points demonstrate the extent to which McClintock's approach to science and the way she explores phenomena share something of the Goethean approach. Although cast as the maverick McClintock is by no means alone in the domain of orthodox science and I would not want to imply that only a few exceptional cases display this concurrence. She is an extreme case and perhaps more unusual in her willingness to talk about the means to her insights than in her use of the means themselves.

Simple and complex simplicity

The account of parish mapping showed the extent to which the experience of a deepening of one's perceptions requires little more than a shift of attention. There is nothing counter intuitive about the process. The ease with which people, from all walks of life and no direct training, could get something from it demonstrates this.

In the field of cytogenetics the complexity of the methods of experimentation and the pressure of dominant theories as well as the highly developed skill of the scientist examined serve to complicate the issue. However, at heart both processes share a common aim which is TO KNOW SOMETHING BETTER. How you achieve that is the same whether one is a beginner or an expert and it is simple: as Common Ground suggest you try, as Goethe believed and as McClintock said you "just let the material tell you"[219].

Phenomenological Geographers and Architects

The other common ground —the other place where people seem to be using the same language is in some approaches to geography and architecture. In these fields where it is 'place' and peoples' engagement with place that is the subject matter similar

practices are being developed. These developments have not come about through an active engagement with Goethe's method, but through examining the world in the manner described by phenomenology.[220] The geographers and architects who use phenomenology tend to attribute their method of approach to Heidegger and developments in phenomenology which stem from Heidegger.[221] To complete these snapshots of other practices I shall just give a brief indication of the field.

'Being-in-the-world'

Edward Relph's *Place and Placelessness,* written in 1976, is a seminal work in phenomenological geography. Other authors the reader might like to refer to are Yi-Fu Tuan, David Seamon and Anne Buttimer. In the area of architecture the approach which shares some aspects of Goethean science is exemplified in the works of Christopher Alexander, Francis Violich and Kimberly Dovey. Although there are many variations and other applications Relph's work is often referred to and the aspects of Heidegger's phenomenology he uses are in some sense typical.

In 'Geographical Experiences and Being-In-The-World: The phenomenological origins of geography' Ralph attempts to redress an imbalance, as he sees it, between the importance given to '"scientific geography" and the marginalizing of "geographical experience". For an elucidation of what the experience element could mean Ralph uses Heidegger's notion of 'being-in-the-world' and its three elements delineated below:

Being-In	**Self**	**In-The-World**
a concern relationship e.g. affection, interest, memory.	entity which has being-in-the world as a feature of what it is	the taken for granted, self-evident, "beforehand" experience

These three elements comprise our common experience and the environment in which we find ourselves is thus —"ready to hand". Another Heideggarian term denoting that which is unconsidered, the world of our experience, ever present ever including ourselves. The notion of ready to hand is then juxtaposed with "presence at hand" which is the reflected upon, the thing distanced and set apart as an item of examination. Being-in-the world comprises of both these modes, but, as Relph points out, scientific geography emphasises the presence at hand. Whilst this approach renders parts of the world open to a particular kind of examination the experience of being-in-the-world is for the most part an experience of readiness to hand. The phenomenological geographers attempt to give proper emphasis to that aspect of experience. They do this by considering the everyday sense of being in a place —of the ingrained habits of moving through a place, of daily life patterns etc. In doing so they move the unconsidered to the considered. However, the examination takes into account the fact that what is detailed, e.g., the way they habitually use certain routes to work, is usually unconsidered.

What arises from their investigations is a more complete picture of 'place' or 'region' or built environment as it is experienced. One aspect of that experience is our emotional engagement. And thus it becomes part of the geographical description of a place to say, for example:

> Passing through the stone gateway, one's mood takes a sharp turn: as the unrestricted movement of people in the larger space appears, one feels a sense of freedom to chose directions and intentions; the heart leaps with an exhilarating sense of opening out to the world again. A fresh meaning of space becomes clear as pigeons define the height and breadth of the piazza with their flights back and forth between children below and roof tops above.[222]

Francis Violich's description of Hvar is part of a study which attempts to reveal the interaction between people and place. The obvious criticism is that such approaches cannot be objective —that places will mean different things to different people. However, this is countered by phenomenologists' claims that when attempts to

corroborate experiences are made (through intersubjective verification) the underlying patterns of responses are very similar.[223]

In architecture the reintroduction of the human perspective also relies on the architect's ability to sense the not obviously quantifiable aspects of space. Botond Bognar, in relating how he gets students to become attuned to the feel of places, shows stages such as imagining without full experience, of looking afresh, of corroborating from different perspectives and in the students' final project shows the process of intersubjective verification at work.

> Students investigate various places and paths in the city from the aspects of what and how they feel about them. They carefully collect observations and then compare places which they feel to be "real" with places which seem to be "out of tune", or "out of place". One of the less satisfactory places is then selected as a site for a design project. Students consider the failures of the site and then seek ways to strengthen its sense of place, making it, in Louis Kahn's words, "what it wants to be".[224]

It will be apparent from these glimpses of some of the work occurring in the field of phenomenological geography and architecture that techniques similar to those in Goethean science are being used. The central shared feature in the practice is the full use of all the human faculties to engage with the phenomenon. The reason for this similarity is not a direct connection of tradition but because the goal is the same — to understand the phenomenon as the thing it is.

Chapter Eight

Phenomenology

The final chapter re-examines features of Goethean science by relating them to Husserl's style of phenomenology. By working through the similarities between each tradition's key ideas a new perspective on each of them is reached. Also examined is the shared aspects of their respective philosophies of science and the criticisms they both make of a scientific orthodoxy. From this new perspective it is possible to evaluate the claim the Goethe's science was an early form of phenomenology.

Introduction

It will be apparent to anyone who encounters the material on Goethean science and who has some knowledge of phenomenology that there are some apparent similarities. Whether these similarities are merely coincidences in the language used, a similarity of aims or a fully fledged correspondence in their aims, method and practice is the question addressed in this section.

The answer will be sought by examining some fundamental aspects of apparent similarity between Goethe/Goethean science and Husserlian Phenomenology. These aspects will be grouped into two sets:

1. The key ideas which are shared

consciousness

pressupositionlessness

method

imagination

essences

subjectivity

intuition.

2. Shared aspects of their philosophy of science and critique of the scientific orthodoxy

conforming to the essence of the phenomena they examine

aim of redirecting science into anti-reductionistic forms

Before embarking on such a comparison it is perhaps necessary to ask what kind of question is it and has it been suggested before? Henri Bortoft in 'Counterfeit and Authentic Wholes: finding a means for dwelling in nature' describes Goethe as a phenomenologist he says:

> It seems clear from his way of working that Goethe could be described correctly as a *phenomenologist* of nature, since his approach to knowledge was to let the phenomenon become fully

> visible without imposing [unconsidered] subjective mental constructs[225]

Also, in *Goethe's Scientific Consciousness* Henri Bortoft uses a phenomenological interpretation of intentionality to emphasise the way in which we are active in our seeing. He mentions Husserl as being influential:

> He identified the mistake of conceiving consciousness in the manner of a natural object, as described by the physical sciences, as if it were an object amongst other objects in nature. He recognized that it is therefore a mistake to try to imagine an empty consciousness confronting an external world. The fundamental discovery on which phenomenology is based is that consciousness has the structure of *intentionality* —it would be better to say that consciousness *is* intentionality.[226]

The suggestion is that we could see Goethe as an early phenomenologist and by accepting an Husserlian style of intentionality we can understand what Goethe is doing. This is a contentious claim, but one that does warrant examination.

The most immediate problem, before engaging with the material at all, is one of time. There is a gap of more than one hundred years between the publication of Goethe's most 'phenomenological' text *The Doctrine of Colours* and Husserl's major works. The strongest suggestion is that Goethe was, at the turn of the nineteenth century, doing what Husserl a century later was suggesting could be developed in the future. Because of the content of the works —Goethe's confident expression of his practice and Husserl's tentative digging of the foundations for a possible future practice— we can be reasonably sure that Husserl was not aware of the suggested connection. The only references to Goethe in Husserl's work are occasional expressions from *Faust* as one would expect in the work of a scholar writing in German. This would suggest either that Husserl was not familiar with Goethe's scientific work or that he failed to see the connection or that there is no connection.

However, the connection has been made and not only by Bortoft. Frederick Amrine has also written:

> ...Goethe devised a subtle "phenomenological" method that recognizes the intentional activity of the mind in constructing experience.[227]

And prior to any of the more recent commentaries on Goethean science is Fritz Heinemann's 1934 article 'Goethe's Phenomenological Method' in *Philosophy Vol.9.*

The suggestions are not of the conscious development of something germinal in Goethe by Husserl. Apart from the lack of reference to Goethe the very experimental and cautious approach of Husserl suggests that he believed himself to be exploring new territory. If there is no connection of this direct type then we are faced with the idea that they both came to their particular formulations independently. However, to suggest independent generation of the same idea would be to ignore the extent to which they are embedded in a particular cultural context. It also assumes that when we today look back to these ideas we can understand them in the same way as they would have been understood at the time. The slight matter of a hundred years is not so slight if we see the work of any philosopher or scientist as both a product of the time in which they are working and as an expression of their response to those times.[228]

However, setting aside for the present the question of cultural embeddedness perhaps there is something to be gained by examining the correlations that do seem to exist between the two approaches. A comparison could be broader than the idea that they share something on the level of an awareness about the subjective element in the process of perception. Instead of focusing on this one similarity I propose to examine the whole of both sets of ideas in, as far as it is possible, a hypothetical time vacuum. This will at least provide a different perspective on them both even if the hypothesis that they are attempting the same thing cannot be sustained.

An initial examination of the material very quickly reveals that neither in Goethean science nor in Husserl's phenomenology is there a polished and complete system. There are loose ends and many changes of nuance in both canons of work. This could be presented as the first similarity and one could make a case for it being

integral to both systems of thought that they are always in progress —always working towards defining themselves. However, it also makes comparison very difficult. For example, it is reasonable to ask what style of Goethean science is being compared to which phase of Husserlian phenomenology and could the very opposite case be argued by choosing different parts to compare? Having raised these issues I am nevertheless going to proceed to a comparison, perhaps a little like the smoker who assiduously reads the health warning on a packet of cigarettes and then smokes them anyway. The equivalent health warning for the reader is to say that while I would *like* the strong thesis —Goethe was practising what later became called phenomenology— to hold, the most that could properly be defended is that Goethe and Husserl were working in the same direction —a direction that is shared by Goethean scientists today.

1. The Key Ideas Which Are Shared

Consciousness

The importance of the nature of human consciousness and experience is stressed by both systems of thought. In Goethe's work this can be shown by, for example, beginning *The Theory of Colours* with the "physiological" colours. At the time Goethe wrote previous attempts to explain colour phenomena had relegated what Goethe calls "physiological colours", such as after-images, to the realms of illusion. But he says of the arrangement of the parts of his study of colour, "It is appropriate to start with a study of physiological colours because they are wholly, or largely, a property of the observer, of the eye." [229] Although Goethe is assuming that other colour phenomena begin in the outer world his emphasis on the inner experience of colour could be seen as an emphasis on 'experience of' instead of 'knowledge of'.

For Husserl the movement from outer objectivity to inner subjective experience, to provide the basis from which to understand phenomena, is more radical. He proposes that before any examination of exterior things can take place or even be posited we must examine fully the nature of our own psychical experience. What is revealing about the nature of psychical experience (that which defines the psychical) is that it is intentional. Working from Brentano's concept of intentionality, by which he meant the object as immanent in consciousness, Husserl activated the concept by interpreting it as the mind's 'directedness towards an object'. Because intentionality is a psychical experience it is open to reflection in a particularly complete way. For example, the experience of the perceiving of something or the thinking of something or the recalling of something is open to our consciousness in a way in which outer things (things posited to be in the world) are not. Intentionality is that 'consciousness of' something and Husserl proceeds to explore the nature of it by proposing a phenomenological reversal of the normal process of perceiving something. The term intentionality comes from the Scholastics' examination of the way we, in perceiving, go out to the object of our perception. Husserl proposes that the reflection on that process is an activity of examining the process itself. This would be a kind of observation of the perception arising in our consciousness.

For Husserl a phenomenon is as it arises 'in' consciousness, indeed for Husserl there is no consciousness except for the arising of phenomena. External existence of phenomena is neither confirmed nor doubted, but is set aside such that the phenomenon is as it is constituted by the consciousness reflecting on it. For Goethe objects do exist outside of the observer —this is not questioned— but our experience of them in all its qualitative dimensions is important to knowledge of them.

Presuppositionlessness

An aspect that Goethe and Husserl share is the aim to proceed from a fresh beginning. They both want to establish a way of seeing which is not bounded by prior conceptions or habits. The presuppositions they each attack are somewhat different and the difference is one way of emphasising their different fields of enquiry. Husserl was a philosopher trying to secure epistemological foundations whilst Goethe was a scientist developing a style of empiricism which did not deny the activity of human creativity.

Goethe's attack on presuppositions is focused on the issue of theory driven perception. His criticism consists of two parts, a) the over reliance on theory to determine what to look for and b) the habits of mind which construct phenomena in the way suggested by the pre-conceived theory. A strong example of this criticism can be seen in the following quotation.

> To rid the human mind of an hypothesis that has unduly restricted it, forcing it to observe erroneously and to combine falsely, to muse instead of seeing, to sophisticate instead of judging, is already to render it an inestimable service. Henceforth it sees the phenomena with greater openness of mind, in other relations and interconnections, orders them after its own manner, and once more gets the chance to err after its own manner, a chance that is invaluable if it soon succeeds in perceiving its error.[230]

The method by which one is to "rid the mind" of constricting hypotheses is to approach the phenomenon from all directions. One of these directions will be prior hypotheses but that is only one direction amongst many diverse approaches. Apart from the importance of a full investigation of the phenomenon as experienced by the scientist there is also, as the latter part of the quotation reveals, the conscious attention to the action of theory, hypotheses and opinion on perception.

An explication of Goethe's criticism can be found in chapter three in the discussion of his polemic against Newtonian colour theory. For the present purpose of comparing his aim of developing a presuppositionless science with Husserl's

suggestion that such a science is not only possible but necessary what is required is a fuller explanation of Husserl's thinking.

Husserl proposes a radical method of beginnings. He is searching for a way of reaching an understanding of the world which does not begin with presuppositions: it must not start with an uncritical acceptance of anything assumed to be true. The method of escaping the trap of only seeing or thinking what is posited by the mental net of our assumptions he calls phenomenology. This is essentially a descriptive method which requires that no assertions about the nature of knowledge or the nature of anything else can be made which have not been realized phenomenologically: that is, drawn from intuitive experience.

How assumptions are removed from our ordinary way of thinking to allow an intuition about that which we seek to know is in its essentials the same for Goethe as for Husserl. The answer lies in the conscious apprehension of the assumptions that we bring to the phenomenon. The relative rigour of the two methods and the type of phenomena to which they are directed differ, but the basic premise that our perception is clouded by unconsidered assumptions is the same. (In the *Cartesian Meditations* Husserl attacks presuppositions on the basis that they are presuppositions and therefore not an appropriate foundation for knowledge. However, by the time of writing *The Crisis in European Sciences* his critique is closer to Goethe's as here he describes theory as masking the "lived world". [231]

The method of holding in abeyance aspects of what we may have previously learnt about a phenomenon in Goethean science is discussed in chapter four where technical names are avoided, but Husserl's method of phenomenological reduction is a much more radical application of this technique of abeyance.

The term 'reduction' carries the opposite connotation from its meaning in phenomenology. As it is proposed as the central part of a technique which is anti-reductionistic we can be sure that the phenomenological reduction is not a means to

simplify by reducing everything to its smallest parts nor to abstract by only looking at measurable quantities of a phenomenon whilst denying its qualitative elements. Spiegelberg clarifies the terminology thus:

> It [reduction] certainly does not involve any connotations of simplification or philosophical economy. What it does imply is best indicated by the literal meaning of the term: a leading back to the origins of which our all too hasty everyday thought has lost sight.[232]

Both systems of thought propose to get to the phenomenon without hindrance from presuppositions by the application of a set of procedures.

Method

The 'method' of Goethean science and the issue of whether there can be an identifiable method will be discussed below. For the purpose of seeing if there is any correspondence between the methods it is necessary to give an account of the phenomenological method. This is slightly contentious because, as with Goethean science, other commentators would describe it differently or deny a rigid set of procedures.

However, I shall set out the process by following Herbert Spiegelberg's analysis of its stages[233]. Spiegelberg, drawing on other phenomenologists as well as Husserl, places less emphasis on the reduction(s) than other commentators[234], but his analysis is clear and it is set out as an activity which one might try out. The seven steps he delineates are:

1. Investigating particular phenomena;
2. investigating general essences;
3. apprehending essential relationships among essences;
4. watching modes of appearing;
5. watching the constitution of phenomena in consciousness;
6. suspending belief in the existence of phenomena;

7. interpreting the meaning of phenomena.

