

Science Group of the Anthroposophical Society in Great Britain

Newsletter - March 2002

Contents

News.....	1
Interview.....	4
Meetings.....	6
Courses.....	7
Correspondence.....	7
Publications.....	7
Membership, Finances, Next Issue.....	8

News

Hedley Gange †

Shortly before going to press, news reached the editor that Hedley Gange died on 27th January 2002. Hedley edited the Science Group's journal *Science Forum* from 1979, when the Group was formed, until 1989. He contributed articles to the journal on a number of themes to do with holistic science and also to its sister journal *Elemente der Naturwissenschaft*, the 'current contents' of which we run in this newsletter.

The group has also just received a number of donations amounting to £240 in memory of Hedley and the committee has decided to put this to work immediately to assist the initiative of Ron Jarman and others in transferring the techniques used in Lawrence Edwards' work on plant buds to other researchers (please see next item).

Research into Living Forms

Following the appeal for funding and for individuals interested in learning the techniques, which was printed in last summer's issue of *New View* and aims to continue the valuable work achieved by Lawrence Edwards – described in his book *The Vortex of Life* – we are now ready to launch this project.

The Launch will take place in Scotland not far from Lawrence's home in a meeting lasting from 3 to 4 days in late September / early October, at which will be present the six or so students wishing to learn how to carry out the research together with the four people having knowledge of the whole subject and the techniques required. We also hope to have Lawrence himself present part of the time. The dates – yet to be finally confirmed – will be the evening of Friday September 27th through to the morning of Tuesday October 1st; if not it is likely to be one week later.

The programme for each day will include presentations of the work each morning followed by geometrical drawing, then practical work with leaf and flower buds in the afternoons, including photography and computer technique, with evenings open for further presentations, questions and discussion, etc.

On the financial side we have received about £2000 with promises of smaller regular donations thereafter. There is therefore enough to cover the cost of the Launch including accommodation of the participants, their travelling expenses and meals. The original hope that donations might enable us to pay the salaries of a couple of people to undertake the research has not been fulfilled, but this remains our future aim when greater funding becomes possible through the generosity of future donors. Hitherto all this research carried out by Lawrence and a handful of others has been purely voluntary, of course, the only help – through the Margaret Wilkinson

Research Fund – being some money to purchase necessary equipment. This situation will clearly have to continue for the time being.

The great need for the future must be to have people living in many different latitudes and longitudes carrying out regular measurements of plant buds and relating them to planetary movements, so that this science is applicable to everywhere on earth and not just in one local area. At present outside Scotland there is very little – some in the U.S.A. and Australia. Nor is this research confined to plant buds. There is the need to develop the research into the human heart described in *The Vortex of Life*, also into embryo forms and water vortices among other realms where path curve forms are clearly at work.

It will be the task of the Launch to determine the future course of the research work, future meetings, possible new funding, publicity and so on and a further report will be made in the autumn.

The experienced people present at the Launch and guiding it will be Graham Calderwood, Nick Thomas, Stuart Brown and myself.

Ron Jarman, on behalf of the Science Group of the School for the Science of the Spirit, whose meeting took place on Saturday 23rd February 2002. Ron Jarman can be contacted at: The Hollies, Butterrow West, Stroud, Glos GL5 3UE. Tel: 01453 730477.

Plants Inherit Traits from More than Gene Sequence Alone – from a Washington University in St. Louis press release 11 February 2002.

Two plants, same species, same environment, same genetic sequence, yet one is a normal, healthy specimen of weedy mustard relative, *Arabidopsis thaliana*, and the other is a tiny dwarf plant, shrivelled, a mere shadow of its genetically identical neighbour. With so many similarities in the environment and genetic make-up of these two plants, how can their many differences be explained?

Trevor Stokes, a graduate student at Washington University in St. Louis, and his mentor, Eric Richards, Ph.D., Washington University associate professor of biology in Arts & Sciences, aimed to understand what was wrong with the dwarf plant. They found that a dwarfed plant, called *bal* because of its shape, constantly perceives a pathogen attack even though it has the exact same DNA sequence of a non-paranoid plant. The researchers found that the differences between the two plants are not due to genes; rather, the differences are due to factors outside of genes. Moreover, such factors, like genes, can be inherited. Stokes and Richards published their findings in the January 15, 2002 issue of *Genes and Development*, with co-author Barbara Kunkel, assistant professor of biology in Arts & Sciences, who studies plant-pathogen interactions. The Richards lab specialises in epigenetics, a biological field that deals with information stored "above and beyond the gene," referring to the Greek meaning of the term. They found that the *bal* dwarf is caused by increasing activation of a single gene, which is otherwise identical in its basic chemical sequence compared to the gene in normal looking plants.

"So you've got something that looks like a mutation and behaves like a mutation, but it's actually caused by the packaging of the DNA and not by the DNA sequence itself," Richards said.

The gene affected in the bal variant is involved in disease resistance and is called an R-gene. The research shows that there is a cost of resistance in plants. In the bal plant, the R-gene is more active, and consequently the plant's defence system becomes hyperactivated, constantly fighting off disease even when no pathogens are present to pose a threat. The resulting dwarfed plant is more resistant to bacterial infection.

So why should a plant so well prepared against infection appear so sickly? Stokes and Richards explain that the bal dwarf provides evidence that there is a cost to resistance in these plants. "They [bal] don't set a lot of seed, they're dwarfed, their leaves are obviously really damaged by this constitutive activation, so there's definitely a cost to being so resistant," Stokes said. The precise molecular change leading to the increased R-gene activation is not clear, but the group suspects changes in DNA methylation.

DNA methylation is a chemical modification of cytosine, one of the four chemical subunits of DNA. Without proper DNA methylation, higher organisms from plants to humans have a host of developmental problems, from dwarfing in plants to certain death in mice. But methylation is just one type of DNA modification studied in epigenetics. There are several others.

