NATURA

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Careful observations can lead to monumental one-off discoveries; Phil Jacobs spotted something special on his walk along the shoreline of Kimmeridge Bay on the Jurassic coast; the snout of a pliosaur skull. He contacted Steve Etches, a friend and founder of the Etches collection and the rest they say is 'palaeontology'. Photo: Tony Jolliffe/BBC

Contents

Poem

Two or More

Where Two or more exist;
Live gossamers infinite
Weaving invisible thread,
In-a-Coherence delicately wed,
Sounding celebration immortal

Thoughts thinking Thoughts
through Portals

Detailing immaculate structure;
Whose junctures function
Beyond mere mortal machines
Gleaning interfluent streams
With watery seams, conversing eternally.

Here,
betwixt Earth,
beams the Heavenly

Speaking
The Mysteries of Space

Secrets,
Time,
Encased

Samuel A. Fisher (a.virtualsam@gmail.com)

Reports

Reflections and echoes from the Natural Science Section "Interfluence" event at the Science Group AGM, Centre for Science and Art, Stroud & The Field Centre, Nailsworth. November 2023

I'd suggested the title *"Interfluence"* for this gathering. I wanted the word to evoke reciprocal, often multidirectional influence, counter influence, and inter-reliance. All kinds of interfluence play out within and around us all the time. For example, the word could describe the essence of a lively conference. So, I feel, it was. Participants from varied backgrounds seemed equally ready to think and converse in this way… so may we all continue... *hearing and saying the songs of days…making the music of what happens.*

Philip Kilner

A reverberation from 100 years ago
"Today, people in general are little inclined to detach themselves from the claims of the material world and to seek the spiritual directly in the physical world around them. It is, however, precisely from observing directly the sense-perceptible that the right path will open up for those who wish now to work entirely within the field of present-day science, if they really seek to discover the spiritual there. It can be done."

Rudolf Steiner 30th August 1923 at Penmaenmawr.

From Howard Smith

It was a wonderful idea to adopt a new word so appropriate to our Goethean-anthroposophic natural science!

"Interfluence" was at the heart of the presentations and discussions throughout the weekend. Holding it in our consciousness in this way helped us approach its true meaning in the context of our research and encouraged us to observe and think in ever more fluid and interactive ways during the workshop.

It also helped create a social atmosphere that encouraged openness, good conversation and attentive listening.

Presentations by Vesna Forstneric Lesjak, Philip Kilner, and Meinhard Simon illustrated interfluence in their research within and between living beings and their processes, on macro and micro scales. Their presentations illustrated the interconnectedness that exists in and between all of life and its evolution including that of our earth.

These presentations left me with a profound sense of unity and wholeness in our ever-changing and awe-inspiring world.

The fluidity workshop led by Simon Charter in which we observed and co-created flow and vortices in water, with the assistance of glycerine, ink and mica powder encouraged us to train our senses and thinking towards an understanding of flow and interfluence.

These playful activities fostered careful observation, openness to possibilities (through

experimenting), reflection, conversation and above all participation and engagement with flow.

An interfluent attitude of soul in our research urges us to be aware of living being's continuous emergence; of the processes underlying this; the vital importance of their interaction with other beings; with their context and with the surrounding nature- as all emerge and evolve together.

The conference highlighted the importance of our own unbiased participation and engagement with the living world in our research and the need to become fluid in our thinking and imagining. Failure to recognise interfluence has been prone to lead us down a path of purely mechanistic interpretation, that misses much..

While our conventional natural scientific research has revealed extraordinary aspects of the living world, it feels important not to become fixated on capturing the static beauty of details. Instead, by embracing interfluence in our thinking, research, conversations, and attitudes, we unveil an even more beautiful awe-inspiring and wondrous, musical, creative and artistic reality without compromising the clarity and rigour of good science.

How we understand and view the world has profound consequences for life and highlights the importance of one of our most important roles as modern human beings: how we think. Not only because it influences how we see and therefore how we might treat and manipulate Nature but also because it is important to another role we have: to truly recognise the essence of other beings so that they might 'speak into our consciousness' thus allowing us to participate with them in a truly interfluent way.

Despite the increasingly 'digital age' we live in that embraces a plethora of data gathering; dogma pleasing and box-ticking research and despite the recent growing fascination with so-called 'artificial intelligence'.. all of which tend to encourage mechanistic interpretation and thinking, there are a growing number of excellent contemporary scientists, philosophers, as well as farmers, artists, thinkers etc. who embrace an interfluent way of research and who, through this, are discovering more and more beautiful and extraordinary truths about our living earth and its beings. We were given several good references. This is extremely encouraging.

And I look forward to further interaction with you all!