I shall give an account of the method as set out under these steps to serve as a brief introduction to phenomenology as a method. Some of the ideas touched upon will be discussed more fully in the later sub-sections where they are compared directly to aspects of Goethean science.

1. Investigating particular phenomena: This first step in the procedure is advanced primarily by phenomenological description. However, the dictum "phenomenology begins in silence"[235] suggests that we cannot begin describing before we have looked and thus the first step is itself made up of stages. The initial part of the first stage could be described as "looking and listening", or 'opening oneself to' the phenomenon. The instruction to just look in order to intuit the phenomenon makes the process sound easy, but as Spiegelberg points out:

> This may be so in theory but it is certainly not so in practice. It is one of the most demanding operations, which requires utter concentration on the object intuited without becoming absorbed in it to the point of no longer looking critically.[236]

Phenomena do not appear alone and unconnected to other phenomena and thus to advance toward an understanding of 'this' phenomenon we need an appreciation of that with which it seems connected. And although we are looking at whole phenomena we can also see that parts can be discriminated as being constituents of the single phenomenon. Thus we have moved from looking to an "examination of the structure of the phenomena according to their ingredients and their configuration." Only when these preliminary beginnings have been undertaken is one in a position to describe phenomena.

Descriptions are not the things they describe so the act of description is one of guiding. When the phenomenon was something previously unknown for which we have no distinct name the situation is a particularly revealing one for understanding the process of phenomenological description. In these cases it is clear that one is left

with negations, with similarities and with metaphor. Thus the relationship of resemblance rather than identity between the spoken/written description and the experience itself is underlined. What becomes apparent through phenomenological description is the impossibility of its ending, we could go on describing in ever finer detail and as circumstances change we would have to change the description. It would be, as Goethe said, "like trying to drink the sea dry"[237] Thus even in the first step we already begin discriminating between those features we see as important to a thing and those which do not require pursuing with description. In making that distinction we are already entering the second step.

2. Investigating general essences: Termed by Husserl 'eidetic intuition' this step in the method moves beyond the particular instances of phenomena to the general essences. It could be called a 'seeing through to' or 'uncovering' the essence of the phenomenon. Again this step involves a seeing, an analysing and a describing. But we are no longer describing, for example, this apple but what it is about it that allows us to see it as an apple.

3. Apprehending essential relationships: One way of reaching that *eidos* would be to describe how far an apple can be from this apple before it would be a pear or anything which we could no longer recognize it as, or even coherently imagine it as, an apple. Thus we can define where the boundaries lie, not linguistically but, by examination of the essence of the phenomenon.

Spiegelberg separates two forms of essential relationships which this step explores. One is the relationship between parts of a single thing and the other is the relationship between separate but connected things. Exploring the former he uses the example of a triangle. With the triangle it is easy to see that we might vary some aspects of a particular triangle, e.g., its size, without "exploding" its essence. Whereas its number of sides cannot be varied without destroying its triangleness. The example given of related phenomena is that of colour and extension. Again we can

vary in imagination instances of a colour, but it becomes apparent in the operation that no occurrence of the colour can be imagined without it being extended. Thus we have apprehended an essential relationship between colour and extension.

4. Watching modes of appearing: This fourth stage emphasises that phenomena as understood by phenomenology are not 'things out there' but things as they appear to consciousness. David Bell describes the Husserlian term 'object' as "the broadest, least specific ontological category there is" or in Husserl's own words "an anything-whatsoever"[238]

To examine the phenomenon we must examine how it is appearing to us. One aspect that arose from this systematic exploration as carried out by Husserl can be seen in his discussion of 'horizons'. In this instance the given object is an object in the world —a die— but the phenomenon —die— as explored by Husserl clearly contains more than what we might term the 'perceptually given' as it might be interpreted naively. Examination of the modes of appearing reveal to us that we bring to the die more than what is <u>immediately</u> present to the senses. Our conceptual horizons are not limited to what is seen because we also conceptualize the meaning-along-with-it. Thus if the die open to our visual field has the side with one spot we know that there will be a hidden side with six spots. The die appearing to our consciousness has not only this appearance but other possible appearances as well. Moreover, the die open to our conception will not only contain all that is meant-along-with-it but also the consciousness of its having a single appearance which includes never being able to see the six and the one at the same time. The appearance that is the sum of all its possible states is its fixed essential type (*Seine feste Wesenstypik*). In this manner we see the essence beneath the flux of its appearances: not the re-consolidation of this particular instance or position of the die but the combination of appearances plus meaning. Another aspect of observing modes of appearing, which is perhaps the opposite of the foregoing recognition that we 'see'

more than we see, is the recognition of degrees of distinctness. In this aspect the mode of appearing is studied to see where the lack of clarity or haziness resides.

5. Exploring the constitution of phenomena in consciousness: Beyond watching the modes of appearing it is also possible to observe the way in which a phenomenon is constituted in our consciousness. One way of explaining the difference is to say that constitution is not just the full appearing but also the taking shape and "crystallisation" of the phenomenon. I will use as an example a reversal of the process that would be revealed phenomenologically. In this example the constituting is particularly drawn out to demonstrate what the phenomenologist would do when faced with an object to 'unpack' how it has come to appear to them in the way it has.

Someone tells me they have a cat, their cat is now for me a phenomenon. However, it is empty in detail, all I know is that it is a cat and so would expect it to be a domestic cat within certain boundaries of ordinary catness. I might add detail imaginatively and I might learn further details from the owner and thus over time the phenomenon is being continually constituted in my consciousness. The owner always wears stripes and so I might speculate that she would chose a tabby cat, I later learn that it is overweight and so the phenomenon becomes a fat tabby cat. That some details have more weight than others is also a part of the phenomenon. For example, when I eventually meet the cat I would be much more surprised if it were thin than if it were black.

Exploration of the constitution of the phenomenon reveals not only aspects of consciousness but also aspects of the phenomenon. Even if I met the cat before knowing of its existence I would not know it all at once. It might be a fat black cat but is it friendly? Friendliness in cats is an aspect of the phenomenon that can only be determined over time and in certain situations. Thus by exploring the constitution of the phenomenon it is revealed that it has certain hidden aspects. Nevertheless the phenomenon is fully known because its unknown aspects or empty features are

constituted as presently empty but open to further constitution. Although the examination of constitution reveals it to be a very active process it is not, and should not be mistaken for, construction. If by constituting the world we constructed it then the cat above would remain tabby. The blackness of the cat we accept as being seen naively or constituted phenomenologically from the hyletic data, either way it is a black cat.

> Only thus can we understand Husserl's constant contention that the constitution of the world is not the creation of the world; it is taking the world which is already there and consciously "immanentizing" it in order to remove from it all possibility of doubt.[239]

The step of watching the constitution of phenomena emphasises that seeing things, hearing things etc. is, like exploring things, a process.

6. Suspending belief in existence: That which is represented here as a sixth step and is variously called the reduction or bracketing or holding in abeyance or *Epoché* has already been mentioned under presuppositionlessness above and will be discussed further in a following section. Spiegelberg's demotion of the phenomenological reduction from its usual primary position is contentious. The reasons he gives for this move are a) that the reduction is not "common ground" for all phenomenologists, b) that Husserl did not introduce the technique until after some of his most accomplished phenomenological analyses in the *Logische Untersuchungen* which suggests that it is not as crucial as was later claimed, and c) there is in Husserl's work no clear and definitive statement giving the meaning and function of the phenomenological reduction.[240]

The procedure is perhaps most usefully termed bracketing, the metaphor being derived by Husserl from the mathematical operation of putting in brackets any part of a larger mathematical problem which one is not dealing with at present. But what is gained by this? By bracketing an aspect of our natural attitude —the assumption of existence— we are free to explore all aspects of a phenomenon, even those which the

natural attitude or a theoretical preconception would not normally allow us to entertain. As Spiegelberg puts it:

> What is all-important in phenomenology is that we consider all the data, real or unreal, or doubtful, as having equal rights, and investigate them without fear or favour. The reduction will help us to do justice to all of them, especially to those which are under the handicap of initial suspicion as to their existential claims.[241]

Something of this approach underlies those that have preceded it. For example, in the eidetic intuition of the third step we are bracketing the non-essential aspects of a specific phenomenon, not as irrelevant to it, but as irrelevant to the general essence. Some commentators have set out the method as a process of ever more radical reductions.[242] Perhaps that more orthodox schema would have provided a clearer introduction to how phenomenology is usually written about. However, this sub-section on method was intended to serve the double function of a basic introduction and setting out Husserl's method as part of the wider attempt to explore possible correlations with Goethean science. For such a purpose Spiegelberg's analysis, which presents the method in a very practical light —as something one might go ahead and try out— and thereby clarifies what phenomenology is, fits both aims rather well.

7. Interpreting concealed meanings: Rather than just being an unusual way to set out the phenomenological method this seventh step goes beyond the work of Husserl, whom Spiegelberg has adhered to most closely until this point. By moving onto interpretation he cites himself within a hermeneutic phenomenology closer to Heidegger or Merleau-Ponty. The describing that has taken place in the previous steps, of course, carries an appreciation of meaning. However, the aim in this step is to uncover the meanings which are not "manifest to our intuiting, analyzing and describing."[243] The results of such an interpretative action could be construed as explanatory hypotheses which the foregoing steps had tried to avoid. But the phenomenologists making this further move into interpretation would claim to be drawing the hidden meanings from "clues" in the manifest meanings. The hidden

interpretation once drawn out is presumably then ‘visible’ or manifest in the phenomena in a similar way to the meanings which are open to intuition through the operation of the previous steps.

The phenomenological steps as outlined above are directed to a recognition of, and reflection on, our everyday taking in and making sense of the world which is called by Husserl “the natural attitude”. By recognizing as such all aspects of a phenomenon which cannot be seen to be apodictic (indubitable) we are left with essences. The procedure which is used to test for apodicticity is similar in the two methods in question. At its most basic there is an explicit use of the imaginative faculties in both Goethean science and phenomenology. The differences in the use of imagination is the subject of the next section.

Exact Sensorial Phantasie and Free Imaginative Variation.

A full discussion of the stage in Goethean observation called exact sensorial phantasie is to be found in chapter four. It is one part of that stage which I will be directly comparing to the use of free imaginative variation in phenomenology. However, it should be noted that for both methods imagination is fully endorsed as the requisite ability for an essential step in their methodologies.

In Goethean exact sensorial phantasie the imagination is used ostensibly to create the movement between static representations. The most common example given is the use of imagination to provide a missing or an extra leaf in a leaf sequence. Imagination grasps the movement in form from the sequence and thus can create a new leaf that is consequent with (develops or precedes in a believable and pleasing way) the one before and the one that follows. Imagination can also create a leaf which is not consequent and in seeing that it is not —that it will not fit— we learn something about the one which will and what the meaning of ‘fit’ is in this context. The exercise of ‘thinking it otherwise’, that is, testing an observation by imagining it

differently is first used in the second stage of Goethean observation. Once acquired as a technique it is something that can be used at any stage.

The particular example I will give of 'thinking it otherwise' (from current practices rather than Goethe's texts) is one which combines both thought experiment in its usual rather abstract sense and the practical experiential sense which is characteristic of Goethean science.

On the second day of the Life Science Seminar 'The Human Skeleton' the participants were asked to draw, from memory, the skeleton we had seen and described the day before. Two very typical general errors emerged from the sixteen drawings; many people had made the limbs too short in proportion to the body and the ribs were depicted as a barrel shaped cage open at the top as well as the bottom. These errors we identified by looking at the range of drawings from the group. The failure to depict the way the rib cage gets smaller and closes off at the top was commented on and before looking at the skeleton for comparison we were asked to follow an exercise. The whole group stood and with eyes closed we were asked to imagine that our rib cage was, like those depicted, very square and open at the top. The experience of this was as if one's chest and head were the same, thoughts were extinguished by a strong experience of breathing and it was as if one's skull expanded and contracted. From sharing these experiences we concluded that the rib cage could not be as it had been depicted for if it were our everyday experience would be very different. It was as if, through the imaginative exercise, our receding normal consciousness had been able to glimpse what it would be like to be physically very different and something of the radical change in our thinking as well as our bodies that would be required to really be such a thing.

Rather than draw out of the example above aspects which might correspond to the use of free imaginative variation in phenomenology I will first describe aspects of the phenomenological procedure independently.

The first aspect of imagination to be used in the phenomenological process occurs without the conscious application of imagination as a tool. To explore the experiencing of something Husserl refers to the noematic structure of the experience of something. The noematic structure reveals that when we, for example, perceive something we perceive not just the single appearance of the thing but what is 'meant along with it'. For example we see the thing not from just the angle available to us but also via the imagination from all the other possible angles, or at least, those to which we have in the past had access to or can imagine. The predicted texture or temperature of a thing can also be provided by imagination. It is only when later experience shows that these imaginatively provided predictions sometimes get it wrong —that snakes are not slimy etc.— that we notice the action of imagination in providing the noematic structure.

However, it is in the process of eidetic description that imagination is explicitly used. In order to see the essence of a phenomenon the original phenomenon, i.e. that which is experienced, is imaginatively varied. The example that Husserl gives of the experience of perception uses a 'table-perception'. We can imagine the table-perception differently. As he suggests:

> Perhaps we begin by fictively changing the shape or the colour of the object quite arbitrarily, keeping identical only its perceptual appearing.[244]

What is gained by this process is not only a range of what are possible perceptions, but also the identity of what it was not possible to imagine of perceptions. From the identification of the principle which guides our intuition about what it is and what it is not possible to imagine as perceptions we see what is essential to perception. That is: what an experience must have and what it must not have in order to be a perception.

Free imaginative variation can also be used on the table itself to reach the essence of tableness. We can imagine the wooden table of our present experience as an iron table or as green instead of brown, but it cannot be imagined as made of water

(in its fluid state). Thus from the use of imagination we can reach an understanding of something which is essential not just to all tables existent but of all possible tables. This essential something is the *eidos* of table.

Thus in phenomenology the *eidos* of the thing is reached via the imaginative variation of certain aspects. With the rib cage example a similar variation is taking place. However, there is a problem in seeing that experience as an example of free imaginative variation. The question arises of how it was possible to gain certain knowledge about the shape of the rib cage from a variation that it was possible to make. The open rib cage must be imaginable in some sense because it was drawable and because it created an experience. An initial interpretation of the method of free imaginative variation would seem to suggest that if the open rib cage was imaginable then we could definitely not conclude from the evidence (evidence meaning experience of) that the human rib cage is not so.

However, a more thoroughgoing interpretation of eidetic description will reveal that the experiencer is changed by the experience being imagined. In a discussion of the "being-sense" of the transcendent relative to consciousness, Husserl writes:

> It consists in recognizing that the relativity of consciousness referred to just now applies not just to the brute fact of our world but in eidetic necessity to every conceivable world whatever. For if we vary our factual world in free fantasy, carrying it over into random conceivable worlds, we are implicitly varying ourselves whose environment the world is: we change ourselves into the possible subjectivity, whose environment would always have to be a world that was thought of, as a world of its [the subjectivity's] possible experiences, possible theoretical evidences, possible practical life.[245]

On the understanding that we are changed by our free imaginative variation into the kind of thing we would have to be for the variation to be true of us we should glimpse what it would be to be that kind of thing. This would seem to concur with the experience as stated above. However, the same problem emerges as with thinking-it-otherwise, that is, who is doing the thinking it otherwise and who is doing the seeing

if that change is possible. This question arises with both Husserlian phenomenology and Goethean science and yet so does the experience of the technique being possible and useful regardless of the problem.

Essences

Phenomenology is sometimes called the science of essences, but exactly what is meant by essence is difficult to pin down. In the final section of *The Crisis in European Sciences* Husserl mentions the tendency to read a philosopher through the historical and cultural context of previous philosophers or rather how those philosophers have retrospectively come to be understood.[246] It is not surprising therefore to see Husserl's idea of essences accused of both reintroducing Platonic hypostatisation and being 'nothing but' linguistic analysis of general types. Goethe's *archetype* is also accused of these two contradictory accounts of essences. To come to a new understanding of what is meant by essence these two misconceptions of what was meant are a useful way in. By defining what Husserl did not mean we perhaps leave a space for the new conception to crystallise.