The next level of gene regulation studied in epigenetics is DNA packaging. DNA is wrapped around proteins similar to the way that thread is wrapped around a spool. Loosely wrapped DNA is more readily accessible and therefore more easily expressed than tightly wrapped DNA, allowing another mechanism for regulation of gene expression. The location of DNA within the nucleus also influences gene expression.

Stokes makes the comparison to a landscape.

"There are some parts of the nucleus that are like deserts where not much is happening. And others are like lush forests where a lot of activity happens," he said. Genes in a desert region will have a much lower rate of gene activation than those found in the lush forests.

Epigenetic changes, like traditional genetic changes, can be inherited. The phenotype of an organism, that is, the sum of all its physical characteristics, depends on much more than just its DNA sequence. "Genes do not just come in one type, genes can be modified, they can be packaged, they can be pushed and pulled around and that alters how they are interpreted and how they are used," Stokes explained. The finding that these levels of epigenetic regulation can be inherited has added to a growing interest in this field, once considered only a side note to the realm of traditional genetics.

"People have known about this sort of thing [epigenetics] for a long time, but it was relegated to the bin of weird genetics," Richards said. "Some people liked to study it as an oddity. But now it's becoming more appreciated." Today, research in epigenetics is providing insight into a broad range of study areas. Molecular biologists working to introduce foreign genes into organisms, such as the introduction of resistance genes into crops, often face the problem of "gene silencing", whereby the gene is properly inserted into the host genome, but it never gets turned on and thus the desired gene product is not produced. An epigenetic perspective suggests that the source of this silencing can be found in incorrect modification, packaging, or location of the inserted gene inside the nucleus. In this example, that means no resistant crops. But understanding gene silencing is of interest to more than just plant biologists. Evidence suggests epigenetic mutations may also be involved in cancer. "Cancer in humans is a multi-step process and you have to inactivate a number of genes along the pathway that leads to cancer," Richards says. "People have shown in the last

ten years that some of these genes are being shut off not genetically, but epigenetically."

Anthroposophical research at the University of Bath

"Uric acid and mad cows" – Judyth Sassoon

Recently, I was given the opportunity to begin a scientific investigation on a subject that has interested me for some time. Broadly speaking, I am fascinated by an organic compound known as uric acid, its function in the nervous system and its possible connection with consciousness states. My work on this subject has several directions but one of the most intriguing questions has its origins in a reference made by Rudolf Steiner to "madness" in oxen fed with a meat diet. Steiner mentions (GA348) that the feeding of meat to vegetarian animals, such as cattle, brings about an excessive deposition of uric acid in their brains leading to symptoms of madness.

In the last 15 years, we have seen the rise of BSE, or "mad cow disease" as it is popularly called. BSE is one of a family of rare neurological diseases, which are characterized by the large-scale accumulation of a protein, known as "prion" and also spongiform changes in brain tissue. There are those who connect BSE with the practice of feeding meat and bone-meal to cattle. In the late 1980s, the disease reached epidemic proportions in the British Isles and consequently the meat industry suffered as the public began to boycott British beef. If the practice of feeding cattle with animal remains was indeed the cause of the epidemic, then the similarities between BSE and the condition described by Steiner are remarkable. There is also another parallel between BSE and Steiner's "mad ox disease" and that is in the nature of the presumed causative substances. Steiner says his meat-fed oxen go mad because of a rise in brain uric acid. Scientists, led by Nobel Prize winner, Stanley Prusiner, say that BSE cows go mad because of the accumulation of the prion protein. The investigations of my colleagues at Bath University and my own current research, strongly suggest that these chemically diverse substances have a functional similarity as they are both molecules known as antioxidants. Antioxidants are molecules that prevent or slow down the breakdown of other substances by oxygen. In biology, antioxidants are scavengers of small, reactive molecules known as free radicals and include enzymes, certain vitamins, metal ions and also uric acid. The latter is generated by the human body as a product of purine metabolism.

In view of the similarities between BSE and the condition described by Steiner, the objectives of my investigations are to see if it is possible to gain a deeper understanding of these maladies with the help of spiritual science. I am in the process of setting up experiments to measure uric acid levels in blood, cerebrospinal fluid and brain tissue from BSE cattle. I have also started a series of experiments connecting meat consumption with elevated uric acid levels in the body and the results suggest that if any animal consumes meat, there occurs a concomitant rise in tissue uric acid levels. In addition, there are a number of investigations connecting high uric acid with aggressive behaviour and on the basis of these I would conclude that Steiner was probably correct in his conclusions about "mad oxen".

So was Steiner referring to a BSE-like condition in oxen? From my research so far I do not believe that he was describing a prion disease. If we define BSE as a prion disease then we must conclude that he was not talking about BSE as we understand it today. But working behind the physical phenomena that can be observed and measured in the laboratory are spiritual events that come into manifestation as diseases. From the point of view of spiritual science, I am beginning to think

that the common antioxidant function of both uric acid and the prion protein is significant and that perhaps common spiritual phenomena lie behind these diseases. From anthroposophical literature we learn that oxidative changes in metabolism may be connected to astral processes and so in both BSE and Steiner's oxen we may be observing changes in astral states that ultimately lead to disease. This is one line of investigation for the project.

Significant social happenings like the effects of the BSE epidemic also have their underlying spiritual reasons. I am therefore additionally concerned with more global questions such as why the British Isles suffered so particularly from the outbreak? Why was it felt by the farming and meat industries? What are we to understand from these events if we view them as messages from the spirit world? I am currently of the opinion that BSE has a deep connection with the spiritual destiny of the British people. According to Steiner, the destiny of the English-speaking people, particularly those inhabiting the area known as England, is to discover spirituality within technology. This task is clearly not being pursued by the majority of Britons. It is also true that the English ("Les Rosbifs" in French) have a tradition of beef consumption which some may say has been excessive over the past half-century. If we connect meat consumption with increased uric acid we have to acknowledge that, according to a large number of psychological investigations, elevated uric acid levels are connected with logical rather than creative thinking and higher aggression (though high uric acid should never be regarded as the cause of such states). Finally, Rudolf Steiner mentions that eating meat brings about a strong connection with the physical world, which if brought to excess, may not be conducive to the kind of spiritual work that is required of the English speaking people. Therefore, is it not possible that one of the messages from the BSE crisis concerns the necessity to reduce meat consumption in order to allow the British people to open up to their spiritual destiny?