Katherine Buchanan Edinburgh

Interfluence is a way of thinking which makes sense in natural science. Such a way of thinking was induced during the conference, both through the hosts' presentations, as well as through conversations between participants. That was the beauty of it; it was through interfluence that we learnt about interfluence.

Moreover, I believe the water experiments to be an important aspect of the conference. Apart from being exciting, they integrated an interfluence between ourselves and nature. We were not only shown results, but were also shown how results are obtained - through a mixture of close observation and thinking.

I was deeply encouraged to see the art of observation being focused on in this way, and know that it is part of the Goethean approach. Though it seems that the 'Goethean approach' may once have been called the 'scientific approach' just as organic food was once called food! I appreciate that there are some other differences but the core principles of holistic thinking, acute observation, imagination and open questioning should be, and I believe once were, the principles of science. Box-ticking, rule following and categorization goes back a long way in scientific history but has become obsessive in so much work in recent years that those 'core principles' seem to have been lost, almost entirely, to the wind.

Yours interfluencingly, Thorfinn Barton, Scotland

My engineering background encourages me to consider one entity influencing another with a certain lawfulness which I often try to comprehend. It is more difficult for me to imagine influences working in both directions at once and each entity changing during a process. Things get even more difficult when the medium conveying the influences has agency itself in the process. However this must be the case with living organisms and with such relationships continually creating the web of life, the tissue of social life and the substance of our spiritual life. It is not easy but in the occasional moments when I can enter consciously into this interweaving it is so wonderful and rewarding.

Simon Charter

I saw interfluence in the context of "The Tree of Life ." Simon asked a key question, "Do intricate patterns within water arise from intelligence ?"

In the lectures on Lemuria, Steiner describes water, at that time, as much less dense than today, not just the bearer of life, but also living in itself. Consequently ,all creation arose out of life, guided by heavenly beings.

Does water still have a memory from this time? Is this why we see constantly changing vortex patterns ? This was also a time when the kingdoms of nature were not so clearly defined as today - they merged to form great world substance creating beings - fluently working together.

Are bacteria also carriers of spiritual impulses? Can we imagine this in a positive way ?

Are cyanate bacteria, children from the old recapitulation Moon period of earth, when there was an oxygen-less nitrogen atmosphere ? The tell tale marker is, cyanate bacteria do not need oxygen for life. This was also the time of the deposition of granitic rocks from life processes, the mother of all silicate rocks on earth.

What does it mean to eat from the "Tree of Life" ?

Steiner gave some hints about the future of science. He suggests paths will diverge. A new science will arise which treats experimentation as sacred, not replicable for conventional science. Certain results will only occur in this new science. Steiner believed Goetheanism would contribute to such new discoveries.

The alchemy of this conference was warm and friendly. Looking forward to further sharing and discussions.

Adrian Lamont

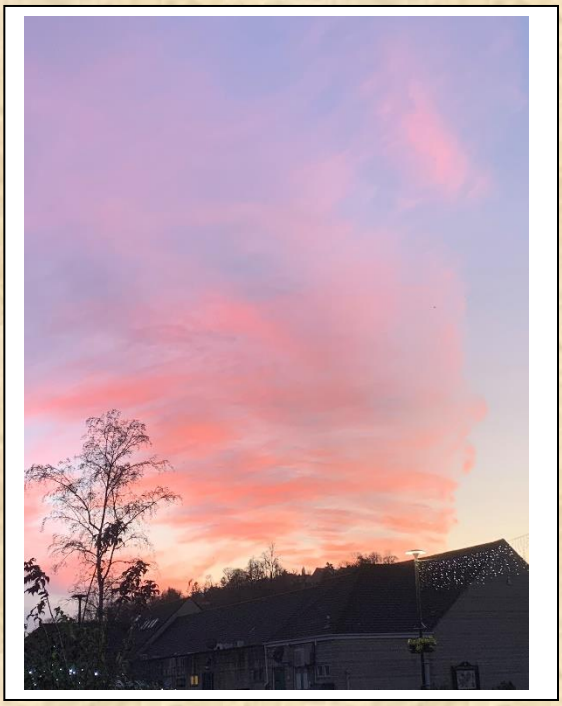
Interfluence paired with Goethean thinking seems to be applicable to all phenomenon where a flow is suggested.

My centre of interest is acoustic resonance as a force to power mechanisms. Sound and resonance can be measured and feel mechanistic. The action of sound on air, fire, and water seem to fit the concept of interfluence where waves penetrate and mould the environment creating animated forms. Observing the shape of a flame changed by the sound of an instrument seems to be more qualitative then quantitative. Interfluence in a choir suggests a convergence of air flows, voices timbres, resonances, wills, feelings, all toward the creation of a musical harmony.