One way of saying what an Husserlian essence is would be to say that the idea of a Platonic form is to overstate it and a nominalistic account is to understate it. To clarify this point I will use the example of the cat above: a platonic form account of the cat would say that the cat (the real one) is a representation of the form Cat (the cat in the text is of course a representation of a representation) so the cat that we see, stroke, feed etc. bears the same relationship to the form Cat as that between the cat in the text and the real one. Although the cat in question, the one we stroke etc., is black and fat and belongs to a particular person, only its catness is shared with the form Cat. The form has all the essential and has none of the incidental attributes of catness. The important point to make clear about the Platonic forms as we understand them is that they would have to exist, in an ideal sense, separate from the individual

representations. Thus to postulate essences of this type we must also postulate a metaphysics which supplies them with a place of residence. Husserl is not proposing a return to Platonism or scholastic realism by his talk of essences[247]. The essence of a thing —that which is revealed by eidetic intuition— is in the thing although only immenantized by the Ego. One might talk of uncovering as if the appearance disguised the essence, but it is only through the examination of the appearances that the essence is revealed. Husserl's adherence to the given to reveal the essence is clearly expressed in the following:

> The decisive factor lies above all, in the absolutely faithful description of what is actually present in phenomenological purity, and in keeping at a distance all interpretations that transcend the given.[248]

The conceptual movement of the essence from an ideal realm to the individual instances, such that they reveal it rather than point to it, could suggest that what is identified is merely an aspect of the structure of language or a process of abstraction. This would mean that should it prove more convenient we could dispense with the name cat and even the class such that both cats and dogs could henceforth be called 'Euro-animal class 1: household'. Alternatively by applying the idea that the essence is an abstraction of features of cats we could list what a thing has to have in order for it to be a cat. The problem with empirically extracting common features to explain essences as generalizable statements is that three legged cats and hairless cats and old cats who cannot retract their claws etc. are still cats. In fact the catness of the unusual cats and the fact that dogs are very different seem to present the essence of catness in just the way that Husserl says that essences do present themselves: as "given".

By outlining what an Husserlian essence is not I have attempted to set out a conceptual middle ground where it is possible to not separate the concept of essence from the thing either by elevating it to a metaphysical super-reality or reducing it to a convention of language or an abstract idea. The problem of setting out what an

essence is when it is not imposed on the thing either from an ideal realm or purely from human thought has been encountered before in the discussion of the meaning of Goethe's archetypes. Before exploring further the similarities it would be instructive to first highlight two distinct differences. Firstly, for Goethe the archetypes are revealed in particular instances the pure phenomena, "the instance worth a thousand", and as such the archetype 'seen' and the particular instances through which it is seen are presented as highly valued. Husserl in many passages is adamant that the essence of a particular thing is of no greater value than the thing itself. Essences are always revealed via particulars and not superior to them. One could argue that Goethe's respect for the phenomena could counter this suggested difference, but his language and way in which the archetype is held in awe would place Goethe, as one would expect given the historical context, slightly closer to the charge of having Platonic residues. Secondly, it must be remembered that for Husserl the phenomenon is always as constituted in consciousness and the examples he chooses are often concepts such as justice or emotions rather than concrete things. The phenomena with which Goethe is working are mainly concrete things, although as emphasised elsewhere his work on colour emphasises that phenomena are as perceived by the human subject. Thirdly, Goethe is developing through reflection on practice a scientific method whereas Husserl is developing the means to see if a truly scientific method is a rational future goal.

Having highlighted those differences I want now to use an example of a similarity to further explore what essences are. The particular example refers to both what is revealed and how to go about revealing it.

Both systems of thought rely on a technique for the perception of essences which one might crudely term 'lining things up'. For both this is a kind of test. Husserl uses free imaginative variation, as discussed above, using many instances to get to the essence of one instance. In Goethe we can see how his insistence on series

of phenomena as being required to come to any insight into even one thing. (The Baconian thrust behind this was explored earlier.) Phenomena —things— are just things until the scientist places side by side those which can be intuitively seen as related. What emerges from this exercise, the simplest form of experiment, is that the 'empirical' phenomenon is thereby transformed into a 'scientific' phenomenon. The process of further scientific experimentation, as Goethe understood it, is what further raises the scientific phenomenon to a pure phenomenon —the phenomenon which is itself the theory.

> *One* phenomenon, *one* experiment, proves nothing; it is but a link in a longer chain, that has significance only as a whole...No phenomenon is self-explanatory; only a large number viewed as a whole, methodically ordered, yield at least something that could rank as theory.[249]

The quotation from Goethe above is unusual in that it tones down his customary exuberance and reverence which often seems to suggest that intuitive perception can yield the archetype instantaneously from the one key example.

Intuition

In a chapter three in the material on the archetype the reader will have already encountered the problem of Goethe "seeing ideas" and his presenting this faculty as evidence of intuitive perception. It is perhaps of no more than passing interest to note that Husserl claimed a similar faculty with regard to the phenomena of mathematico-logical concepts. Curtis H. Peters records this in his introduction to Husserl's *Introduction to the Logical Investigations*.

> Husserl's investigations were primarily attempts to examine directly the basic phenomena of mathematico-logical thinking and to determine thereby the bases for the judgements we make in this sphere. Husserl used the language of vision to express himself on this point. He claimed to "see" mathematico-logical concepts with the same clarity he could see a table. The similarities and differences between natural vision and the intuitive experiencing of logical concepts are not explored, however.[250]

Vision is at the very least a model or metaphor for both men for what they call intuitive perception or intuitive judgement.

However, to explore how far these terms actually designate the same thing I propose to compare them separately to Kant's idea of intuition. By reflecting on the way in which they both challenge aspects of Kantian intuition a certain vantage point is gained whilst also touching upon the philosophical position in relation to which they both developed their respective ideas about intuition.

For Kant intuition is one half of the means by which we have knowledge of things. It is primary, in that before beginning to develop concepts there must be some experience of something about which to develop concepts. However, whilst it is intuition or 'sensibility' that presents us with, for example, a table it is 'understanding' that is able to categorize this instance of a sense impression as having something in common with the concept of tables and therefore a particular instance — a table. Kant summarized the dual nature of experience in the famous dictum "thoughts without content are empty, intuitions without concepts are blind"[251]

Although for Kant intuition is the non-reflective pre-categorizing means to bring phenomena to our understanding for Goethe it means much more. He recognizes the division which Kant sets out, but calls the <u>bringing together</u> of sensibility and understanding "intuitive perception". Although Goethe recognizes that we use both sensibility and understanding all the time he retains the term intuitive perception for instances of their <u>complete synthesis</u> in the knowledge of a phenomenon. And, as the following shows, for Goethe both types of knowing are essential but must be balanced to reach his interpretation of intuition.

> Two needs arise in us when we observe nature: to gain complete knowledge of the phenomena themselves, and then to make them our own by reflection on them. Completeness is a product of order, order demands method, and method makes it easier to perceive the concept. When we are able to survey an object in every detail, grasp it correctly, and reproduce it in our mind's eye, we can say

> that we have an intuitive perception of it in the truest and highest sense[252]

One of the main problems between Goethe and his reading of Kant was around the nature of intuitive perception. For Goethe a systematic study of the material of a phenomenon and an opening of oneself to its gesture will lead to perception of its essential nature. What is perceived is the whole and not something which the perceiver has built out of parts. Goethe was certainly in agreement with Kant over the human tendency to reach hasty conclusions and the inappropriateness of understanding life forms through a conceptually constructed whole from intuitively perceived parts. However, he felt that he was himself capable of the intuition of wholes including their formative forces. Therefore he believed it was possible for humanity to develop the *intellectus archetypus* which for Kant would be the only way of understanding the organization of life forms.[253] Because we can see what would be necessary to attain such knowledge Kant proposes that it can be simulated such that we can know the appearance of things. The appearance he terms phenomena and distinguishes between the "phenomena" and the "noumena", or things-in-themselves, which it is not possible for us to know.

It is the doctrine of noumena to which Husserl takes exception. The noumena exist beyond our understanding and for Husserl the only transcendent realm is that of our own subjectivity. A phenomenon is, for Husserl, that which is present in experience. The transcendental Ego is not only part of that experience but also that which describes and gives meaning to the phenomenon.

Husserl's use of intuition is in one sense closer to Kant's in that he uses the term to be precise about what is open to knowing and in another closer to Goethe's use where intuition is a type of informed insight. Spiegelberg makes clear the problems of translating the terms used. The German term of *Anschauung* can be translated as 'looking at' without the English emphasis on sight. For example, we can 'look at' a recollection or the concept of number etc. But Husserl also calls a specific form of

intuition not *Anschauung* but *Wesensschau.* It is *Wesensschau* ("categorical intuiting"), I think, that relates most closely to Goethe's use of intuitive perception because it is in this idea that Husserl makes explicit the human ability to intuit general essences from particular instances. His emphasis on the necessity of working with particular instances whilst also seeing beyond them is made clear in the following quotation from Spiegelberg's treatment of Husserlian phenomenology.

> While it does not require the massing of instances from experience or experimentation or even restriction to real cases, the intuiting of general essences must be based on the careful consideration of representative examples, which are to serve as stepping stones, as it were for any generalized "ideation". ... it is always the intuiting of the phenomena, particular as well as universal, in which all genuine knowledge finds its terminal verification.[254]

So whilst the language is slightly different and a more thorough examination would be able to explore the aspects in which their respective uses of intuition differ it can be seen that in both approaches intuition is seen as the means to an exact knowledge of phenomena and that the phenomena (in the knowing of them) contain, in a way open to human perception, all that was contained in Kant's noumena and phenomena.

However, in both Goethean science and in phenomenology the ability to intuit essences, whilst being innate, is not available without training. Goethe speaks of the need to "grow organs of perception" and the preceding chapters will have emphasised the extent to which Goethean science as a practice is connected to training the senses. Likewise it is clear from Husserl's representation of the difficult progress of phenomenology that repeating the phenomenological procedures of bracketing and eidetic description etc. are not automatically accessible abilities. As Quinten Lauer said:

> this kind of knowing, this kind of apodicitically evident ideal entity, cannot spring fully panoplied from the untutored mind, like Minerva from the head of Jove. The mind in which philosophy’s ideal objects are constituted must be a mind which develops, a mind which becomes better and better equipped to know, a mind which

> has been trained to employ consciously the phenomenological method, not of *finding* evidence but of *making* evident.[255]

Subjectivity

It is clear from the previous sub-sections that both phenomenology and Goethean science place a high value on the whole experience of phenomena. Some aspects of that whole are what can be termed qualitative dimensions and personal dimensions. For example, the haunting quality of the first few bars of a particular melody and the personal associations in memory of when it was first heard. Whilst such aspects obviously are aspects of a phenomenon the problem for both systems of thought is whether anything certain can be said about such phenomena without taking away the more subjective aspects. Both systems of thought place the human experiencing subject at the centre of a method which aims at certain knowledge, but with subjectivity as the central source is it then possible to say anything which has the certainty previously ascribed to objectivity.

The two most obvious ways to dismiss the idea of finding objectivity subjectively are discounted by both systems. The first of these is to say that if only the subjective is to be acknowledged as objective or valid then there are as many objectivities or validities as there are subjectivities and we become trapped in relativism. Alternatively a more thoroughgoing subjectivity will deny anything approaching another subjectivity by making all naive knowledge of others as beings like myself into the creations of a single self. These two views I shall term for the present subjective relativism and solipsistic idealism. I shall not be attempting to refute either view in any systematic way. My ambition is limited to showing how Husserl attempts to remain aloft, poised above these chasms, treading a tightrope between the crumbling pinnacle of naive objectivity and an assumed subjective objectivity: a tightrope which he has to spin as he goes along.

Certainty, Husserl maintains, is a rational aim and one which is made possible by reaching the core of subjectivity. What becomes certain is not only that the experience of the subject is the experience of the subject, but that it will be in essence the same for any other subject. The experience of 'tree' or 'justice' or 'recollection' is the same for anyone. Not, of course, a particular instance or even a type of tree etc. but what makes it this thing and not another. And just as we can strip away species and age and condition etc. from tree and still have its essence so can we strip away instances of justice and prejudices about forms of justice to arrive at its essence (that which is revealed to all subjects as essential to justice). I use the expression "revealed to" in order to distinguish essences in phenomenology from agreement about terms in language. A tree is not a tree, phenomenologically speaking, because we as subjects agree to call it such. It is a tree because it is a tree —it shares something with lots of similar and some not so apparently similar things— our agreeing to call it a tree is because of a prior recognition of its essence.

How can we get beyond the obviously ununiversalizable subjectivism of prejudice and opinion, which is the opposite of an idealized objectivism, so that we can know we are perceiving essences? Husserl writes:

> *Subjectivism* can only be overcome by the most all-embracing and consistent subjectivism (the transcendental). In this [latter] form it is at the same time objectivism [of a deeper sort], in that it represents the claims of whatever objectivity is to be demonstrated through concordant experience, but admittedly [this is an objectivism which] brings out its full genuine sense, against which [sense] the supposedly realistic objectivism sins by its failure to understand transcendental constitution.[256]

Husserl does not defend subjectivism out of a scepticism about the possibility of objective truth. Nor does he defend it purely in terms of human experience being what is important. The kind of thoroughgoing subjectivism he suggests has no place for opinion or prejudice as arbiters of truth. But subjectivity consists of more than that which is cast in the shade by a mythical objectivity. By beginning with the

experience and by applying thinking to the experience it is possible to reach the essence of the phenomenon being experienced. The process involved —the phenomenological method— involves the setting aside from the experience aspects of our "natural attitude" such as assumptions about the existence of the phenomenon external to ourselves. With the example of a tree this would entail setting aside not only the assumption about the tree's existence but even the question about its existence. Also one's pre-formed likes and dislikes about the phenomenon would also be set aside (bracketed). Having made this step towards purifying the subject experiencing the tree we can, in thought, purify the phenomenon being experienced by a similar process of stripping away that which is not essential to it being what it is.

It would now seem that we are approaching the essence of the phenomenon but is it not also reduced in the sense of being revealed as nothing but the parts which make it up or in the sense of loosing its qualitative features? Such a conclusion would mean that phenomenology fails in the same way as those sciences it criticises; the phenomenon is not accurately described but merely abstracted. To understand the difference between a phenomenological essence and a reduction of experience to, for example, only its quantifiable features requires a further exploration of what it means to be dealing with the essence of a phenomenon rather than its appearance to the natural attitude. The process of purifying the phenomenon is carried out by the individual thinking subject. That which is reached will be that which is reached by anyone carrying out the same procedure. The reason why this is held to be the case is not due to a leap to a standpoint of realism but because of the nature of pure subjectivity.

In one sense the phenomenological procedure can be seen as a way of saying that a thing is as it is for the subject because the world is as it is for the subject. However, this does not mean that the subject constructs the world by interpreting a real world in a prejudiced way nor by creating an ideal world in the absence of a real

one. The essence arrived at of any phenomenon in being the essence is a *distillation* of the whole subjective experience rather than a separation or abstraction from it.

To understand a) why the distillation of all the elements in one person's subjective experience of a phenomenon will be in some sense pure or certain and b) why it will be the same distillation as any other subject's experience, requires an understanding of the phenomenological concepts of object/subject poles and of intersubjectivity.

In the 'natural attitude' we assume a subjective 'I' and an objective world outside of that 'I'. So on encountering a thing in the world the experience is interpreted as 'I am looking at (or some other sensing) this X'. In phenomenological parlance this object/subject divide is identified —in preparation for its dissolution— by the term object pole and subject pole. So the 'I' doing the seeing is the subject pole: it is aware of its self-consciousness (or knowing itself in a way different to the knowing of the X) and that it is itself trying to know the X. The X is the object pole, or that to which the subject is directed. Through the phenomenological procedure, as outlined above, the subject, in its purified form encompasses the phenomenon so that the subject/object relationship is transcended and it is no longer an object but part of that same subjectivity. Other subjectivities can also be fully known, but not by becoming part of one person's subjectivity. On meeting another ego bearing subject the recognition that this is already a subject (to itself) in the same way that I am a subject requires a meeting in the human- community encompassing 'realm' of pure consciousness.

This idea of intersubjectivity can be explained more fully through the phenomenological terms of "appresentation" or analogical apperception and "empathy". When the phenomenon I examine is another human, I can see that the 'person perception' is similar to me. I see their body and its behaviour, in a sense directly, whereas their subjectivity is not presented in the same way. However,

because I know what it is like to have a body and the body I see reacts in the same way, for example, to pain as I would I can apperceive the other as subject: as having an internal world —a mental and emotional life in the same way as me. Two aspects of my subjectivity allow this appresentation to take place, the first outlined above is my awareness of my own body such that I can see, for example, another's wince as like my wince, a response to pain. The other related factor is my ability to imagine being, not here in my situation but, there in another's situation. To actively use imagination in this way is to empathise with the other subjectivity —to, partly experience the experience of that other subjectivity.

Husserl speaks of the multiple yet unified nature of intersubjectivity as being like the way in which we can understand our individual subject pole as having separate parts and yet knowing that they are all one 'I'.