I began this project last summer at the University of Berne, Switzerland and have now transferred to the University of Bath, U.K. I am grateful to the German Anthroposophical Society and the Biodynamic "Forschungsring" for their financial support and acknowledge the interest and moral support of a number of colleagues, including Johannes Wirz (Natural Science Section, Goetheanum), Peter Heusser (Medical Section, Goetheanum) and David Brown (University of Bath). Although this project is still at an early stage, I would nevertheless like to inform other anthroposophists about my objectives and it would give me great pleasure to enter into correspondence with anyone who may be interested in this work.

Dr. Judyth Sassoon, Dept. Biology and Biochemistry, University of Bath, Bath, BA2 7AY, U.K. Tel: +44 (0)1225 384 304 or 323 133. Fax: +44 (0)1225 826 779. email: bssjs@bath.ac.uk.

Effect of homeopathic potentiation on seed germination and other plant model systems

In the preparation for last autumn's Kolisko Quarter Centenary Conference our attention was drawn to ongoing work at the University of Bologna in which one of Lily Kolisko's lines of investigation has been greatly extended. One of the most graphic presentations of her work on the effects of the 'smallest entities' was a photograph of a row of sunflowers grown under the influence of tin chloride potentised in the range D1 to D60 (see for instance *Archetype* 7, 2001, p.35). The row showed evidence of the periodic effect of different potencies throughout the series. Her work did not have the benefits of

modern statistical analysis. However, the work at Bologna by Lucietta Betti and colleagues, which has been in progress for some eight years now not only shows effects of potentised substances and a periodicity in these effects but also is backed by a thorough statistical treatment. The following abstract of their paper presented at the Conference on Complementary, Alternative and Integrative Medicine Research in San Francisco, May 17-19 2001 provides a snapshot of their work.

"Plant model systems to study the biological effects of ultra-high dilutions. The aim of our research group is to develop in vitro model systems based on higher plants to assess the biological effects of ultra-high dilutions, with particular attention to the following features: randomisation, reproducibility, and standardizability. The plant models we have been studying are: in vitro seed germination and growth of wheat and *Arabidopsis thaliana*; *Nicotiana tabacum* leaf disks for the hypersensitive response (FIR) to tobacco mosaic virus (TMV); in vitro pollen germination and tube growth. In all our plant models we studied the effects of Arsenicum album (As_2O_3 , phytotoxic up to 10^{-6} dilutions). Aqueous solutions of this substance were prepared in a standardized process of stepwise dilution (1:10) and succussion. In some experiments, some of the seeds or pollen were previously stressed with a material sublethal dose of As_2O_3 . All the experiments were performed blind, and data were analysed using a detailed statistical method. In the wheat model, we found that the Poisson distribution fitted well with our experimental data; As_2O_3 D45 treatment (44 dilution steps, 45 succussion phases) significantly stimulated both germination and seedling growth. We also detected an evident oscillatory trend as a function of the potency. In *Arabidopsis*, As_2O_3 D30 exerted a significant inhibitory effect on germination compared with stressed controls. The inhibitory effect of As_2O_3 D30 was confirmed on cotyledon size; As_2O_3 D45 also showed a highly significant inhibitory effect. In the tobacco/TMV model, the working variable was the number of local hypersensitive lesions per leaf disk, counted 3 days after virus inoculation: As_2O_3 treatments (D5 and D45) induced a significant decrease in the number of hypersensitive lesions versus controls. In the pollen model, preliminary results on germination percentage (video recording and semiautomatic counting) and on the tube mass produced (spectrophotometric measurement) seem to show a pollen sensitivity to the different treatments. We conclude that the plant model systems used are sensitive to ultra-high dilutions, and offer the following advantages: good reproducibility of the results, a large database ($103 < n < 105$) for a powerful statistical analysis, a short time in performing the trials (4-8 days for seeds, 3 days for leaf disks, a few hours for pollen). Betti L, Blondi S, Brizzi M, Caizoni GL, Canova A, Lazzarato L, Nani D, Peruzzi M, Scarainagli S, Torrigliani P, Flebbi G (University of Bologna). *Alternative Therapies* 7(3), p55."

Lucietta Betti can be contacted at Dipartimento di Scienze e Tecnologie Agroambientali, University of Bologna, Via Filippo Re 8, I-40126 Bologna, Italy, Tel: +39 051 2091510. Email: lbetti@agrsci.unibo.it. She has provided the Science Group library with copies of four other publications from her group. These are available for loan by members. Please contact David Heaf.

Kolisko on the Internet

Some of Lily Kolisko's early work on metal planet relationships published as *Working of the Stars in Earthly Substances* is now on the Science Group web site together with the work of Nick Kollerstrom and others using the same capillary dynamolysis technique. The URL of the index page for this is http://www.anth.org.uk/Science/Metal-Planet_Relationships_Index.htm

'Warmth Course' Study Group

If anyone would like to participate in a study of Steiner's "Warmth Course", please contact Dr. Judyth Sassoon, Dept. Biology and Biochemistry, University of Bath, Bath BA2 7AY. Tel: +44 1225 323 133/384 304. email:

bssjs@bath.ac.uk. My colleague and I are working through this fascinating series of lectures both theoretically and practically and we would be happy if other interested people would join us. We are based in the Bath/Bristol area.

Projective Geometry Study Group

Weekly classes in projective geometry at the St. Michael Creative Arts Centre in Brighton (5 minutes walk from Preston Park railway station on the London main line). Wednesdays 7.30 to 9 pm from 16 January. For further details contact Paul Courtney at pcourtney@btclick.com.