So it seems to me that many fields of research and observation in science could incorporate this concept into their vocabulary.

Long live interfluence….

Philippe Rigal Isle of Mull Scotland



Interfluence – everything is related to everything else. Inspiring to learn about the work Vesna is doing on her farm, including her pharmaceutical research. Oases like these are essential to keep the pathways into the etheric world open. There are of course many more all over the world, but every one is crucial) while the rest of the world deals with its problems in its own way.

Meinhard's impressive lecture illustrated another pathway into that mysterious world of life, taking us to the very threshold, at which even the life sciences have to pause and take stock. Will a leap of faith be needed to open the gate? Or will the life sciences, which have made such astonishing discoveries during the past 100 years thanks to their amazingly sensitive tools, be able to integrate a sense of life into what their instruments reveal?

Then Philip's description of that most amazing product of evolution – the human heart; a sure sign that matter, in the form of "genes" working from "below", guided by spirit, in the form of "form" working from "above" which Steiner referred to as Rupa; has been placed at the service of evolving consciousness as manifest in the human being – all 8 billion of them.

Last but not least Simon's demonstration of vortices in the element of life – water.

"All Phenomena have their Origin in Vortices" Axiom III in The Transcendental Universe, six lectures by C G Harrison to the Berean Society in 1893. https://www.amazon.co.uk/Transcendental-Universe-Lectures-Theosophy-Catholic/dp/0904693449 *Maarten Ekama*

Dear interfluencers,
right after shaping this conference together with all of you, I travelled forward to Romania, to give a weekend-seminar on plant metamorphosis in Bucharest. Both two destinations were to high extent unknown to me, almost all people I met for the first time. As I was thinking afterwards, my whole way of life now is about "interfluence" between different people and groups, different countries, themes, methods and approaches, levels of knowledge and interest, different cultures and languages...
Our conference has been echoing within me long after its end and I think I haven't digested all events, conversations and contents yet. It was so full of life, exchange and potential for the future and further development. One sees, the knowledge is endless and always evolving new, but through certain people, that nurture this further development with great care, effort and interest.
As we were discussing interfluences on a biological level in the conference and I could bring few examples of symbiotic relationships - between different species, also different kingdoms of nature, as well between a being and its surrounding landscape, it was clear to me that "survival of the fittest" is really a thinking way of the past, 19th going on into 20th century. However, nature doesn't work like that at all - it was and is never about "let all others die, in order for me to live", it is all about symbiosis and "interfluencig". Also our biggest task for the future and very existential question, how to save and stimulate life on Earth, is a question of our symbiotic relationship between us and the mother Earth. Are we just using, exploiting its natural resources and driving species into endless death, or can culture and nature develop together in a symbiotic way? As the culture in middle Europe began to develop, the biodiversity in Europe rose up. Before this there were often only woods with only few endemic species, but then humans brought many other new species and cultivated them, together with the whole landscape.

If one plant species is to survive in a new environment, it depends on whether it can build symbiotic relationships with other species, for example underground with fungi. What we haven't spoken of or got to speak about, is the evolution of mammals and later on humans. Mammals evolved to an even higher level of autonomy in comparison with birds, that also achieved having a stable body temperature, it means they conquered the warmth element. Mammals reached an even further level of autonomy, that is the development of embryos inside their bodies. With birds we still have laying of eggs , exposing embryos to outer circumstances and dangers. This point of autonomy we reached with the help of a certain virus, from which one specific protein was included in the placenta through the so-called "gene transfer" and it caused a local immune deficiency, so female organisms didn't destroy the foreign embryo inside them. That means, ***a higher level of autonomy is always connected with a higher level of symbiosis.***

That is an important biological point and can serve also as a future picture for our social life and developmental abilities. Beside that, it is important that in this "interfluence" one entity doesn't lose its own entity. Maybe this entity has a beginning and a certain end. This we also observed through the forms of flow demonstrated by Simon Charter and then further experimented with in the groups, where one form was changed through other forms and had a certain pattern of development, and for us observers almost always an unexpected one. But still "interfluence" doesn't mean just "all becoming one" and "formless, shapeless". It carries a challenge within itself, to take our own entity and abilities and to further develop and transform them through multidirectional meeting and interfluencing. Maybe that's why many scientists don't want so much interfluence between different ways of thinking and methods, because it demands a strong, stable and open "I", to be able to stand and share, learn and possibly get transformed. Interfluence is also a very complex, dynamical, multilevel way of thinking, which makes it much harder to grasp the emerging processes and possible outcomes, in comparison with a linear way of thinking. But Rudolf Steiner said himself, that science nowadays wants to have it all very simple and that scientists themselves are often very lazy in thinking. Models like that of a key with a specific lock as a pair-combination This is often used for describing our nerve system, functioning through certain receptors and chemicals, also for describing working mechanisms of chemical substances and remedies. The models are very easy to understand, and as Steiner said - the answer lies open on the hand. However our organism itself shows it is not so easy, by inducing a reaction through one key-lock interaction, it affects so many other parts in the body and reactions between the organ-systems themselves.These are often unknown reactions to the pharmacists, chemists and biologists, who develop such linear systems***. The organism shows, that in reality, everything in the body works in an "interfluence"***. So many side effects of drugs occur, because we are lazy in our thinking and don't want to dive into understanding of this interfluences on different levels of our organism.We prefer to think in simple models, not being able to think multimodal and multidimensionally thus creating the risks of unforeseen and harmful side effects. Evolution demands from us to step forward, to strengthen our "I" in such a way that it becomes open, social, engaged, capable of interfluencing and going beyond mechanistic, linear thinking, to a more imaginative, more complex and living way of thinking. In other words, so it may exercise its spiritual muscles in thinking and perception.