> To every mind there belongs not only the unity of its multiple *intentional life-process (intentional Lebens)* with all its inseparable unities of sense directed towards the "object". There is also, inseparable from this life-process, the experiencing *I-subject* as the identical *I-pole* giving a centre for all specific intentionalities, and as the carrier of all the habitualities growing out of this life-process. Likewise, then, the (phenomenologically) reduced intersubjectivity, in pure form and concretely grasped, is an acting community of pure "persons" in the intersubjective realm of the pure life of consciousness.[257]

Intersubjectivity is the means by which Husserl attempts to avoid that chasm of solipsistic idealism. However, in the final description of intersubjectivity in *The Crisis of European Sciences* it is only fully established at the expense of introducing a cultural and historical dimension to the life-world[258] which would seem to draw Husserl closer to cultural relativism and away from the establishment of a means to certainty. This is a problem which remains to be resolved if phenomenology is to provide the foundational step to a means of securing human access to knowledge. The groundwork is there to place subjectivity at the centre of a new epistemological

framework, but it remains to be seen whether it can be used as anything more than a warning about the inadequacy of (non-subjective) objectivity in some situations.

The kind of objective facts to which science is thought to be directed do not, by their very nature, include everything of the subjective experience. An example of this would be the use of decibel readings to determine noise levels. In many instances the noise levels are being recorded to determine to what extent noise is a problem for people. No matter how complex the readings they do not convey the actual experience of the noise. There is a gap between the extrapolation of a supposed experience from an instance reduced to numbers and the experience itself. Also there are dimensions of the experience which numbers cannot begin to express such as the connotations triggered by memories etc.

The foregoing would suggest that the certainty afforded by the abstraction to numbers is a certainty about numbers and not about an event they were used to express. Or as Goethe said, "what except for its exactitude is exact about mathematics"[259] The gap that exists between the experience and the representation of the experience in a quantifiable form presents a problem for the idea that quantifiable forms represent reality. There is a sense in which they are a particular but agreed form of subjectivity. So if what is usually regarded as objective is nothing more than a convention about the kind of things we can be artificially precise about there seems little excuse for throwing out all the subjective side of experience.

A stark example of the potential confrontation between the use of quantifiable objective facts and the appeal to subjective experience about the noise issue can be drawn from a real life meeting of what could be called two world views. The scene was a recent public enquiry regarding an appeal for planning permission to build a clay-pigeon shooting and off-road driving centre at Quarryford estate in the Lammermuir Hills. The local inhabitants, various nature conservancy bodies and the Life Science Trust were the main objectors to the planned development and all had

representatives present at the enquiry. Several hours of the first day were taken up with the cross examination of the person who had taken the sound readings of an experimental firing. The evidence being relied upon both to support and to attack the proposition that the clay-pigeon shooting would not be a noise nuisance was in the form of decibel readings. The main contention finally rested on such technical details as the machine's height from the ground and the distance it had been placed from a reflecting wall whilst taking the readings.

There is, of course, much one could say about the use of 'science' and the role of 'experts' in such quasi court situations. However, the focus of the present discussion requires only the less critical point that to an expert, with a long experience of using the relevant technology, the numbers could be decoded into a representation of the volume, sharpness, duration and pitch of the sound. But it could not, I suggest, represent even to the expert the experience of the sound.

After a great deal of technical haggling between the experts' of the two contesting parties, conducted through the advocate and the recorder, the first days' proceedings were drawing to a close and a representative from the Life Science Trust was called to speak. Although his petition to speak had been an open one he chose to return to the topic of sound, but he moved the debate away from the accuracy of numbers to the accuracy of subjective experience —as one would expect of someone working in the field of Goethean science. To paraphrase his short presentation:

> "We have heard an awful lot about the volume of the sounds today, but I would like to say something about the experience of sounds. We all know that some sounds, like the wind howling outside when we are warm by the fire, can be very loud and yet they are somehow comforting But the sound of a dripping tap, which is very quiet, can drive us mad. Before anyone can decide anything about the amount of nuisance that can be caused by a noise we have to remember what kind of noise it is, what is it like to hear it, what is that experience actually like."[260]

The statement can be seen not only as an appeal to return 'to the things' —to the actual experience— but also grounding that appeal in intersubjectivity. We all have

experienced something of the way sound affects us and the effect not being determined by the volume but by the kind of sound it is.

The situation, which was focused on technical detail mainly about volume of a sound, could through the application of the phenomenological method be re-examined in a way closer to the real issue which was about the effect of the sound on those in proximity to it. Rather than go through the whole seven stage process as given above, which would be particularly difficult from memory, I will just give some of the aspects of the experience —hearing a gunshot— which are not well expressed in the decibel reading. The following are part of the phenomenon: sudden intrusion, tensing of body, feeling of constriction across chest, the momentary arresting of all thought, ringing sound, silence before the background sounds are re-identified, distraction into anger, possibly a break in the hearing of a sequence of sounds and the awakening of memories. More aspects of the momentary experience could be identified, many of which, like the first set, could be universalizable. The last two I gave are particular instances which can be analysed to reveal other aspects of the subjective experience. The break in a sequence of sounds, for example music, is an interesting case because the sequential nature of music means that it has to take place over time. So for example, if the phenomenon (gunshot) occurred whilst listening to the closing bars of a concerto then not only does it interrupt one instant —a couple of crotchets say— or even just the following bars, in one sense it affects the listening that preceded its occurrence as now the sequence cannot be completed. If we see the first few movements of a concerto as a kind of investment in time which is mainly 'paid off' by, for example, the resolution of dissonance in the final bars then the phenomenon effects the past as well as the present and future. The other non-universalizable effect of triggering memories also displays some interesting features. The phenomenon in this case has particularly extended horizons because it carries connotations for someone who, for example, saw active service in the war. Although

the memories are real for that person we might question to what extent is it relevant to the phenomenon, is this not the very thing which bracketing should enable us to disregard as not being essential to the phenomenon in question. I would propose that not only is it relevant to take account of such affects that a phenomenon will have for some people, but also that through intersubjectivity those personally extended horizons can be made accessible to anyone. It only requires empathy to constitute the phenomenon as having for some people an extreme version of whatever sound is evocative of fear for me.

The emphasis on the qualitative experience is there in both Goethe and Husserl but there is a difference of degree in the radicalness of their uses of subjectivity. Subjectivity is for phenomenology the means to reach objectivity whilst for Goethe it is the way to reach meaning in science.

As the sub-sections above have shown there are not only shared ideas between phenomenology and Goethean science, but also similarities in the methodological procedures. These could come about by coincidence or unexamined historical developments. However, I will now go on to argue that there are further correlations between the aims of the two systems of thought and that this is a more likely reason why similar procedures are found useful.

2. Shared aspects of their philosophy of science and critique of the scientific orthodoxy.

Conforming to Essence

The idea of sciences having to, in Husserl's terminology, "conform to their own essences" shares something with Goethe's appeal to study phenomena in the way that the phenomena themselves suggest how they should be approached. For both the

argument which basically states that something should be studied in its own manner and not by applying logical or technical procedures from a different field of enquiry relates to the next section which addresses the anti-reductionistic stance of both Goethean science and phenomenology. However, it is separated here as the positive counterpart to that criticism. In the idea of conforming to essence both approaches can be seen as proposing a 'correct' way forward for science.

It is in Husserl's rejection of psychologism that the beginning of his idea of sciences conforming to their essence can be found. This can be seen in his well documented *volte-face* from the position argued in *Philosophie der Arithmetik* — which maintained that mathematical and logical ideas were open to a psychological analysis— to the position in the *Logische Untersuchungen* which separates logic and mathematics as *a priori* and psychology as empirical. In Husserl's article for the Encyclopaedia Britannica at the point where he argues for the necessity of a pure phenomenological psychology on which to base an exact empirical psychology we find the following:

> A phenomenological pure psychology is absolutely necessary as the foundation for the building up of an "exact" empirical psychology, which since its beginnings has been sought according to the model of the exact pure sciences of physical nature. ... As essentially differentiated as the methods of natural science and psychology may remain, there does exist a necessary common ground: that psychology, like every science, can only draw its "rigour" ("exactness") from the rationality of what "conforms to essence". The uncovering of the *a priori* set of types without which "I", "we", "consciousness", and therewith mental being as such would be inconceivable — with all the essentially necessary and essentially possible forms of synthesis which are inseparable from the idea of a whole comprised of individual and communal mental life — produces a prodigious field of exactness that can immediately (without the intervening link of *Limes-idealizing* [idealisation to exact (mathematical) limits] be carried over into research on the psyche.[261]

So although he is arguing for a common concept of rigour as determining science, that rigour has to be born out of the thing examined and not transferred from one field of enquiry to another. Husserl's focus, in the quotation above, is on the essential

qualities of the psychical e.g., the experience of consciousness, to find psychology's own form system. And so just as logic, being an exact science with a different essence, does not rely on any empirical data for its form system, psychology cannot be based on an abstract exactitude separate from the experience of the psychical. Although very different psychology and logic, Husserl believes, should comply to the same rationale or meta-method: that of drawing their approach from the nature of their subject matter.

In the scientific work of Goethe a similar appeal is made. The style is very different —the language is Romantic and the advice is more practical as it suggests how to 'do' scientific observation— but the theme of conforming to essence is there in Goethe's own work and is emphasised today.

> We speak here frequently of a "Goetheanistic" way of thinking. Yet in the end, Goethean research in the broad sense exists wherever methods adequate to their respective object in nature are employed.[262]

To some extent the idea of the phenomenon showing the researcher how to approach it could present a problem in the way in which Goethean science has been represented as 'having a method'. How can a single method, a single set of procedures, serve all phenomena? The single principle of conforming to essence is the meta-methodological part of the approach. However, the four fold process of 'exact sense perception', 'exact sensorial fantasy', 'seeing in beholding' and 'being one with the object' does require further explanation if it is to be seen as conforming to the meta-methodological principle. A hard and fast method with distinct stages does not appear to be the kind of approach which would always conform to the essence of that which it examines.

As was stated in the method chapter, the representation of Goethean science given was from a pedagogical perspective and the four stages were separated, for the purpose of training and explanation, more than they would be by practising Goethean

scientists. The four stages as well as merging would also be open to separate emphasis and in this way the method whilst dictating particular practices can also be seen as allowing the requisite sensitivity to the different nature's of phenomena. To some extent this can be expressed in terms of the pre-first stage of first impressions. When we meet a particular phenomenon we are said to meet it with a part of ourselves which we share with it.[263] So the first impression of a rock is always of its physical appearance whereas the first impression of a plant is of its particular expression of aliveness. With animals we meet their expression of intentions and with other humans we meet first the ego — momentarily seeing I to I. And so whilst all four stages are appropriate to every phenomenon one stage will in a sense bear a special stamp of that first meeting. The phenomenon presents itself in such a way that throughout all the processes of observation one is given, by the phenomenon, how to apply those processes to this particular thing.[264]

Another aspect of this phenomenon specific approach is discussed by Wolfgang Schad in his article 'Scientific Thinking as an Approach to the Etheric'. The purpose of the article is to explain Rudolf Steiner's concept of "the etheric", but in the process Schad gives a very good example of how Goethean scientists will acknowledge the requirement of sensitivity to the nature of phenomena. He explains why it is necessary not just to use different techniques but an entirely different way of thinking depending on the nature of the phenomenon being explored. Schad delineates three ways of thinking: the causal, the correlative and the teleological each of which is appropriate to different areas of scientific enquiry. He sets out the causal and the teleological first before explaining the mediating category of "correlative thinking" and I shall follow him in this.

The causal mode of explanation assumes the principle of the causal nexus: every condition is caused by a prior condition and that prior condition can only issue in one effect. So all present effects are caused by past effects or as Schad says: In

causal explanation, the essential thing is that every phenomenon is recognized to be a product of its past.[265] The areas of science where causal thinking has been successful and is deemed to be appropriate (with the exception of the "microphysical realm of elementary particles") is in the areas of physics and chemistry. This appropriateness Schad attributes to the evolution of these disciplines in their dealing with the inorganic.

> Here causal thinking has the clear advantage of presenting fewer boundary experiences than would another mode of thinking, because lifeless phenomena obviously can to a great extent be deduced from their past states and understood in this way.[266]

However, causal thinking fails to serve the phenomenon when it is something which is orientated towards the future. Teleological thinking is seen as necessary to approach any phenomenon which exhibits future orientated drives or "wishes, desires, longings, hopes" etc. and the epitome of a science that requires an approach which takes such things into account is that of psychology. However, these two ways of scientific thinking are not capable of serving all phenomena because of the vast realm of nature which is living and therefore not explicable in purely causal terms but not primarily future orientated in the sense of mobilizing its own intentions. For this realm a way of thinking is required which does not treat living things 'as if' they were dead nor as if they were conscious. The type of thinking Schad proposes is what he calls "correlative" by which he means an awareness of the phenomenon as being "simultaneously and mutually conditioning".[267] What correlative thinking is attempting to capture is not just the simultaneous interrelationships in, for example, an organism but also the necessity of their being as they are (without falling back into seeing the interrelationships as causal). The important aspect of time in this realm is that of the present. As Schad says:

> A life process, however, always proceeds for the sake of its own present. Here time is no longer a mere segment [as in the elapsed time of movement in physics]; rather it is individualized time, time

> made autonomous in each organism's own life rhythm that cannot be lengthened or shortened at will.[268]

The following table is adapted from the one given in Schad's article. It helps to clarify these three types of scientific thinking, their respective relationships to time and the kind of sciences within which they are predominately applicable.

Type of thinking	*Causal*	*Correlative*	*Teleological*
Science	physics, chemistry	biology	psychology
Realm	mineral-lifeless	living	psychological
Time determination	past	present	future

Of course, suggesting only three types could be seen as imposing a restricted approach to the multiplicity of phenomena and is in that sense a constraining classification rather than in any way allowing the researcher to 'conform to the essence' or 'listen to the phenomenon'. However, two things need to be taken into account. One, is that the classification itself is seen as being 'drawn' from the phenomena. And secondly, it is always a particular permutation of the three ways of thinking that will be used. For example, human beings still have physical bodies (even shedding entirely dead matter) and non-intentional metabolic processes, so to some extent the kind of thinking which in its pure form only relates to the inorganic realm and that which relates to living but not future orientated realm are relevant in the study of human beings.

It also needs to be taken into account that when particular practical suggestions are made there will be a sense in which they sound as if they are tying down what they are at the same time trying to 'free up'. In the movement from an ideal or meta-methodological principle to the practical details of 'how to do it' it seems that there will inevitably appear to be a disjunction between the theoretical imperative —

treating each individual phenomenon in the manner dictated by its essence— and making suggestions about how one could go about achieving that aim.

The foregoing criticism of systematizing what should ideally remain open also fails to take into account the additional problem of formulating an approach to science in the background of a dominant scientific orthodoxy. In this sense suggesting that there are three types of scientific thinking rather than just the one (the causal) is a major step towards the ideal of a science that takes account of what kind of thing it is that it is investigating.

The respective responses of Goethe/Goethean scientists and Husserl to a scientific orthodoxy is another area of correlation as both focus their criticisms of that orthodoxy on the over-emphasis on quantification and lack of appreciation of the full human experience of phenomena.

Anti-reductionism

It has already been brought out in the treatment of subjectivity and in the above discussion of conforming to essences that both traditions attempt to approach phenomena as a whole experience. This approach is sometimes set alongside a perceived orthodoxy which, they claim, fails to take account the whole of the human experience of phenomena as in some sense valid (even in phenomenology though some aspects are bracketed they are acknowledged as claiming being). I now want to turn to the way in which both traditions approach the perceived scientific orthodoxy and cite themselves as outside of and as proposing a corrective to it

As the comparison is primarily between the poet/ practical scientist Goethe, writing in the late eighteenth and early nineteenth century, and the mathematician/ philosopher Husserl, writing in the late nineteenth and early twentieth century, both their approaches and the scientific background against which they are writing are very different. However, a common strand is easily identifiable in that both attack the

trend of reductionism in the sciences of their day. Moreover, the interpretative work of Rudolf Steiner on the scientific works of Goethe, which is the main inspiration for Goethean scientists working now, was being conducted at the time of Husserl's first phenomenological works. Indeed Steiner, like Husserl, attended Brentano's lectures in Vienna.[269] Thus the two men must have shared something of the same intellectual/cultural background. And so the orthodoxy which they both accuse of abstraction; in its failure to respond to the human experience, was the same cultural orthodoxy even if the particular sciences which form the focus of their criticisms are different.[270]

Much of Goethe's attitude to the way in which science was becoming increasingly abstracted from the appearance of things as they naturally occur and increasingly mathematicised has been examined in chapter three. The material given there, particularly on Newton's use of the *experimentum crucis*, serves to demonstrate not only a personal distaste for aspects of a reductionistic approach, but also a warning reproach. In the *Maxims and Reflections* can be found, in much the same vein, the following:

> Someday someone will write a pathology of experimental physics and bring to light all those swindles which subvert our reason, beguile our judgement and, what is worse, stand in the way of any practical progress. The phenomena must be freed once and for all from their grim torture chamber of empiricism, mechanism, and dogmatism; they must be brought before the jury of man's common sense.[271]

In this can be seen the criticism of the sciences, in this case physics, for not drawing the way of looking from the phenomenon as it occurs in nature. The example Goethe has in mind is no doubt Newton's prismatic experiment because to him the idea of exploring the phenomenon of light or colour primarily in a darkened room is a particular instance of reducing the multiplicity of colour phenomena which would be the appropriate starting point to a complex and constructed instance.