Interview

Getting to know water – or a question of undines

A conversation with Wolfram Schwenk, Michael Jacobi and Franz Metzler of the Institute for Flow Sciences, Herrisried, Black Forest on the occasion of its 40th anniversary.

In the 70s after I gave a most profound lecture on the qualities of water at a Free University Seminar in Tübingen – Michael Jacobi was there too – two participants armed with water-filled syringes (which I had used to demonstrate ring eddies) paced their distance and began to duel with each other, much to the amusement of all present. The impression percolated through my disappointment at that time that water is veiled (one is reminded of the din in swimming baths) when the soul is not prepared to become still. Not simply so as to devote itself to itself – which is moreover often a rejecting effect that water can have – but in order to approach something which is itself a medium for something else. This effect reminded me of the answer Wolfram Schwenk gave me when I asked him why he wanted to talk to the *Goetheanum* newspaper: 'Our institute has worked from the outset with the source of anthroposophy and with the best anthroposophical intentions but we often hear from friends that they see nothing about us in the anthroposophical newspapers. So, on the occasion of our 40th anniversary, we would like to attend to this wish.' Does working with water silence people? My conversation partner seemed to hesitate somewhat as if he did not want to leave the ground on which he felt safe: 'We have hesitated to publish for a long time because we only want to do it when it can withstand the potentially critical judgements of our readers'.

What then are the seven co-workers at the Institute for Flow Sciences currently working on?

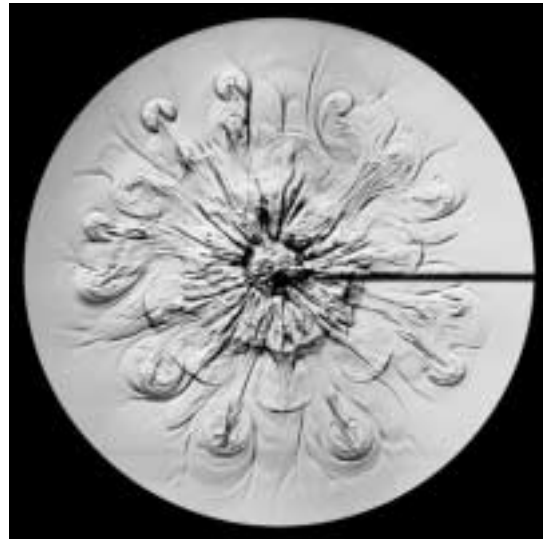
Wolfram Schwenk: We are concerned with researching and rendering observable those properties of water which mediate its life supporting functions. Taking the example of drinking water, our most important means of life, we not only try to distinguish between good and bad water but also to demonstrate what is 'good' about good water – 'good' in the broadest sense, i.e. not just free of toxic chemicals or pathogens. In general we try to 'get to know water'. In doing so we need to supplement the usual toxicological techniques with ones which give a picture of life qualities. For water is not just a solvent but a means of life.

The drop picture method

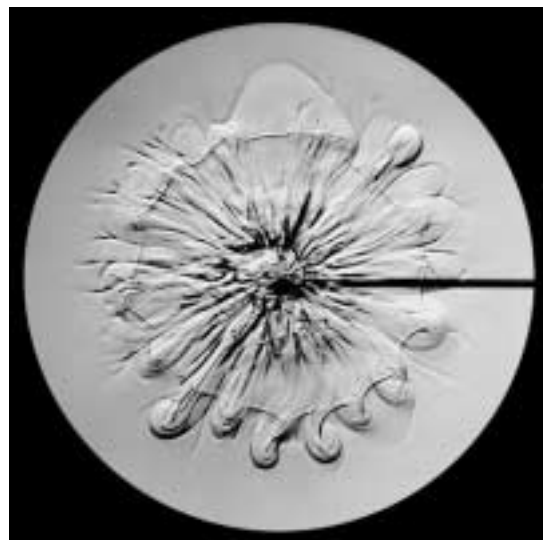
Andreas Heertsch: What does this mean in practice?

Michael Jacobi: We are making the flow movements of water observable and assessing them. This is how Theodor Schwenk formulated the problem forty years ago and from it arose the drop picture method. At that time he needed first of all a test method for various water treatment technologies aimed at im-

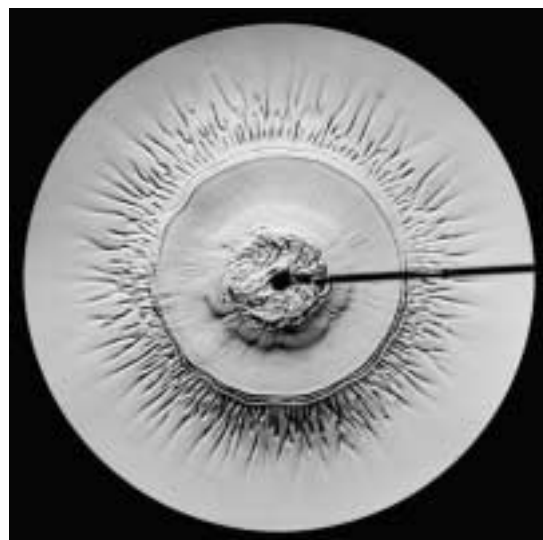
Figs. 1-3: Drop pictures



1. Pure spring water



2. Mediocre mains water



3. Water containing detergent

Pictures by kind permission of Institut für Strömungswissenschaften

proving water quality. With the drop picture method photographs using special optics are taken of the flowforms which arise when drops fall on a thin film of water. These photos reveal a variety of forms. The work has produced a set of dis-

tinct patterns which now enables analysis of the results of flow forms.

W.Sch.: Natural pure groundwater manifests a great multitude of distinct flow patterns. This also shows up in the drop pictures. You can see the same richness of form in them. This gives us our quality standard.