Rudolf Steiner in his major work on Goethe's scientific method, *Goethean Science,* reflects on the increasing propensity for science to mathematicize. Informed by Goethe's view he clarifies this propensity and brings to it a further criticism in his explanation of why science has adopted a reduced interpretation of phenomena.

> Magnitude, shape, location, motion, force, etc., are perceptions in exactly the same sense as light, colours, sounds, odors, sensations of taste, warmth, cold, etc. Someone who isolates the magnitude of a thing from its other characteristics and looks at it by itself no longer has to do with a *real* thing, but only an abstraction of the intellect. ... When the modern view of nature traces all the processes of the corporeal world back to something that can be expressed mathematically and mechanically, it does so because the mathematical and the mechanical are easy and comfortable for our thinking to deal with.[272]

In the 1950's, following on from Steiner's criticism, Ernst Lehrs in his book *Man or Matter,* which was influential in the building of a Goethean science tradition, uses Heisenberg's criticism of a scientific orthodoxy. He characterized the scientist as a "one-eyed, colour blind onlooker"[273]. Today this view of Goethean science as a corrective to the orthodoxy is still strong with mainstream science being characterized as faltering, its apparent success now being shown to be hollow particularly from an ecological viewpoint. Although there are arguments for Goethean science being more responsive to nature, issuing in more sustainable technologies etc. it is still the non-reductionistic principle that is seen as paramount and the reason for its perceived strengths. The following quotation, from 1992, is by a group of scientist who have, so to speak, crossed the divide.

> For this illness of science we must find a cure which will only begin when science recognizes that it originates in the use of specific human faculties. ... We can no longer afford to live with a nonsensical world picture produced by human beings that does not include human beings in their wholeness and richness. We need a science which can embrace the warmth of smiles as well as the muscular contractions which widen oral apertures, which can include the inwardness of all the kingdoms of nature, of human beings and of the universe as a whole.[274]

Their use of the sickness/health metaphor is not unusual and phrases such as "de-humanizing" and "loss of meaning" are familiar and find resonances outside of Goethean science in wider criticisms of science. However, the emphasis on *human* faculties providing the means to a more holistic science is more specifically Goethean and can be linked directly back to Goethe, who said:

> Insofar as he makes use of his healthy senses, man himself is the most exact scientific instrument possible. The greatest misfortune of modern physics is that its experiments have been set apart from man, as it were; physics refuses to recognize nature in anything not shown by artificial instruments, and even uses this as a measure of its accomplishments.[275]

However, it also should be said that the scientists at the forefront of developing a Goethean approach are not all active polemicists arguing for the relative strength of their own approach against the shortcomings of a scientific orthodoxy. From the scientific writings of Jochen Bockemühl, Theodore Schwenk, Wolfgang Schad and Andreas Suchantke one gets the impression of them 'getting on with it', to some extent in isolation, and drawing on more orthodox work when it is applicable.[276] It is from the commentators on their work, such as Frederick Amrine and Arthur Zajonc, that a critique of orthodox scientific practice is developed from the non-reductionistic approach of the Goetheans.

The approach of Goethe and those working from his initial insight can best be described as the development of a science of qualities which uses specifically human faculties to reach an understanding about phenomena as they appear to humans in nature.

Husserl's criticisms of reductionism follow the same pattern of a) rejecting the submission of the subject of one field of enquiry to the norms and methods of another field and b) the reduction of phenomena (that which is experienced) to that which can be quantified. These two criticisms have been covered to some extent, a) in the section on conforming to essence and b) under subjectivity. However, anti-

reductionism, in Husserl's wider sense, as a matter for reform in the sciences remains to be covered.

Husserl's phenomenology was never intended to be a philosophy amongst other philosophies. Its aim was explicitly programmatic. Each of Husserl's works on phenomenology is a restarting of the programme of developing a method that could be used for a specific task in the world. The nature of that task is redefined in each of the books and although always all encompassing it becomes more concrete in the final version —*The Crisis in European Sciences*.

Phenomenology aims to provide a foundation for philosophy and for science. It can be described as an attempt to construct a meta-philosophy and a meta-science. As such phenomenology only needs to demonstrate an internal consistency, but the intention of it is more far reaching. From the initial publication of the *Logical Investigations* in 1900 phenomenology was established as a means, via the criticism of psychologism, of criticising the ungrounded assumptions in the wider application of scientific method. By the time of writing *Crisis,* when Husserl was in his mid-seventies, the critique had become historically focused. Not only were the logical problems surrounding the justification of scientific method being raised, but also the effect of "impure" sciences on European culture. He says:

> The exclusiveness with which the total world-view of modern man, in the second half of the nineteenth century, let itself be determined by the positive sciences and be blinded by the 'prosperity' they produced, meant an indifferent turning-away from the questions which are decisive for a genuine humanity. Merely fact-minded sciences make merely fact-minded people.[277]

What are, for Husserl, the questions of genuine humanity? As he goes on to argue it is the questions which have a bearing on reason. Greek philosophy and the philosophy of the Renaissance addressed reason and thereby the foundational questions concerning humanities' being in the world. This Husserl sets against the

positivist sciences which have no role for a foundational philosophy and do not recognize its necessity to inform their own endeavours.

In the German universities of Göttengen and Munich particularly in the years between 1913 and 1930 this proposal of starting afresh with the aim of re-awakening the search for certainty found many keen followers. United under the slogan *"Zu den Sachen!"* (to the things) the early phenomenologists sought to apply the method, as set out by Husserl, to examine phenomena and in so doing to refine the method in preparation for its reforming task on the sciences and through the sciences on European culture. By the time of writing the *Crisis* the wider rejection of positivist science and been joined by an embracing of irrationalism. This potent mixture had become endemic in Germany thus lending Husserl's final attempt to secure a human and rational foundation for the sciences a quality of pathos.

Husserl's work is, of course, philosophically more foundational than Goethe's reflections on the grounding of science. And his knowledge of the physical sciences and the way in which scientists actually work has been criticized.[278] So whilst Goethe is accused of being philosophically naive but empirically rigorous Husserl would seem to be his counterpart.

Conclusion

The comparison of Goethean Science and Husserl's phenomenology has shown that there are many similarities in both their aims and practices. It is therefore not surprising that the work of phenomenological geographers and architects, as mentioned in chapter seven, share something of the same feel —the same sense of really knowing a phenomenon, e.g., place, as the place surrounding and experienced by the subject exploring it. The complex procedures which create the necessary transformation of the subject are not counter to ordinary states of being. They are sometimes utilized as an adjunct to orthodox scientific practice, because of the personal style of the scientist, as was shown to be the case with Barbara McClintock. The 'common sense' basis of the first steps of the process are also used when circumstances have created the possibility to discover their efficacy as was the case with the parish maps project.

The crucial aspect which could be taken as a defining characteristic of Goethean science and is recognized by some phenomenologists is the necessity of some form of purification of the subject. Necessary both to meet the phenomenon as an essential being and to bring the human capacity of thought to that meeting. The distinction which is fully explicit in Goethe's work and the writing of Goethean scientists is that the necessary purification and development of faculties entails a moral journey. The moral stature of the scientist and the scientist's expertise are not seen as two complementary features but are one and the same quality. Thus a scientific training is at the same time a moral training and the means to that single good are seen as exercises for the development of new organs of perception. The inherent ethical dimension to Goethean science does mean that it will tend toward reading how nature works and devising methods of intensifying nature's non-entropic features. Not

because that is what one ‘should’ do and Goethean science is a means to that end, but because that is what Goethean science aims to do. Its ethics is not a cleverly integrated feature it is one and the same thing. The moral strand in debates surrounding not just how to do it but why and to what end and who can teach it etc. help to define the tradition both as dynamic and as having a core identity. That identity is not drawn entirely from parameters laid down at one point in time, but is always in a process of development.

The mutability of the techniques is shown in their application at Pishwanton. Also questions about the integrity of a place and human impact on place and the idea of helping nature to further its ‘higher possibilities’ are encountered on the ground. The similarities and disjunctions between Goethean science and both scientific ecology and less human centred environmentalism can also be drawn from the material.

To see in the practice at Pishwanton wood the fluid application of method requires a clear exposition of the method. This was given within the framework of the way Goethean science is taught on The Life Science Seminars with additional material from the texts of practising Goethean scientists. Only in presenting the method as experienced could the explicitly experiential nature of the techniques used be explained.

Why one would chose to approach nature and explore phenomena in the way outlined is answered by the starting point of Goethe’s criticism of theory driven science. By examining Goethe and the people from whom he drew inspiration it is possible to define a clear departure point setting Goethe’s science outside of a developing orthodoxy. The beginnings of a qualitative science can be seen in Goethe’s division of the inorganic from the organic not as categories in nature but as requiring different approaches —different soul responses— from the scientist.

Conclusions about how far that science has come, as a living entity, can be drawn from the material which covers its germinal development in Britain and from the difficulties and strivings of those involved. In the diverse applications described the key features, which were given at the beginning in the form of temporary orienting characteristics, can now be more tightly summarized into a definition of Goethean science as an attempt to create a ‘science of compassion’.

Appendix A

Appendix B

Below is an outline of the science curriculum taken from *Goethean Science in the Waldorf Curriculum* p.24. (Steiner Schools Fellowship publications.1978) which is a report on a study conference. (The age of the pupils can always be determined by adding five years to the class number.)

CLASS 1: Animals, plants, stones, metals in Fairy Stories.

CLASS 2: Animals, plants, stones, still speak in Fables. Man speaks through the Saints.

CLASS 3: Farming, Gardening, in principle; then practical work with animal and plant until class 10.

CLASS 4: ANIMAL STUDY —approached as an archetypal picture of Man.

CLASS 5: PLANT STUDY —approached from the soul aspect: what is expressing itself?

CLASS 6: MINERAL STUDY —approached from the formative character of landscape.
OPTICS —from darkness, stages of dawn, light surfaces
ACOUSTICS —from music in the classroom
WARMTH —from heat and cold in surroundings
ELECTRICITY —arising and dispelling of static electricity
MAGNETISM —arising and dispelling of magnetism - direction, relation

CLASS 7: CHEMISTRY —from combustion, the colour of acid and alkali

PHYSIOLOGY —nutrition and health, circulation, breathing (be ready to answer questions on sex, conception and periods etc.)

OPTICS - Image

ACOUSTICS - Tuning fork

WARMTH - expansion, the thermometer

ELECTRICITY -the circuit

MAGNETISM - fields

MECHANICS - lever, pulley

CLASS 8: CHEMISTRY —the organism; industry

PHYSIOLOGY —bones and muscles

OPTICS - lenses

ACOUSTICS - speed of sound, airwaves

WARMTH - ELECTRO-MAGNETISM - the coil, the motor

HYDRO-MECHANICS - buoyancy, pressure

AEROMECHANICS - climate etc.

CLASS 9: CHEMISTRY - substance and organic

ANATOMY - sense and skeleton

ACOUSTICS - ELECTRO-MAGNETISM - the telephone

HEAT-MECHANICS - steam and petrol engines, technical analytical

CLASS 10: NEW MINERALOGY

PHYSIOLOGY - inner organs

MECHANICS - machines and mathematics

CLASS 11: BOTANY - study of cells

TECHNOLOGY - wireless, X-ray, radioactivity

CLASS 12: ZOOLOGY - discussion of order and relation to man

OPTICS - mirror

EPISTEMOLOGY

References

[1] Lawrence Edwards 'Form and Gesture in Tree Buds' in *The Golden Blade 1988* p.116. (Sussex: Hawthorn Press, 1988).

[2] There is research done in Britain and anthroposophical doctors practising medicine as well as homeopathic medicines produced by the anthroposophical company Weleda. However, I decided to limit the range of this thesis to those areas covered. Anthroposophical medicine particularly would warrant a much more in-depth study than the space and time I could commit to it within the confines of an academic thesis.

[3] A similar point is made by Roger Smook in 'Rudolf Steiner on the Presuppositions of Goethean Science' *Idealistic Studies* Vol.22. part 1. p.70. He says:

> Goethean science, as I understand it, is founded on the assumption that a *zarte Empirie* is possible based upon "seeing with the eyes of the mind" in addition to seeing with the bodily senses. It seems to me that in this sense of "Goethean science" Goethe was neither the first nor the last Goethean scientist. A good case can be made that Paracelsus was a Goethean scientist. And, at the present time, largely due to the impetus of Steiner, there exists a thriving school of Goethean science.

The "thriving school" he mentions is at the Goetheanum in Dornach, Switzerland.

[4] On this point a practising Goethean scientist agreed and offered the comment that "on the methodological level one may even say that anthroposophy is the natural consequence of Goetheanism." Robert Rose, pers. com., 3.6.94.

[5] Frits H. Julius has written:

> One sees again and again, how Goetheanism and Anthroposophy go hand in hand; how you are led by the one to the other, and how the latter cannot exist without the former

from *The World of Matter and the Education of Man* p.5. (Forest Row: Steiner Schools Fellowship Publications, 1987).

[6] Frits H. Julius *Ibid.* p.4.

[7] Graham Kennish (teacher trainer) pers. com., Stroud 19.3.92.

[8] Robert Rose pers. com., Stroud 20.3.92.

[9] The structure was devised by Eugen Kolisko under the guidance of Rudolf Steiner. See Frits Julius *Op.Cit.*

[10] Frits Julius *Op.Cit.* p.24.

[11] Frits Julius *Op.Cit* p.11.

[12] Goethe J.W. 'Selections from Maxims and Reflections in *Scientific Studies* p. 307. trans. Douglas Miller (New York: Suhrkamp Publishers, 1988).

[13] Douglas Miller introduction to Goethe, J.W. *Ibid.* p.x .

[14] Emerson College Prospectus leaflet. Although undated this leaflet was distributed in 1993 several years after Goethean observation was no longer taught in any systematic way. However, in 1994 a full introduction to Goethean science was re-established on the foundation course to be taught mainly by Margaret Colquhoun and Clara Passchier.

[15] In 1994 the Rural Development Course did not run and there were plans to run a Landscape and Design course.

[16] Information booklet 'Camphill Communities: social renewal through community living' (The Association of Camphill Communities, 1988).

[17] The eight lectures which were foundational to the development of biodynamics were given by Steiner at a conference for farmers and landowners in Silesia in the spring of 1924. See Shepherd, A.P. *A Scientist of the Invisible* p.201. (London: Hodder and Stroughton, 1954).

[18] See Christof Lindenau 'Life Organization and Thought Organization' in Bockemühl, J.ed. *Toward a Phenomenology of the Etheric World* p.202. (New York: Anthroposophic Press, 1985).

[19] The nature of questions had formed part of a lecture on the Adult Education Course at the Centre for Social Development. Ernst Amons 4.6.94.