A.H.: *You have now published an excellent book which gives a thorough and comprehensive account of the drop picture method. It will most likely be the standard work in the field. Yet hardly anyone uses the method nowadays. Why is this?*

W.Sch.: There are probably lots of reasons. The main one is to do with complexity. The experimenter needs to have firm control of the unstable conditions necessary for the drop picture method to give the required sensitivity. Another reason is to do with the language of forms that one first has to learn to cope with. Even so there is now another laboratory apart from ours where the method is used, namely Jennifer Green's in the USA. There are several other institutes where the equipment is installed but at the moment it is idle.

And what about Undines?

A.H.: *And when someone comes to your Institute and says they would really like to see the Undines in water, what do you do with them?*

M.J.: Part of the work involves teaching ourselves, not others. And together we try to make progress with the kind of questions that one has to face when one works with the elements and ethers in such a way that, despite observing physically, one is dealing with the effects of higher planes of existence. When a vivid picture arises, then you are dealing with the etheric, the living, precisely because that is how it manifests. And we need to get a better understanding of it.

A.H.: *Actually my question was not referring to the etheric (life forces) – this aspect I know has received a lot of your attention – but to the beings living in this area.*

W.Sch.: The fact is, nobody's ever asked this question.

A.H.: *Lucky so far! (All laugh.)*

W.Sch.: Though I've given this theme some attention. One day an old lady was standing by a trough in which we were demonstrating an eddy pattern and she asked who was really making it. Who produces the forms? It alerted me to the realisation that it's not I who makes the forms. I can only provide the conditions for them to arise. No more does the fluid itself cause them because if I leave it alone it does not organise itself. Then she shook her head: 'Doesn't anyone ever ask who makes these forms? It's the spiritual beings!' So to put it in a nutshell: if someone were to come I would answer that they should on the one hand study what is said in Rudolf Steiner's spiritual science about Undines as well as about the beings of the other three elements – earth, air, fire – because from the contrasts the properties stand out clearer than when one studies just one element. And on the other hand they should compare them with the phenomena that can be observed in water. Then they will notice the water phenomena can be grasped like a physical manifestation of someone with whom they're conversing. I cannot see the spirit instead of the physical when through my physical eyes I study someone's features or gaze into their eyes even though they convey the spirit. Equally I cannot do this with water. But I can discover that here too the spirit is conveyed through the physical. And in this respect, Steiner's indications about Undines offer a wonderful key to this world.

Group spiritual research?

A.H.: *How far has what you've just described become part of the Institute's collaborative work?*

M.J.: We work individually on these questions and then we discuss them in scientific meetings. But the focus is on individual effort and reciprocal reporting of what one is working on.

W.Sch.: 'Elemental beings' as such has so far not been a theme involving the whole Institute. I have in fact worked in this area a lot myself and have lectured several times on it in meetings of members and in the flow research working group. Other Institute colleagues have taken part. But it is not a research topic for the Institute per se. This of course applies to other topics and questions in spiritual science. One cannot draw up a programme of work for it but only communicate with one another. When one says he wants to do such and such and finds another who is interested in doing the same thing then something can begin. But it cannot be made into an item in a research programme by a board of directors or anyone else.

A.H.: *I well understand your position on this. But recently I have discovered in all sorts of places an openness to accepting spiritual phenomena as valid science. People are more willing to talk about it. I think one might even say that we are facing a paradigm shift. We have done Goethean science in all its subtleties for nearly a century. But I see new horizons looming; I have noticed a preparedness of people to share impressions, moods, pictures from their own experience and to clarify them by discussing them. People suddenly discover that they have a shared impression. One individual may describe it in quite different terms but behind the various pictures that they use there is also something in common which can be talked over. I mention this also because I think that through individual activity we can learn how to work together. And this openness is noticeable in all kinds of work situations; a willingness to invest the trust that is needed. It is for this reason that I asked you about the Undines – somewhat provocatively I know – because I think that people today want to hear answers to such questions from you and of course from anthroposophical research as a whole. Five years ago it would have been different. They now want answers to questions for which finding an answer calls for inner experience and they want to hear them from yourselves and people whom they know will not answer them thoughtlessly. Here I see an expectation that we can only satisfy if we have the courage to leave the safe and somewhat well worn road of Goethean science with the immediate real danger this entails of sinking into subjectivity.*

W.Sch.: I do not see this as such a problem especially when the question is about Elemental beings. But I have noticed that in this field there is a desire for sensation – and that is harmful. So personally I'm rather hesitant. But when for instance after lectures questions are asked in this direction, then I notice a receptivity bordering on religiousness.

M.J.: Water prompts us to a metamorphosis of our inner attitude to the world of the senses; an intermediate area between observation in the physical and observation of elemental beings. For instance, when I get involved in observing flowing water's formative movements they stir my soul to movement and stimulate it into imaginative activity. Watching currents can be a preparatory exercise to imagination.

Research on the edge of dreams

A.H.: *Can you describe the mood which arises when you follow such metamorphoses?*

M.J.: Perhaps not a mood as such but rather a certain mental effort. Additional conscious activity is called for in order not to drift off. Dreaming would set in immediately if an increased inner activity were not summoned.

A.H.: *You would like to avoid dreaming. I can understand that perfectly, but let us anyway stay with this a moment. If I follow*

such dreams 'wakefully', something completely new can reveal itself, something which is perhaps really typical of water. Here I'm after the elemental effects. When people describe the longing of the Undines, how does it envelop them so as to lead them away? This enticing longing that can come from Undines is vividly described by for instance Bernard Moitessier in his book 'Der verschenkte Sieg', now out of print, as he surfed across the waves in his yacht in the roaring fifties (50th parallel south). He knew that it would mean death if the bows cut under the waves and he capsized. He surfed on nevertheless because it was so lovely... Or we can think of the incredible 'longing' of a cloud for a hang glider passing under it. He too experiences a discrepancy between the longing to rise further into the cloud and knowing a storm cloud with its low temperature, hail and increased turbulence could spell death for him... So this longing already has something dreamy about it. How do you approach such 'waking dreaming'?

W.Sch.: When I try to remain awake in such a situation then I notice that I have to change the language. Thus when I have to describe something I use terms such as 'moving processes' or 'forming processes'. I try to describe activities using verbs instead of nominalising. But in translations or through editing 'forming processes' becomes 'form' and 'activities' 'states'. It is very hard to make it clear to those concerned that I deliberately choose these formulations because I want to stay in such movings instead of hardening into states.

The value of imagery

A.H.: Might we call this 'processual descriptive'? I think that an artistic description, for instance by means of metaphors, similes and imagery might better encompass what is meant. Do you agree or do you feel that this is unscientific?

W.Sch. That would be walking the tightrope. Such an approach could stay within the bounds of science but it's not easy to make sure that it really does stay scientific. You could easily drift off into anthropomorphisms. Then a stream or even an individual drop might start to talk in the first person singular about everything it experiences, even though in a stream it has long since ceased to exist as an individual drop.

A.H.: You're saying that it would be a false picture in that it would not arise from the experience of processes but from the predilections of the speaker?

W.Sch.: Yes. Because saying no more than is right for the process is of course an art in itself.

A.H.: Indeed, but describing a phenomenon by means of what is immediately perceptible to the senses is a question of courage. Here I have found it helpful for a group first to be exposed to the situation and then in discussion to try to clarify its inner meaning.

W.Sch.: Yes, that presents no problems for work done in house but I'd be very careful about presenting this publicly.

M.J.: Nowadays this question of courage presents itself differently from the way it did six, seven or eight years ago. There is now increasingly a mood of expectation in the sense that people would gladly listen, yet it's no better than before, just different. Now people long for richly imaginative pictures and this once again means keeping on the tightrope and not falling off the other side.

A.H.: I quite agree, but I also see the danger of our simply projecting our insecurities into unrealistic expectations such as 'richly imaginative pictures' and then giving up when we think 'This can't be it!'. What I'm getting at with the tightrope metaphor is the danger of saying that it's such a terrifying drop on both sides I'd rather not go any further.

M.J.: No I need to know exactly when I'm phantasing and when I am imagining.

A.H.: Quite so, but there is a smooth transition in the difference between them.

W.Sch.: Of course, Rudolf Steiner himself set this as a problem. According to the lecture cycle *Lebendiges Naturerkennen* scientists should strictly adhere to the principle of speaking about only what they can observe. Or as he put it in 'The Boundaries of Natural Science' they should not roll on beyond the limits with their hypotheses and models. And on the other hand he required them to symbolise and develop a language of imagery. When you consider both together it does not mean symbolising just as you like but rather choosing the symbolic language in such a way that one does justice to what one is studying in a really soul-spiritual way. We have to practice this. That's the tightrope.

In our one hour conversation we also talked about how society's needs and expectations affect the work at the Institute and how collaboration with other institutes in various of fields of work has continued to grow. Finally we came to the way the Institute is run. Here Franz Metzler who is the manager spoke about how he frees his research colleagues from the administration work. For they need not only to do the good but also share it with others – which is where we came in...

Interviewer: *Andreas Heertsch*
(By kind permission of *Das Goetheanum* No.27, 1 July 2001)

Meetings

Earthly & Heavenly Harmonies—Conference Number Two
Hawkwood College, Stroud, Glos. Thursday 18th to Sunday 21st July, 2002. Contributors:

Wolfgang Held—Chief astronomer at the Goetheanum; Mathematical-Astronomical Section. *John Meeks*—Science teacher at a Swiss Rudolf Steiner School. *Malin Starrett PhD*—Workshop on 'Chladni' figures. *Nick Kollerstrom PhD FRAS*—There's No Place Like Earth'; participate in the Venus Dance. *Robert Byrnes*—Developments of the Invertible Cube of Paul Schatz. Workshop with new models. *Mary-Ann Paterson*—Painting and poetry. *Henry Goulden*—1. Anthroposophical Scientific Research and Future Technology. 2. The Zodiac Through the Ages. Illustrated with colour slides (based on a lecture given by Dr Elizabeth Vreede in 1926). Exhibition of John Salter's Sculptural Forms of the Constellations of the Zodiac.

Enquiries & booking to: Hawkwood College, Old Painswick Road, Stroud, Glos GL6 7QW. Tel: 01453 759034 and/or Henry Goulden, The Chapel, Treligga, Delabole, Cornwall, PL33 9EE. Tel: 01840 212728.

Genetic Engineering and the Intrinsic Value and Integrity of Animals and Plants

Ifgene – International Forum for Genetic Engineering Workshop 2002. 18-21 September 2002. Royal Botanic Garden, Edinburgh, UK

14 invited speakers from the following fields: bioethics; molecular genetics; biodynamic farming; sociology; law; environmental philosophy; public perception of technology; plant & animal breeding; transgenesis and Goethean phenomenology. Plus guided practical observation sessions; breakout workshops; public panel discussion; and contributions by representatives of Roslin Institute (home of Dolly the cloned sheep) and other institutes round Europe and USA.

For full details please see the workshop web site at <http://www.anth.org/ifgene/2002.htm> or contact Ifgene UK co-

ordinator: David Heaf, Hafan, Cae Llwyd, Llanystumdwy, LL52 0SG, UK. Tel/Fax: 01766 523181. Email: 101622.2773@compuserve.com.

UK group of the Science Section

There will be a meeting of the UK group of the Science Section on Sunday 9th November 2002 for members of the School of Spiritual Science who are taking responsibility for the scientific work. For further details please contact: Richard Swann, Orchard Leigh Camphill Community, Bath Road, Eastington, Stonehouse, Gloucestershire GL10 3AY. Tel: 00 44 1453 825617; Fax 00 44 1453 823811. E-mail: raswann@callnetuk.com.