[20] Naomi Brandel in a letter to Margaret Colquhoun (September 1992).
[21] Naomi Brandel *Life Science Newsletter* 1993.
[22] David Heaf pers. com., 14.7.94.
[23] Philip Kilner 'Form out of Flowing Movement 2' *Science Forum* 7 Autumn 1987. pp. 28-31.
[24] Two periodicals devoted to Goethean science are *Elemente der Naturwissenschaft,* published since 1964. and *Der Farbenkreis,* published since 1977. both in Dornach.
[25] Goethe J.W. *Scientific Studies* p.271.
[26] Rudolf Steiner *The Story of My Life* p.42. (London: Anthroposophical Publishing Co., 1928).
[27] Olive Whicher 'The Life and Work of George Adams' in *George Adams interpreter of Rudolf Steiner* p.31. (East Grinstead: Henry Goulden, 1977).
[28] George Adams & Olive Whicher *The Plant Between Sun and Earth* p.37. (Boulder: Shambala, 1982).
[29] Arthur Zajonc pers. com., Oxford, 8.5.93.
[30] Flowforms are produced by: Virbela Flowforms, Emerson College, Forest Row.
Ebb and Flow, Ruskin Mill, Nailsworth, Nr Stroud.
Iris Water, Castleton, Whitby, North Yorkshire.
[31] See Theodor Schwenk *Sensitive Chaos* (London: Rudolf Steiner Press, 1965).
[32] John Wilkes pers. com., 22.4.94.
[33] John Wilkes pers. com., 22.4.94.
[34] John Wilkes pers. com., 22.4.94.
[35] The first flowform was incorporated into a biological sewage system at Järna in Sweden. Wilkes, J & Thomas, N. 'Flow Design Research Group' *Science Forum* 5 Spring 1985. pp.12-14.
[36] Other forms of water cascade can increase oxygenation, such as a step cascade. However, there is some evidence that, particularly in encouraging higher plants and macro-fauna, the flowform is more effective. See *Ibid* p.13.
[37] John Wilkes pers. com., Forest Row, 22.4.94.
[38] John Wilkes pers. com., Forest Row, 22.4.94.
[39] Industrial wastes that have been treated successfully have included those from quarrying, the district council, a pharmaceutical company, a brewery and a cement company. Mark Moodie, pers. com., Oaklands, 30.6.94.
[40] Uwe Burka & Peter Lawrence 'A New Community Approach to Waste water Treatment With Higher Plants' p.3.
[41] Mark Moodie pers. com., Oaklands, 30.6.94.
[42] Uwe Burka *Op. Cit.* p.10.
[43] See *Science Forum* No. 3. Spring 1983 p.14.
[44] A very thorough discussion of the purpose and problems behind this technique is William Steffan's 'The Physico-Chemical Basis of Capillary Dynamolysis' *Science Forum 4* Spring 1983.
[45] Lawrence Edwards *The Vortex of Life* p.204. (Edinburgh: Floris Books, 1993.)
[46] Lawrence Edwards *Ibid.* p.206.
[47] Lawrence Edwards *Ibid.* p.206.
[48] Lawrence Edwards pers. com., Strontian, 12.03.93.
[49] Lawrence Edwards pers. com., Lancaster, 17. 9.1993
[50] Lawrence Edwards *The Vortex of Life* p.12.
[51] See Rudolf Steiner *The Philosophy of Freedom* (London: Rudolf Steiner Press, 1988).
[52] Goethe J.W. *The Autobiography of Goethe: Truth and Poetry Vol. 1.* p.31 trans. John Oxenford (London: George Bell and Sons, 1891).
[53] Karl Fink *Goethe's History of Science* p.70. (Cambridge: Cambridge University Press, 1991).
[54] A very complete and readable early account, first published in German in 1906, is Rudolf Magnus' *Goethe as a Scientist* trans. Heinz Norden (New York: Collier Books,1961).
[55] Helmholtz H. von *The Selected Writings of Hermann von Helmholtz* ed. R.Kahl (Connecticut: Wesleyan University Press, 1971).
[56] Karl Fink *Op.Cit.* p.131.
[57] Baconian science is also connected to the desire for control over nature see Carolyn Merchant *The Death of Nature* (New York: Harper and Row, 1980).

[58] H.B. Nisbet *Goethe and the Scientific Tradition* p.24-27. (London: University of London, Institute of Germanic Studies, 1972).
[59] See Foucault, M. *The Order of Things* (London: Routledge, 1991) for a full treatment of what he terms the "Renaissance episteme".
[60] The theoretical move of defining the phenomenon as 'this thing and not others' does not appear to be classed as theory by Goethe. This question of how the thing is bounded is dealt with more fully in the sub section 'Too much stuff'.
[61] Francis Bacon from *Novum Organum II* summerized by Anthony O'Hear in *Introduction to the Philosophy of Science* p.14. (Oxford: Clarendon Press, 1989).
[62] Dennis Sepper *Goethe Contra Newton* p.134. (Cambridge: Cambridge University Press, 1988).
[63] "*das Kind mit dem Bade auszuschütten*" Goethe, J.W. quoted in H.B. Nisbet *Op.Cit.* p.30.
[64] Alfred North Whitehead *Science and the Modern World* p.59. (Glasgow: Fontana Books, 1975.)
[65] Alan Chalmers *What is This Thing Called Science 2nd Ed.* p.16. (Milton Keynes: Open University Press, 1983).
[66] Gregory, R.L. *Eye and Brain: the psychology of seeing* 3rd ed. p.194. (London: Weidenfield and Nicolson, 1979).
[67] Eckermann, J.P. *Conversations with Goethe* p.66. trans. John Oxenford (London: Dent and Sons, 1935).
[68] James Bruce quoted in Gombrich, E.H. *Art and Illusion* p.71. (London: Phaidon Press, 1962).
[69] Gombrich, E.H. *Ibid.* p.71.
[70] William Harvey quoted by Stephen Mason in *A History of the Sciences* p.221. (New York: Collier Books, 1979).
[71] Goethe J.W. 'Symbolism' in *Scientific Studies* p.26.
[72] Goethe J.W. in Eckermann *Op.Cit.* p.414.
[73] Goethe J.W. 'Maxims and Reflections' in *Scientific Studies* p.311.
[74] Goethe J. W. 'Theory of Colours' in *Ibid.* p.160.
[75] For example, see Karl Fink's criticism of the *Metamorphosis of Plants* and exposition of *Theory of Colours* as a more thorough application of the same method in *Op.Cit.* p.33.
[76] Goethe J.W. 'Theory of Colours' in *Scientific Studies* p.159.
[77] Goethe J.W. *Ibid.* p.282.
[78] Goethe J.W. *Ibid.* p.168.
[79] Arthur Zajonc *Catching the Light* p.190. (London: Bantam Books, 1993).
[80] Alfred I. Tauber 'Goethe's Philosophy of Science: Modern Resonances' in *Perspectives in Biology and Medicine Vol 36.* part 2. 1993.
[81] Agnus Arber 'Introduction' to 'Goethe's Botany' trans. Agnes Arber *Chronica Botanica Vol 10* p.71. (U.S.A.: Chronica Botanica Company, 1946).
[82] Goethe, J.W. quoted in Steiner, R. *Goethean Science* p.18. trans. William Lindeman (New York: Mercury Press, 1988).
[83] Goethe J.W. In his autobiography Goethe writes:

> In the course of my frequent walks along the dunes of the Lido which divide the Venetian lagoons from the Adriatiatic sea, I found a sheep's skull, so happily burst open as not only anew to demonstrate to me the great truth I had formerly recognised, that the skull-bones have all originated in transformed vertebrae, but plainly established the fact of the conversion of inwardly unformed organic masses, through elaboration outwards in progressive advancement towards the highest structure and development ...

from 'Annals or Day and Year Papers' in *The Autobiography of Goethe Vol 2.* p.191. trans. Charles Nisbet (London: George Bell & Sons, 1894).
[84] Goethe J.W. the statement here is explained further in *The Metamorphosis of Plants* were Goethe says:

> For the present, however, we must be satisfied with learning to relate these manifestations both forward and backward. Thus one

> can say that a stamen is a contracted petal or, with equal justification, that a petal is a stamen in a state of expansion;

from *Scientific Studies* p.97.

[85] Goethe, J.W. 'Annals or Day and Year Papers' in *Op.Cit.* p.210.

[86] Eckermann *Op.Cit.* p.66.

[87] It can of course be argued that when the social pressures are real, for example, to do with defending status etc. then observations will be severely compromised. See Shapin, S. on Phrenology in *Natural Order* eds. Barnes, B. Shapin, S. (Beverly Hills: Sage Publications, 1979).

[88] The coining of the term 'morphology' (from the Greek *morphe* meaning form) is sometimes attributed to Goethe. See Rudolf Magnus *Op.Cit.* p.39.

[89] Goethe, J.W. 'The Purpose Set Forth' in *Scientific Studies* p.63.

[90] Goethe J.W. *Ibid*. p.64.

[91] Goethe J.W. *Ibid.* p.64.

[92] Senden, M.von *Space and Sight* p.285. (London: Methuen and Co., 1960).

[93] Goethe quoted "from his notebooks" (no further reference given) in Henri Bortoft's *Goethe's Scientific Consciousness* p.46. (Tonbridge Wells: Institute for Cultural Research, 1986). An account of this ability is also given in the introduction to *Scientific Studies* by Douglas Miller which he takes from a review by Goethe of Purkinje's *Sight From a Subjective Standpoint* (1824).

[94] Goethe J.W. 'Maxims and Reflections' in *Scientific Studies* p.307.

[95] The moral qualities of the observer is a topic dealt with in the chapter on tradition.

[96] Goethe J.W. *Conversations of Goethe With Eckermann and Soret* trans. J.Oxenford (London, Smith, Elder and Co. 1850).

[97] From Bockemühl's term *Intuitive Vorgriff* quoted in Colquhoun and Day 'Study and Development of Place' (unpublished)

[98] Lydia-Marie Gionet Discussion on plant course 13.4.93.

[99] Mathias Guipin Participant on the Penquoit plant course 29.8.92.

[100] Margaret Colquhoun Lecture on plant course13.4.93.

[101] Dennis Sepper *Goethe Contra Newton* p.45.

[102] See 'Elements and Ethers: Modes of Observing the World' in *Toward a Phenomenology of The Etheric World*. (New York: Mercury Press 1985).

[103] from The Human Skeleton course 5.2.92.

[104] Sara Martin 'The School of Life Science Newsletter Winter 91/92'

[105] Goethe, J.W. 'Empirical Observation and Science' in *Scientific Studies* p.24

[106] Ernst Lehrs *Man or Matter* p.82. (London: Rudolf Steiner Press, 1985).

[107] Jochen Bockemühl *Op.Cit.* p.21.

[108] Jochen Bockemühl *Op.Cit.* p.11.

[109] Goethe, J.W. *Scientific Studies* p. 133.

[110] Goethe, J.W. *Ibid.* p.25.

[111] Goethe, J.W. *Ibid*. p.26.

[112] Colquhoun and Day *Op. Cit.* p.6.

[113] An experiment of imagining an open rib cage is given in the final chapter.

[114] Ernst Lehrs "In view of such forms [siliceous shell of radiolarian and the calcareous shell of a foraminifer] one is inclined to speak of two gestures of nature. *Op.Cit.* p.240.

[115] Georg Maier 'Light and the Pictorial Appearance of the World' in Bockemühl ed. *Op.Cit.* p.84.

[116] Ernst-August Müller and Dietrich Rapp in Bockemühl ed. *Op.Cit.* p.95.

[117] Various course participants.

[118] Rudolf Steiner *A Theory of Knowledge Implicit in Goethe's World Conception* p.95. (New York: The Anthroposophic Press, 1978).

[119] Jochen Bockemühl in *Op.Cit*. p.30.

[120] This expression was used by Olive Whicher pers. com.,14.1.93

[121] Participant at the Friends of the School of Life Science meeting 14.1.93.

[122] Colquhoun and Day 'Study and Development of Place' p.8. (unpublished)

[123] Although I have emphasised the Goethean method as four-fold it should also be clear that the four stages outlined here can be understood as embedded in the seven life processes outlined in the first chapter with the Öschelbronn method. In this way the four stages could be seen as the first phase of a

process which eventually results in something in the world, be it a work of art, a technology or an ability to treat illness etc. They are to some extent the receptive part of the process and the fourth stage is actually the middle —where one turns the corner, as it were, into an active phase.

[124] Clifford Geertz *The Interpretation of Cultures* p.5. (New York, Basic Books Inc., 1973).

[125] Clifford Geertz *Ibid*. p.6.

[126] Gilbert Ryle 'The Thinking of Thoughts What is *Le Penseur* Doing? in *Collected Papers Vol.2.* (London: Hutchinson, 1971).

[127] Clifford Geertz *Op.Cit.* p.20.

[128] Clifford Geertz *Op.Cit.* p.23.

[129] Clifford Geertz *Op. Cit*. p22.

[130] For an example of the use of thick description in an historical study see Carlo Ginzburg's *The Cheese and the Worms: the cosmos of a sixteenth century miller* trans. Tedeschi, J. and A. (London: Routledge and Kegan Paul, 1980).

[131] Mary Douglas, pers. com., Lancaster University 1987.

[132] John Van Maanen *Tales From the Field* (Chicago: University of Chicago Press, 1988).

[133] Malinowski quoted in Van Maanen *Ibid.* p.38.

[134] See Michael Agar for a discussion on the ethnographer's use of sameness and difference as foci in studies of other cultures in *Speaking of Ethnography* p.20. (California: Sage Publications, 1986).

[135] Clifford Geertz *Op.Cit.* p.22.

[136] Colquhoun and Day 'Op.Cit.' p.3.

[137] Peter Stewart, pers. com., Pishwanton, 12.4.94.

[138] Warren Bouwer, pers. com., Pishwanton, 12.4.94.

[139] Warren Bouwer, pers. com., Pishwanton, 12.4.94.

[140] David Seamon and Christina Nordin explain the idea of place ballet thus

> The body as subject manifests extended behaviours reaching over time and space. These behaviours are of two types: *body ballets* and *time-space routines.* A body ballet is a set of integrated gestures and movements that sustain a particular task or aim, for example washing dishes ... A time-space routine, which may incorporate body ballets, is a set of habitual body behaviours that extend over a considerable length of time. Sizeable potions of a persons day —for example, getting up, travelling to work, cleaning the house— may be organized around such routines. In a supportive physical environment, many body ballets and time-space routines can merge to create *place ballet*, which is an interaction of many time-space routines and body ballets rooted ion space. The groundstone of place ballet is a regularity of human behaviours in time and space.

in 'Marketplace as Place Ballet: a Swedish example' in *Landscape,* 24, 3 (October 1980), p.36.

[141] Olive Whicher, who features below, has often stated a dislike for the term as she believed it to overemphasise Goethe's contribution to Rudolf Steiner's "spiritual science". She said:

> George Adams didn't want to call it the Goethean Science Foundation but Michael Wilson insisted it should be. But at the end of his life Michael agreed that it was wrong and we should have adopted Rudolf Steiner's term Spiritual Science or some new form. You see Goethe is in the past —a great figure but that is all history.

pers. com., Forest Row, 1.2.93.

[142] Alasdair MacIntyre *After Virtue 2nd ed.* p.222 (London: Duckworth, 1987).

[143] To identify what are the defining goods one could look to the telos of the tradition. As Goethean science is mainly embedded in anthroposophy it is to that philosophy that one could turn to find its telos —that aim to which it is directed. From the texts one could draw out aims such as 'hastening the

next planetary phase'. But I would have to admit that I have never met anyone who professed to such an aim. When asked why they engage in the practices of the tradition people respond with more personal reasons of individual growth. As the present epoch is sometimes defined in anthroposophy as that of 'winning the consciousness soul' the individualistic efforts for self development are not counter to its wider aim.

[144] Alasdair MacIntyre *Op.Cit.* p.188.

[145] Alasdair MacIntyre *Op.Cit.* p.222.

[146] Olive Whicher *George Adams: interpreter of Rudolf Steiner* p.33.

[147] Olive Whicher *Ibid*. p.30.

[148] Arthur Zajonc *Catching the Light* p.192.

[149] Agnus Arber

> The systematic botany of the period paid little attention to the plasticity of the leaf structures, and Goethe was unable at first to find any clue to the part which these transformations played in the general scheme of things.

From her introduction to 'Goethe's Botany' *Chronica Botanica Vol 10* (Chronica Botanica Company, U.S.A., 1946).

[150] from Peter Salm's *The Poem as Plant: a biological view of Goethe's Faust* p.26. (Ohio: Case Western Reserve University Press, 1971).

[151] Rudolf Steiner *Goethean Science* p.64. trans. William Lindeman (New York: Mercury Press, 1988).

[152] Gerbert Grohmann *The Plant Vol.1* p.37. trans. K. Castelliz & B. Sanders-Davies (Kimberton: Biodynamic Farming and Gardening association Inc., 1989).

[153] Ernst Lehrs says:

> A more intense impression of what these metamorphoses actually mean is achieved by altering our mode of contemplation.

from *Man and Matter* p. 81.

[154] Jochen Bockemühl *In Partnership With Nature* p.6. trans. John Meeks (Wyoming: Bio-Dynamic Literature, 1981).

[155] Jochen Bockemühl *Ibid.* p.31.

[156] see Bockemühl *Phenomenology of the Etheric World* p.11-15. for an example of Peony.

[157] Jochen Bockemühl *In Partnership With Nature* p.58.

[158] Goethe, J.W. *Scientific Studies* p.307.

[159] Rudolf Steiner *The Calendar of the Soul* preface, trans. W.&L. Mann (Stroud: Hawthorn Press, 1990).

[160] Jochen Bockemühl *Awakening to Landscape* p.131. (Dornach: Natural Science Section, 1992).

[161] This is an exercise used in form drawing classes in Steiner schools. Margaret Frolhlich says of this form: "...an exercise with a wonderfully harmonising effect, especially if one repeats the movement several times. Beginning with the innermost, smallest spiral one swings out to the outermost, largest one. In this polarity, the size and form has already been established by the first movement, and further development proceeds with any desired number of swings, beyond a balance of the forms to their reversed relationship." From Hans R. Niederhauser and Margaret Frolich *Form Drawing* p.8. (New York: Mercury Press, 1984).

[162] Sara Martin participant on the plant course 1992.

[163] Nicola Stubbs participant on the plant course 1991.

[164] Naomi Brandel in 'The School of Life Science Newsletter Jan. 93.'