Courses

Seeing with new eyes: Science and the nature of life

Chris Clarke, Rupert Sheldrake, Arthur Zajonc & Brian Goodwin. March 3-22, 2002

For nearly 400 years, Western culture has been heavily influenced by a science and a technology which assumes that the universe is a meaningless machine made up of disconnected atoms. But science is gradually changing, and these underlying assumptions can now be authoritatively challenged. This course will study some of the key changes coming from cosmology, high-energy physics, quantum theory and the perception of light, discussing what they mean for the nature of life and consciousness and how we understand the world. Biology is also being transformed, as the necessity of studying organisms as living wholes – rather than collections of cells – becomes ever more apparent. The importance of understanding the living world as interdependent systems has major implications for how we interact in social groups and the structure of our institutions, and these will be explored using a variety of methodologies.

Chris Clarke was Professor of Applied Mathematics at the University of Southampton and now concentrates on teaching in the area of science and spirituality. He is author of *Reality Through the Looking Glass*. Rupert Sheldrake is a biologist and author of *Dogs that Know When Their Owners are Coming Home*, and *Other Unexplained Powers of Animals*, a sequel to his best-selling *Seven Experiments that Could Change the World*. Arthur Zajonc is professor of physics at Amherst College, and lectures widely on the history and philosophy of science. He is author of *Goethe's Way of Science*. Brian Goodwin was Professor of Biology at the Open University, and is now co-ordinator of the MSc in Holistic Science at Schumacher College. He is author of *How the Leopard Changed its Spots*.

Details of this and other science related courses at Schumacher College available from: Administrator, Schumacher College, The Old Postern, Dartington, Totnes, Devon TQ9 6EA, UK. Tel: +44 (0)1803 865934; Fax: +44 (0)1803 866899. Email: schumcoll@gn.apc.org. Web: <http://www.gn.apc.org/schumachercollege/>

Correspondence

Picture Forming Methods in UK?

Tim Brink, UK Demeter Standards Development Manager asks if anyone in UK is using or might be willing to use picture-forming methods for quality testing of biodynamic pro-

duce etc. If any of you can help please could you contact him directly at timbrink48@aol.com. Tel. 0131 478 1201.

From the Science and Mathematics Association for Research and Teaching (Parker Courtney Press), P.O. Box 41531, Austin, TX 78704, USA. Email: parcourt@airmail.net

I am writing to you on behalf of the Science and Mathematics Association in Austin, Texas. We are pursuing phenomenological sciences, and were attracted to your newsletter.

Four of us are teachers at the Austin Waldorf School. Dr David Booth teaches mathematics, Dr Lee Bienski is the chemistry teacher, Laurel Trevino teaches Biology and Mr John Kirkilis attends to the computer curriculum. Sandy Booth is a physical anthropologist, and I am a biologist. Our meetings typically cover a range of topics from education and curriculum discussions to various research topics.

Parker Courtney Press, our publishing activity, has printed several things including *Forming Concepts in Physics* by Georg Unger, the former leader of the Mathematical-Astronomical Section of the School of Spiritual Science, Dornach. This translation of Unger's account of physics in the first half of the twentieth century, written as an interior dialogue, shows the human side of the process of grasping physical laws.

One of the topics we have discussed recently is Domino Puzzles. There has been a translation of *Construction Games with Kepler's Solids* by Gerhard Kowalewski. This 1936 publication concerns pentagonal geometry, higher dimensions, and their application to games and puzzles. Dr David Booth added an illustrated appendix. He has also developed a booklet containing a new type of puzzle based on Kowalewski's ideas and has involved High School students in making new discoveries solving various puzzles. This information is contained in the booklet, *The Domino Rule* by David Booth. This is a new development and may very well interest some of your readers.

Once again we appreciate your newsletter and look forward to the next publication. If you would like more information on different aspects of our meetings, research interests or publications feel free to contact us. We hope to hear from you. Do let us know if it seems likely that there are those in England interested in our work. *Deborah Mann*

Publications

Elemente der Naturwissenschaft

Nr. 74(1) (2001) *Multilingual – Abstracts in English*. Ernst-August Muller, *Johannes Kühl*. Wasser, das universelle Lebenselement, *Wolfram Schwenk*. Das Wasser in der Nutzung durch den Menschen, *Norbert Pfennig*. Water as a Mediator for Life A. *John Wilkes*, Wasser in Pumpen und Turbinen, *Christian Liess*. Wasser und Energie, *Georg Sonder*. Stausee-Groß-projekte – Beispiele faustischen Wirkens, *Eduard Naudascher* (published in English in *Archetype 7*, 2001). Trinkwasserversorgung – eine Selbstverständlichkeit? *Walter Jülich*. Wiederbelebung von Fließgewässern, *Helgard Zeh*. Was lernen wir vom Wasser? *Johannes Kühl*.

Nr. 75(2) (2001) Der Begriff des Gegenraumes, *Oliver Conradt*. Doppeldrehung und Polarisation, *Johannes Grebe*. Der blaue Planet – Erdgeschichtliche Betrachtungen über das Weltmeer, *Wolf-Christian Dullo*. Einflüsse unterschiedlicher Behandlungen auf die biologische Wertigkeit von Kuhmilch, *Haijo Knijpenga*. Getting rid of Metaphysics, *Ronald H. Brady*.

Editorial board: Dr. Johannes Wirz, Birgit Althaler, Haijo Knijpenga, Johannes Kühl, Barbara Schmocker. Forschungslaboratorium am Goetheanum, Hügelweg 59, CH-4143 Dornach, Switzerland. Email: science@goetheanum.ch. Distributor: Verlag der Kooperative Dürnau, Im Winkel 11, D-88422 Dürnau, Germany Tel: +49 7582 93000,

Fax +49 7582 930020. Email: verlag@kooperative.de. Subscription €15.00/year for 2 issues, (circa €8.00 per single issue), inclusive of p&p. (N.B. We have heard from Kooperative Dürnau that they will not be producing future editions.)

Mathematisch-Physikalisch Korrespondenz

No. 207, Christmas 2001 Infinitesimal transforms, *Nick Thomas*. Wie kann die Menschheit lernen, die Computerwelt zu bestehen? *Horst F. Wedde*. Das Nichts in der projectiven Geometrie, *Lou de Boer*.