[165] Rudolf Steiner *Occult Science* p.250. trans. G.&M Adams (London: Pharos Books, 1979). The term subsidiary is, I believe, to reassert his claim that any insight that it is possible to gain through such exercises or the texts that contain them is possible through the study of his first major work, a more conventionally philosophical book, *The Philosophy of Freedom*.

[166] As the page number in the following footnote suggests these exercises are freely available, but generally in the midst of a difficult texts. As well as contextualizing the material this would also presumably deter the superficial student. On the two occasions that I have been taught these exercises

the instruction has been preceded by the warning that it is unwise to embark on them unless one intends to continue the practice.

[167] Rudolf Steiner *Occult Science* p.246.

[168] Marianne de Nooj pers. com., Lancaster, June 91.

[169] Shepherd, A..P. *A Scientist of the Invisible* p.41. (London: Hodder and Stroughton, 1954).

[170] Rudolf Steiner *The Story of My Life* p.125.

[171] Karl Fink *Goethe's History of Science*

[172] See the idea of C.U.D.O.S. norms in 'The Normative Structure of Science' in Merton R.K. *The Sociology of Science* (Chicago: Chicago University Press, 1973).

[173] Goethe, J.W. *Scientific Studies* p.143.

[174] Goethe, J.W. from the poem 'In Honour of Howard'

> "He first has gained, first held with mental grasp.
> Defin'd the doubtful, fix'd its limit-line,
> *And named it fitly.* —Be the honour thine!

translated by George Soane and Sir John Bowring, quoted in Douglas Scott's *Luke Howard* p.26. (York: William Sessions Ltd., 1976).
See also Goethe's reference to the names as a "welcome terminology" quoted in Ernst Lerhs *Man or Matter* p.121.

[175] Compare with Goethe's eventual dissatisfaction with the Linnean taxonomy, see Ernst Cassirer, *Rousseau Kant Goethe: two essays* p.70. trans. J.Gutmann, P.O.Kristeller & J.H. Randall (Connecticut: Archon Books, 1961).

[176] Goethe J.W. *Scientific Studies* p.143.

[177] Douglas Scott *Op.Cit.* p.vii.

[178] Goethe J.W. *Scientific Studies* p.144.

[179] Vernon Pratt and Isis Brook 'Goethe's Archetype and The Romantic Self' (unpublished).

[180] Karl Fink *Op.Cit.* p.93.

[181] Goethe, J.W. in Eckermann *Conversations of Goethe* p.293.

[182] Goethe, J.W. *Scientific Studies* p. 39.

[183] Ernst Lehrs *Op. Cit.* p.474.

[184] Miller's translation has this statement as "Colours are the deeds of light, what it does and what it endures" *Scientific Studies* p.158.

[185] Arthur Zajonc Presentation at Oxford 8.5.94.

[186] Robert Chamberlain Plenary session, Oxford 9.5.93.

[187] Henri Bortoft Plenary session, Oxford 9.5.93.

[188] Teun Timmers Plenary session, Oxford 9.5.93.

[189] Henri Bortoft Plenary session, Oxford 9.5.93.

[190] Participant Plenary session, Oxford 8.5.93.

[191] Arthur Zajonc Plenary session, Oxford 9.5.93.

[192] Margaret Colquhoun Plenary session, Oxford 9.5.93.

[193] Robert Rose Plenary session, Oxford 9.5.93.

[194] A key passage is as follows:

> Man is only free to the extent that he is able, at any moment of his life, to be his own guide; a moral deed is *my* deed if it can be called free in this sense. Here we are first of all dealing with the prerequisites under which a willed action is felt as free; how this purely ethical idea of freedom realizes itself in human nature will be seen in what follows.
>
> Acting out of freedom includes rather than excludes moral laws, but proves to be on a higher level than those dictated by such laws. Why should my action be of less service to the public good if performed out of love, rather than because I felt it my duty to serve the general good? The concept of duty excludes *freedom;* it does not recognize what is individual but insists that it must conform to

> accepted standards. Ethical individualism is the only standpoint from which freedom is conceivable.

from Steiner's *Philosophy of Freedom* p.110 trans. Rita Stebbing (London: Rudolf Steiner Press, 1988).

[195] Robert Rose Conference discussion, Oxford, 9.5.93.

[196] Olive Whicher Conference discussion, Oxford, 9.5.93.

[197] Arthur Zajonc Conference presentation , Oxford 8.5.93.

[198] Common Ground leaflet 'Local Distinctiveness' (Green Print, 1990).

[199] Sue Clifford Seminar at Lancaster University 8.6.93.

[200] Common Ground leaflet 'Local Distinctiveness' (Green Print, 1990).

[201] Sue Clifford and Angela King *Holding Your Ground* p.183. (London: Maurice Temple Smith, 1985).

[202] Sue Clifford Seminar at Lancaster University 8.6.93.

[203] Sue Clifford Seminar at Lancaster University 8.6.93.

[204] Dennis Wood *The Power of Maps* p.153. (London: Routledge, 1993).

[205] Lautensack quoted in Eliot James *City in Maps* p.29. (London: The British Library, 1987).

[206] James Eliot *City in Maps* p.59 (London, The British Library 1987.)

[207] Lister, R. *Antique Maps and Their Cartographers* (London: G.Bell & Sons, 1970).

[208] Dennis Wood *Op.Cit.* p.72.

[209] Standard modern maps are, of course, also a particular human perspective in that they reflect the cultural value of exact measurement which wants to extract the easily quantifiable from the full encounter with place. This is done for specific cultural and therefore human ends.

[210] Her techniques and approach to questions and to organisms show traces of the naturalist tradition which she incorporated into an otherwise thoroughly experimental approach. See Fox Keller *A Feeling for the Organism* p.101. (New York: Freeman and Company, 1983).

[211] Evelyn Fox Keller *Ibid.* p.198.

[212] Barbara McClintock quoted in *Ibid.* p.103.

[213] Barbara McClintock quoted in *Ibid.* p.117.

[214] Fox Keller *Ibid.* p.178.

[215] Barbara McClintock, quoted in *Ibid.* p.202.

[216] Barbara McClintock, quoted in *Ibid.* p.204.

[217] *Ibid* p.115.

[218] *Ibid* p.115.

[219] *Ibid*. p.179.

[220] Exceptions to this absence of a link to Goethe would be the geographer David Seamon and the historian Eric Dardel.

Seamon has written on Goethe's approach to phenomena. See Seamon, 'Goethe's Approach to the Natural World: Implications for environmental theory and education' in D. Ley & M. Samuals eds. *Humanistic Geography: Prospects and Problems* pp. 238-250 (Chicago: Maaroufa Press, 1978). He also used the similarity between Goethe's method and George Trevelyan's concept of the "active eye" in architecture to explain the following:

> Trevelyan's second proposition involves the effort to activate the eye-beam sequentially, in a way similar to the method that Goethe used to study changes in plant growth so as to demonstrate that all vegetative forms are in the process of becoming, either transforming themselves or fading away. ...the student must discover how to look at the images the eye makes and observe how they transform from one another when the student makes an active effort to superimpose one image on the next.

from a review of Trevelyan's *The Active Eye in Architecture* in *Impressions* Vol 13. 1988.

Eric Dardel refers to Goethe in his explanation of "telluric" space using Goethe's experience of granite—"I rest directly on a foundation which reaches into the deepest regions of the earth. In this moment the inner forces of the earth act directly on me"—to explain the "depth, solidity and durability" of telluric space. In *L'Homme et la Terre: Nature de la Réalité Géographique* (Paris:

Presses Universitaires de France, 1952). Translated and quoted in Edward Relph 'Geographical Experiences' Seamon and Mugerauer eds. *Dwelling, Place and Environment: towards a phenomenology of person and world* p.25. (Dordrecht: Martinus Nijhoff Publishers, 1985). Dardel's work precedes Heidegger's and so the picture of two separate streams with the geographers all using Heidegger is probably an oversimplification.

[221] For personal reasons I chose not to study Heidegger in depth and have compared Goethean science to Husserlian phenomenology, see chapter seven. As well as avoiding the problem of Heidegger's membership of the Nazi party this also emphasises the foundational nature of the two approaches: the sense in which both Husserl and Goethe are beginning streams of 'beginning again', of attempting to look at the world afresh.

[222] Francis Violich 'Towards revealing the sense of place: An intuitive reading of four Dalmatian towns' in Seamon and Mugerauer *Op. Cit.* p.126.

[223] David Seamon *A Geography of the Life-world* p.21 (New York: St Martin's, 1979).

[224] Botond Bognar 'Phenomenology in the Design Studio' in Seamon & Mugerauer *Op.Cit.* p.194.

[225] Henri Bortoft 'Counterfeit and Authentic Wholes: Finding a means for dwelling in nature' in *Dwelling Place and Environment: towards a phenomenology of person and world* p.295. eds. David Seamon and Robert Mugerauer

[226] Henri Bortoft *Goethe's Scientific Consciousness* p.24. (Tunbridge Wells: The Institute for Cultural Research, 1986).

[227] Frederick Amrine 'Readings in the Text of Nature: Three Contemporary Goetheans' in *Beyond the Two Cultures, Essays on Science Technology and Literature* p. 51. ed. Joseph W. Slade and Judith Yaross Lee (Iowa: Iowa State University Press, 1990).

[228] See Foucault's idea of 'epistemes' in *The Order of Things* (London: Routledge, 1991). First published as *Les Mots et les Choses* (Gallimard, 1966).

[229] Goethe, J.W. *Theory of Colours* in *Scientific Studies* p.168.

[230] Goethe, J.W. from *Goethe's Naturwissenschaftliche Schriften* Vol 4. part 2. quoted in 'Goethe's Phenomenological Method' by Fritz Heinemann in *Philosophy* Vol.9. 1934. p.68.

[231] I am indebted to Dr Jane Howarth for drawing my attention to this distinction. pers. com., Lancaster, Feb. 94.

[232] Herbert Spiegelberg *The Phenomenological Movement Vol.1* p.133. (The Hague: Martinus Nijhoff, 1978).

[233] Herbert Spiegelberg *The Phenomenological Movement Vol. 2.* p.659. (The Hague: Martinus Nijhoff, 1978).

[234] c.f. Quinten Lauer in *The Triumph of Subjectivity* 2nd ed. (New York: Fordham University Press, 1978).

[235] Herbert Spiegelberg *The Phenomenological Movement Vol. 2.* p. 672.

[236] *Ibid* p.659.

[237] Goethe, J.W. 'Empirical Observation and Science' in *Scientific Studies* p.24.

[238] Edmund Husserl quoted by David Bell in *Husserl* p.93. (London: Routledge, 1991). See also from Husserl "Object and predictable subject are equivalents. All logic would come to an end if the concept "object" would not be conceived in as broad a sense as this equivalence demands —i.e., if one did not also allow "ideas" to count as objects" from *Introduction to the Logical Investigations* trans. Philip Bossert and Curtis Peters p.26. (The Hague: Martinus Nijhoff, 1975).

[239] Quentin Lauer *The Triumph of Subjectivity* p.90.

[240] Herbert Spiegelberg *The Phenomenological Movement Vol. 2.* p.690.

[241] *Ibid.* p.692.

[242] See Quinten Lauer in *The Triumph of Subjectivity* ch. 3 where the reductions are outlined as "the psychological reduction", "the eidetic reduction", "the phenomenological reduction or transcendental reduction" and so on.

[243] Herbert Spiegelberg *The Phenomenological Movement Vol.2.* p.695.

[244] Husserl, E. *Cartisian Meditations* p.70. trans. Dorian Cairns (The Hague: Martinus Nijhoff Publishers, 1982).

[245] Edmund Husserl '"Phenomenology" Edmund Husserl's article for the Encyclopaedia Britannica (1927): new complete translation by Richard E. Palmer' (Manchester: Haigh and Hochland Ltd 1971).

[246] Edmund Husserl *The Crisis in European Sciences* Appendix IX p. 392. (Evanston: Noerthwestern University Press, 1970).
[247] Edmund Husserl *Introduction to the Logical Investigations* trans. Philip Bossert and Curtis Peters p.25. (The Hague: Martinus Nijhoff, 1975).
[248] Edmund Husserl quoted in David Bell's *Husserl* p.197. (London: Routledge, 1991).
[249] Goethe, J.W. quoted by Fritz Heinemann's 'Goethe's Phenomenological Method' in *Philosophy Vol.9.* 1934 p.72.
[250] Curtis H. Peters 'Thematic Introduction' in Husserl's *Introduction to the Logical Investigations* p.xxvi (The Hague: Martinus Nijhoff, 1975).
[251] Emmanuel Kant quoted by P.F. Strawson in *The Bounds of Sense: an essay on Kant's critique of pure reason* (London: Methuen and Co Ltd, 1968).
[252] Goethe J.W. 'Polarity' in *Scientific Studies* p.155.
[253] Emmanuel Kant *The Critique of Judgement* p.64. trans. James Creed Meredith (Oxford: Oxford University Press, 1978).
[254] Herbert Spiegelberg *The Phenomenological Movement Vol.1.* p.118.
[255] Quinten Lauer *The Triumph of Subjectivity* p.xxi.
[256] Edmund Husserl 'Phenomenology' *Op.Cit.* p.89. square brackets added by Palmer.
[257] Edmund Husserl 'Phenomenology' *Op.Cit.* p.80.
[258] See David Bell *Husserl* p.231.
[259] Goethe, J.W. 'Maxims and Reflections' in *Scientific Studies* p.310.
[260] Axel Ewald, Paraphrase of his statement to Public Enquiry Gifford 26. 10. 93.
[261] Edmund Husserl '"Phenomenology" *Op.Cit.* p.81.
[262] Wolfgang Schad 'Scientific Thinking as an Approach to the Etheric' trans. Frederick Amrine in *Toward A Phenomenology of the Etheric World* p.179. ed. Jochen Bockemühl .
[263] Margaret Colquhoun pers. com., Garvald, 21.04.93.
[264] This, of course, assumes that the four fold distinction of mineral, vegetable, animal and human is itself 'read from nature' and is not an unfounded presupposition.
[265] Wolfgang Schad 'Scientific Thinking as an Approach to the Etheric' trans. Frederick Amrine in *Toward A Phenomenology of the Etheric World* p. 164. ed. J. Bockemühl.
[266] *Ibid* p.166.
[267] *Ibid* p.176.
[268] *Ibid* p.178.
[269] Rudolf Steiner *The Story of My Life* p.38.
[270] For Steiner the key strength of Goethe's work was his seperation of the organic from the inorganic with the assertion that they must be treated differently. Whereas Husserl's first anti-reductionistic pronouncement is in the seperation of logic from psychology.
[271] Goethe J.W. 'Maxims and Reflections' in *Scientific Studies* p.309.
[272] Rudolf Steiner *Goethean Science* p.241.
[273] Ernst Lehrs *Man or Matter* p.36.
[274] Stephen Endelglass et.al. *Matter and Mind: imaginative participation in science* p.20. (Edinburgh: Floris Books, 1992).
[275] Goethe J.W. 'Maxims and Reflections' in *Scientific Studies* p.311.
[276] An exception to this would be Schwenk's article 'How Can the Earth Be Kept a Realm of Life' *Journal for Anthroposophy* No. 40/41. Spring/Summer 1985. pp.3-22.
[277] Edmund Husserl *The Crisis in European Sciences* p.6.
[278] Gilbert Ryle 'Phenomenology' in *Proceedings of the Aristotelian Society* vol.xi 1932. pp. 167-197.

Bibliography

Adams, G. 'A Letter From George Adams' (published as study material) (London: Rudolf Steiner Press, 1978).

Adams, G. & Whicher O. *The Plant Between Sun and Earth* (Boulder: Shambala 1982).

Agar, M.H. *Speaking of Ethnography* (California: Sage Publications 1986).

Ahern, G. *The Sun at Midnight: Rudolf Steiner Movement and the Western Esoteric Tradition* (London: Aquarian Press 1984).

Amrine, F. 'Three Goethean Scientists' in *Beyond the Two Cultures: essays on science, technology and literature* eds. Slade, J.W. and Yaross Lee, J. (Iowa: State University Press, 1990).

Amrine, F. et.al. *Goethe and the Sciences: a reappraisal* (Dordrecht: D.Reidel Publishing Co. 1987).

Appel, T.A. *The Cuvier- Geoffroy Debate* (Oxford: Oxford University Press 1987).

Arber, A. 'Introduction to *Goethe's Botany' Chronica Botanica* Vol. 10. (U.S.A.: Chronica Botanica Company, 1946).

Atkinson, P. & Hammersley, M. *Ethnography: principles in practice* (London: Tavistock Publishing Co. 1983).

Bacon, F. *The New Organum and related writings* ed. Anderson, F.H. (New York: Liberal Arts Press, 1960).

Baravalle, H. von. *Introduction to Physics in the Waldorf Schools* (Englewood N.J: Waldorf School Monographs, 1967).