Subscriptions are Sfr45/DM50 per year. Edited by Dr. Peter Gschwind, Mathematisch-Physikalisches Institut, Benedikt Hugiweg 18, CH-4143 Dornach, Switzerland.

Newsletter of the Society for the Evolution of Science

Vol. 17 (2) Fall 2001: Main articles: From human color-perception to intentionality, *Georg Iliev*. The reality of mathematics, *Marisha Plotnik*.

Editor/Treasurer: Jim Kotz, 3698 Dwight Davis Drive, Tallahassee, FL 32312, USA. Email: jimk_99_11@yahoo.com.

Wasserzeichen

Nr. 15 (2001): This 50-page issue has many short contributions including items on the Flow Research Institute's work, its conferences and publications. Apart from Andreas Heertsch's interview with Institute staff (see p.4 above) there are excerpts from the main scientific publication *Sensibles Wasser*. Issue 6 (2001) is a sourcebook on the drop picture method and issue 7 contains a number of contributions celebrating the 40th anniversary of the Institute. *Wasserzeichen* is €2.00 per issue. Free to sponsors. Institut für Strömungswissenschaften, Stutzhofweg 11, D-79737 Herrischried, Germany, Tel: +49 (0)77 64 269, Fax +49 (0)7764 1324. Email: sekretariat@stroemungsinstitut.de.

In Context – The Newsletter of the Nature Institute

No. 6, Fall 2001: Short essay: The trouble with qualities. Notes & reviews: The great green hype (on genetically modified crops); Science and belief, *Steve Talbott*; Pattern and explanation, *Steve Talbott*. Main articles: What forms an animal? *Craig Holdrege*; The lure of complexity, *Steve Talbott*. The main articles are illustrated.

Contact details: The Nature Institute, 169 Route 21C, Ghent, NY 12075. Tel: 518 672-0116. Fax: 518 672 4270. Email: info@natureinstitute.org. Web: www.natureinstitute.org.

Waldorf Science Newsletter

8, #15, Autumn 2001: Arabic science, *Dennis Overbye*. Arabic mathematics: forgotten brilliance? *taken from St Andrews University mathematics history web site*. Making natural dyes, *David Mitchell*. Exploring the qualities of iron, *Gary Banks & Cedar Oliver*. Fundamental approach of the Mackensen conference, *Michael D'Aleo*. Formic acid and oxalic acid, *Reinhard Schoppmann*. What the water spider taught me, *Mick Follari*.

Edited by David Mitchell and John Petering, \$5.00 each. Contacts: Judy Grumstrup-Scott, Association of Waldorf Schools in North America (AWSNA) Publications, Email: jgscott@awsna.org. Web site: www.awsna.org. David Mitchell, 1158 Quince Avenue, Boulder, CO 80304, USA. Fax 303/ 541-9244. Email: davidm@awsna.org.

Evidence for Lunar-Sidereal Rhythms in Crop Yield: A Review by Nicholas Kollerstrom*, PhD. and Gerhard Staudenmaier, PhD.** Biological Agriculture & Horticulture, an International Journal for Sustainable Production Systems Vol. 19 (2001), pp.247-259. Authors' addresses: *9, Primrose Gardens, London NW3 4UJ. **Knappertsbuschstr 18, Munich.

Abstract In 1956, Thun developed a procedure of sowing according to the position of the Moon in front of the twelve zodiacal constellations. These constellations were classified into four groups according to the element (Earth, Water, Air and Fire) astrologically associated with them. Root, leaf, flower and fruit crops were found to show increased yields if sown when the Moon stood before Earth, Water, Air and Fire constellations, respectively. Thun's philosophy of sowing by this sidereal rhythm has become a major component of biodynamic planting calendars, even though the founder of biodynamic agriculture, Rudolf Steiner, had only mentioned positive effects of the Full Moon in an agricultural context. In 1990, Spiess

published a three-year study claiming to find effects of other lunar rhythms but not those of the 27-day sidereal month. This paper reviews published confirmations of the 'Thun effect' and re-analyses data concerning planting times and crop yields from Spiess' study with radish and carrots, by computing yield values as deviations from a moving average rather than as deviations from seasonal trends estimated by quadratic functions. The re-analysis showed an increase (ca +7%) in the yield of radishes which were sown in Earth constellations for his 1982 trial, with a comparable result demonstrated on re-analysing data from three years of carrot trials.

BAH, Biological Agriculture and Horticulture, produced in Coventry UK, may be the only academic journal devoted to organic growing.

This co-authored article is 12 pages long with 7 graphs and 40 references. It is the first comprehensive review of published evidence for the 'Thun-effect' i.e. the notion of 'sidereal' rhythms as present in vegetable growth, as has evolved within the Bio-dynamic gardening and farming movement. It rebuts the claim of Spiess made in 1994 in the same journal, that these rhythms were inoperative. NKK.

Science Group Membership & Finances

The Science Group is open to members of the Anthroposophical Society worldwide. At the discretion of the committee, non-members of the Society may join the Group as Associate Members.

The membership subscription is currently £5 (UK), £6 (Europe) or £7 elsewhere. This newsletter is issued to members in March and September each year. The Group's account is £1657 in credit (31 January 2001). £250 of this is a surplus from the October 2001 Lily Kolisko 25th Anniversary Conference and is reserved for any future conference initiative by members. A further £240 represents the sum of three donations received in February 2002 via Mabel Gange in memory of her husband Hedley Gange. This edition of the newsletter goes to 73 subscribers in 11 countries.

Next Issue

Copy for the next issue should reach the editor at the address below by 20th August 2002.

Dr David J. Heaf, Hafan, Cae Llwyd, Llanystumdwy, Cricieth, Gwynedd, LL52 0SG, UK. Tel/Fax: +44 (0)1766 523181. Email: 101622.2773@Compuserve.Com.

Science Group web site: <http://www.anth.org.uk/Science>