Barfield, O. *Saving the Appearances: a study in idolatry* (London: Faber and Faber, 1975).

Barfield, O. *The Rediscovery of Meaning and Other Essays* (Connecticut:Wesleyan University Press, 1977).

Barnes, B. 'The Comparison of Belief-systems: Anomaly Versus Falsehood' in *Modes of Thought* eds. Horton, R. & Finnagen, R. (London: Faber and Faber, 1973).

Bell, D. *Husserl* (London: Routledge, 1991).

Bockemühl, J. 'Morphic Movements in the Vegetative Leaves of Higher Plants' trans. N. Skillen (unpublished).

Bockemühl, J. 'The Morphic Movements of Plants as Expressions of the Temporal Body' trans. N. Skillen (unpublished).

Bockemühl, J. *In Partnership With Nature* trans. John Meeks (Wyoming: Bio-Dynamic Literature, 1981).

Bockemühl, J. et.al. *Towards a Phenomenology of the Etheric World* (NewYork: Anthroposophic Press Inc. 1985).

Bockemühl, J. *Awakening to Landscape* Dornach: Allgemeine Anthroposophiche Gesellschaft, 1992).

Bortoft, H. *Goethe's Scientific Consciousness* (Tunbridge Wells: Institute for Cultural Research, 1986).

Burwick, F. *The Damnation of Newton: Goethe's colour perception and romantic perception* (New York: Walter de Grayter, 1986).

Butterfield, H. *The Origins of Modern Science* (London: Bell and Hyman 1982).

Callaway, H. & Oakley, J. *Anthropology and Autobiography* (London: Routledge, Keagan Paul, 1992).

Cassirer, E. *Rousseau, Kant, Goethe: Two essays* trans. Gutmann, J., Kristeller, P.O. & Randall, J.H. (Connecticut: Archon Books, 1961).

Chalmers, A. *What is This Thing Called Science* 2nd Ed. (Milton Keynes: Open University Press, 1983).

Clifford, S. and King, A. *Holding Your Ground* (Houndslow: Maurice Temple Smith, 1985).

Clough, P. T. *The End(s) of Ethnography: from realism to social criticism* (London: Sage, 1992).

Collot D'Herbois, L. *Colour* (Driebergen: Stichting Magenta, 1985).

Colquhoun M. and Day, C. 'Study and Development of Place' (unpublished).

Cunningham, A. and Jardine, N. *Romanticism and the Sciences* (Cambridge: Cambridge University Press, 1990).

Dean, J. 'Controversy Over Classification: a case study from the history of botany' in *Natural Order* eds. Barnes, B. and Shapin, S. (California: Sage Publications Inc. 1979).

Dolby, R.G.A. 'Reflections on Deviant Science' in *On the Margins of Science* ed.Wallis, R. (Keele: Keele University Press, 1979).

Eckermann *Conversations With Goethe* trans. Oxenford, J. (London: J.M.Dent and Sons, 1930).

Edwards, L. 'Variations in the Forms of Plant Buds' in *Science Forum* 7. Autumn 1987. pp.4-11.

Edwards, L. *The Vortex of Life* (Edinburgh: Floris Books, 1993).

Edwards, L. *Projective Geometry* (Pennsylvania: Rudolf Steiner Institute, 1985).

Eliot, J. *City in Maps* (London: The British Library, 1987).

Endelglass, S. et.al. *Matter and Mind: Imaginative Participation in Science* (Edinburgh: Floris Books, 1992).

Farber, M. *The Aims of Phenomenology* (New York: Harper and Row, 1966).

Fetterman, D.M. *Ethnography Step by Step* (California: Sage Publications Inc., 1989).

Feyerabend, P. *Science in a Free Society* (London: NLB, 1978).

Feyerabend, P. *Against Method* (London: Verso, 1987).

Fink, K. *Goethe's History of Science* (Cambridge: Cambridge University Press, 1991).

Foucault, M. *The Order of Things* (London: Routledge, 1991).

Fox-Keller, E. *A Feeling for the Organism* (New York: Freeman and Co., 1983).

Fyfe, A. 'Anthroposophical Science with special reference to Capillary Dynamolysis' in *Science Forum* 6. Spring 1986. pp.16-20.

Geertz, C. *The Interpretation of Cultures* (New York: Basic Books Inc., 1973).

Ginzberg, C. *The Cheese and The Worms: the cosmos of a sixteenth century miller* trans. Tedeschi, J. and A. (London: Routledge and Kegan Paul, 1980).

Goethe, J.W. *Scientific Studies* ed. and trans. Miller, D. (New York: Suhrkamp Publishers, 1988).

Goethe, J.W. *The Autobiography of Goethe: Truth and Poetry* Vol 1. trans. Oxenford, J. (London: George Bell and Sons, 1891).

Goethe, J. W. *The Autobiography of Goethe: Truth and Poetry* Vol 2. with the Annals or Day and Year Papers trans. Nisbet, C. (London: George Bell and Sons, 1894).

Goethe, J.W. *Elective Affinities* trans. Hollingdale, R.J. (London: Penguin Books, 1987).

Goethe, J.W. *Fairy Tale of the Green Snake and the Beautiful Lily* trans. Carlyle, T. (New York: Garber Communications, 1991).

Goethe, J.W. *Italian Journey* trans. W.H.Auden and E.Mayer (London: Collins, 1962).

Goethe J.W. *Goethe's Faust* trans. Walter Kaufmann (New York: Doubleday and Company, 1961).

Goethe J.W. *Correspondence Between Schiller and Goethe from 1794-1805* vol 2. trans. Schmitz, L.D. (London: George Bell and Sons, 1879).

Gombrich, E.H. *Art and Illusion* (London: Phaidon Press, 1962).

Gregory, R.L. *Eye and Brain: the psychology of seeing* (London: Weidenfeld and Nicolson, 1979).

Grohmann, G. *The Plant* Vol.1. (Kimberton: Bio-dynamic Farming and Gardening Association Inc., 1989).

Grohmann, G. *The Plant* Vol. 2. (Kimberton: Bio-dynamic Farming and Gardening Association Inc., 1989).

Hammond, M et.al. *Understanding Phenomenology* (Oxford: Blackwell Publishers, 1992).

Heinemann, F. 'Goethe's Phenomenological Method' *Philosophy* Vol.9. 1934. pp. 67-81.

Heisenberg, W. *Philosophical Problems of Nuclear Science* (London: Faber, 1952).

Helmholtz, H. von *The Selected Writings of Herman von Helmholtz* ed. Kahl, R. (Connecticut: Wesleyan University Press, 1971).

Holbrook, D. *Further Studies in Philosophical Anthropology* (Aldershot: Gower Publishing Co., 1988).

Howard, L. *Essay on the Modification of Clouds* (New York: St. George Publications, 1987).

Howard, L. *Luke Howard* (*1772-1864) His Correspondence with Goethe and His Continental Journey of 1816*. ed. Douglas Scott (York: William Sessions Ltd, 1976).

Husserl, E. *Introduction to the Logical Investigations* trans. Bossert, P. and Peters, C. (The Hague: Martinus Nijhoff, 1975).

Husserl, E. ''Phenomenology' Edmund Husserl's article for the Encyclopaedia Britannica 1927: a new complete translation by Palmer, R.E.' in *British Society for Phenomenology Journal* 2. 1971. pp.77-90.

Husserl, E. *Cartesian Meditations* trans. Cairns, D. (The Hague: Martinus Nijhoff, 1982).

Husserl, E. *The Idea of Phenomenology* trans. Alston, W.P. and Nakhnikian, G. (The Hague: Martinus Nijhoff, 1964).

Husserl, E. *The Crisis of European Sciences and Transcendental Phenomenology* trans. Carr, D. (Evanston: Northwestern University Press, 1970).

Ihde, D. *Instrumental Realism* (Indianapolis: Indiana University Press, 1991).

Ihde, D. et.al. eds. *Dialogues in Phenomenology* (The Hague: Matinus Nijhoff, 1975).

Jardine, N. *The Scenes of Inquiry* (Oxford: Clarendon Press, 1991).

Julius, F.H. *The World of Matter and the Education of Man* (Forest Row: Steiner Schools Fellowship Publications, 1987).

Kilner, P. 'Form Out of Flowing Movements 1: Practical experiments' *Science Forum* 5. Spring 1985. pp.28-31.

König, K. *Seals, Dolphins, Penguins and Eels* (Edinburgh: Floris Books, 1984).

Kühlewind, G.*States of Consciousness: meditations on the boundaries of the soul* (Great Barrington: Lindisfarne Press, 1984).

Kuhn, T. S. *The Structure of Scientific Revolutions* (Second edition, enlarged) (London: University of Chicago Press, 1970).

Laudan, L. *Science and Relativism: some key controversies in the philosophy of science* (Chicago: University of Chicago Press, 1990).

Lauer Q.S.J. *The Triumph of Subjectivity* (New York: Fordham University Press, 1978).

Lehrs, E. *Man or Matter* (London: Rudolf Steiner Press, 1985).

Lister, R. *Antique Maps and their Cartographers* (London: G. Bell and Sons, 1970).

MacIntyre, A. *After Virtue: a study in moral theory* (London: Duckworth, 1985).

Magnus, R. *Goethe as a Scientist* trans. Norden, H. (New York: Collier Books, 1961).

Mason, S.F. *A History of Science* (New York, Collier Books, 1979).

Merton, R. 'The Normative Structure of Science' in *The Sociology of Science* (Chicago: University of Chicago Press, 1973).

Nisbet, H.B. *Goethe and the Scientific Tradition* (London: Institute of Germanic Studies, 1972).

Paracelsus *Paracelsus: essential readings* trans. and ed. Goodrick-Clarke, N. (California: Borgo Press, 1990).

Peterfreund, S. 'Blake and Anti-Newtonian Thought' *Beyond the Two Cultures: essays on science, technology and literature* eds. Slade, J.W. and Yaross Lee, J. (Iowa: State University Press, 1990).

Pettit, P. *On The Idea of Phenomenology* (Dublin: Scepter Publishers, 1969).

Polanyi, M. *The Tacit Dimension* (London: Routledge Keagan Paul, 1967).

Polanyi, M. *A Study of Man* (London: Routledge Keagan Paul, 1958).

Prigogine, I. and Stengers, I. *Order Out of Chaos* (London: Heinemann, 1984).

Rackham, O. *The History of the Countryside* (London: Dent, 1993).

Reason, P. and Rowan, J. *Human Inquiry* (London: John Wiley and Sons Ltd., 1981).

Relph, E. *Place and Placelesness* (London: Pion, 1976).

Riegner, M. 'Toward a Holistic Understanding of Place: reading a landscape through its flora and fauna' in *Dwelling, Seeing and Designing: toward a phenomenological ecology* ed. Seamon, D. (New York: Suny Press, 1993).

Ryle, G. 'The Thinking of Thoughts What is *Le Penseur* Doing? *Collected Papers* Vol. 2. (London: Hutchinson, 1971).

Ryle, G. 'Phenomenology' *Proceedings of the Aristotelian Society* Vol. XI. 1932. pp.167-197.

Salm, P. *The Poem as Plant: a biological view of Goethe's Faust* (Ohio: Case Western Reserve University Press, 1971).

Schad, W. *Man and Mammals: toward a biology of form* (New York: Waldorf Press, 1977).

Schwenk, T. *Sensitive Chaos* trans. Whicher, O. & Wrigley, J. (London: Rudolf Steiner Press, 1990).

Seamon, D. 'Emotional Experience of the Environment' *American Behavioural Scientist* Vol. 27, (6.) 1984. pp. 757-770.

Seamon, D. 'Towards a Phenomenology of Environmental Meaning: the example of flowforms' *The National Geographical Journal of India* Vol. 34, (1.) 1988. pp. 66-74.

Seamon, D. 'Phenomenology and Environment-Behaviour Research' in *Advances in Environment, Behaviour and Design* Vol.1. eds. Zube, E.H. and Moore, G.T. (New York: Plenum, 1987). pp.3-27.

Seamon, D. 'Phenomenology and the Environmental Experience Groups' in Seamon, D. *A Geography of the Lifeworld* (London: Croom Helm, 1979).

Seamon, D. 'Goethe's Approach to the Natural World: implications for environmental theory and education' in *Humanistic Geography: prospects and problems* eds. Ley, D. and Samuals, M. (Chicago: Maaroufa Press, 1978).

Seamon, D. 'Review of Trevelyan's *The Active Eye in Architecture' Impressions* Vol. 13. 1988.

Seamon, D. and Nordin, C. 'Marketplace as Place Ballet' in *Landscape* 24. (3) 1980. pp. 35-41.

Seamon, D. and Mugerauer, R. eds. *Dwelling Place and Environment* (Dordrecht: Martinus Nijhoff Publishers, 1985).

Sendon, M. von *Space and Sight* trans. Heath, P. (London: Methuen and Co., 1960).

Sepper, D. *Goethe Contra Newton* (Cambridge: Cambridge University Press, 1988).

Shepherd, A.P. *Scientist of the Invisible: an introduction to the life and work of Rudolf Steiner* (London: Hodder and Stroughton, 1954).

Skillen, N. 'Rational Organicism: introduction to translations of Bockemühl and Suchantke' (unpublished).

Smook, R. 'Rudolf Steiner on the Presuppositions of Goethean Science' *Idealistic Studies* Vol. 22. (1.) pp. 68-81.

Spiegelberg, H. *The Phenomenological Movement* Vol. 1. (The Hague: Martinus Nijhoff, 1978).

Spiegelberg, H. *The Phenomenological Movement* Vol. 2. (The Hague: Martinus Nijhoff, 1978).

Steiner, R. *The Study of Man* trans. Harwood, D. and Fox, H. revised and ed. Harwood, A.C. (London: Rudolf Steiner Press, 1990).

Steiner, R. *Theosophy* trans. not given (London: Rudolf Steiner Press, 1989).

Steiner, R. *The Story of My Life* trans. not given, ed. Collison, H. (London: Anthroposophical Publishing Co., 1928).

Steiner, R. *Goethean Science* trans. Lindeman, W. (New York: Mercury Press, 1988).

Steiner, R. *A Theory of Knowledge Implicit in Goethe's World Conception* trans. Wannamaker, O.D. (New York: The Anthroposophic Press, 1978).

Steiner, R. *The Riddle of Humanity* trans. Logan, J.F. (London: Rudolf Steiner Press, 1990).

Steiner, R. *Occult Science* trans. Adams, G. and M. (London: Rudolf Steiner Press, 1979).

Steiner, R. *Knowledge of Higher Worlds: How is it achieved?* trans. Osmond, D.S. and Davy, C. (London: Rudolf Steiner Press, 1989).

Steiner, R. *The Philosophy of Freedom* trans. Stebbing, R. (London: Rudolf Steiner Press, 1988).

Steiner, R. *The Calendar of the Soul* trans. Mann, W. and L. (Gloucester: Wynstones Press, 1990).

Steiner, R. *A Modern Art of Education* (London: Rudolf Steiner Press, 1972).

Steiner, R. *Goethe's Worldview* trans. Lindeman, W. (New York: Mercury Press, 1985).

Suchantke, A. 'The Leaf — The True Proteus' trans. N. Skillen (unpublished).

Suchantke, A. 'The Metamorphosis of Plants as an Expression of Juvenilisation in the Process of Evolution' trans. N. Skillen (unpublished).

Tambiah, S.J. *Magic, Science, Religion and the Scope of Rationality* (Cambridge: Cambridge University Press, 1990).

Tauber, A.I. 'Goethe's Philosophy of Science: modern resonances' *Perspectives in Biology and Medicine* Vol. 36. part 2. 1993. pp.244-257.

Thomas, N. and Wilkes, J. 'Flow Design Research Group, Emerson College' *Science Forum* 5. Spring 1985. pp.12-14.

Van Maanen, J. *Tales of the Field* (Chicago: University of Chicago Press, 1988).

Wells, G.A. 'Goethe's Scientific Method and Aims in the Light of His Studies in Physical Optics' *The English Goethe Society publications* Vol. 37. 1966-67. pp. 69-113.

Whicher, O. *Projective Geometry* (London: Rudolf Steiner Press, 1981).

Whicher, O. *George Adams: Interpreter of Rudolf Steiner* (East Grinstead: Henry Goulden, 1977).

Whitehead, A.N. *Science and the Modern World* (London: Penguin, 1978).

Whitehead, A.N. *Interpretation of Science* (Indianapolis: The Bobbs-Merrill Co., 1961).

Wilkes, J. 'Flowforms: An innovative approach to the rhythmic properties and use of water' *Planned Innovation* Vol.3. 1980. pp.99-103.

Willoughby, L.A. & Wilkinson, E. *Goethe: Poet and Thinker* (London: Edward Arnold Publishers, 1970).

Woods, D. *The Power of Maps* (London: Routledge, 1993).

Zajonc, A. *Catching the Light* (London: Batam Books, 1993).