I highly recommend also reading a new book from Albrecht Schad "Vom Leben unserer Erde - eine Liebeserklärung an unseren Heimatplaneten" and I hope it gets translated into English soon. The book is all about interfluence and symbiotic relationships on Earth, on biological and cosmic-global level.

Vesna Forštnerič Lesjak

Everything being there for everything else with no centre - just collaboration and interwovenness in the great scheme of things.

All coexisting, engendering, and being engendered in a vast network.

Bacteria, being entirely selfless, completely open and non-apparent. Multitudinal and countless like a huge cornucopia.

They show the Etheric forces of the Earth buzzing, singing, vibrating and life-giving, and this force can also be experienced in the human body in this way.

All absolutely inseparable, forming a great wholeness of life living itself through its many and varied parts.

Inscape and landscape mirroring one another with no boundary.

Yvonne Greenaway, Stroud

I am leaving to go back to South Africa - after 5 months in Europe - with many gifts. One of the greatest of these is a single word. This word describes what I have experienced repeatedly and have a concept of, yet did not carry with as full an awareness as now. This word - INTERFLUENCE - is stimulating a fertile image inside me which I know will be born in my conversations and my reality in many ways. I am positively changed, I have affected those that I have interacted with, and I will take responsibility for my impact and influence to the best of my ability where I continue to walk further.

With gratitude Liesl Haasbroek

Remembering Ralph Brocklebank

Some Members of the Science group may not yet know that Ralph Wilfrid Brocklebank passed away in May 2022, aged 94. A brief note appeared in the Newsletter of the Anthroposophical Society of Great Britain, but apparently no obituary. His colleagues in the world of heraldry did publish a couple of obituaries.[i]

The present author did not know Ralph Brocklebank well but nonetheless, in the absence of other communications from anthroposophical circles, a few memories should be shared. Ralph corresponded by letter, articles and greeting cards with the present author from 2001 to 2021, mostly on themes relating to the science of colour.

Ralph Brocklebank carried out colour researches with Michael Wilson and co-authored various articles which have recently been published together in the book *What is Colour? – The Collected Works* [ii]. Both individuals made the difficult journey of gaining acceptance as independent researchers among the small community of professional colour scientists in Great Britain in the 1950s and 1960s. Both also held the position of Chairman of the main association of colour science researchers in Great Britain, The Colour Group (GB) – Ralph from 1971 to 1973.

In correspondence with the present author, Ralph Brocklebank was consistently polite, encouraging and prompt with his replies, even though he was sometimes dealing with viewpoints contrary to his own. We eventually did meet together with warm conversation at his home in September 2018. The world of anthroposophically oriented natural science would be well served today if we could all display his qualities of character in our interactions together.

Malin Starrett

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[1] The Royal Heraldry Society of Canada. See: www.heraldry.ca/content/bios/bio_brocklebank.htm A very brief obituary also appeared in *The Heraldry Gazette*, New Series 165, September 2022, p.14.

[1] Wilson, M. (edited by Liska, L. and Vine, T.) *What is Colour? – The Collected Works* (2018), Logos Verlag, Berlin. It should also be stated that Ralph, with a keen aesthetic feeling for imagery, was not pleased with the rather pedestrian cover of this book.

Shadows of a Dolmen

Fig. 1 Magheraboy dolmen in north Co. Antrim

Following his journey to Wales in August 1923, Rudolf Steiner spoke about the ancient Druidic sites that he had visited. He described one kind of enclosed stone structure with a small dark space within. According to Steiner's account, the ancient Druid priests were able to see through the stones to perceive the spiritual and soul aspects of sunlight which can pass through opaque matter.[iii] These perceptions of the Druid priests brought knowledge of the cosmos at certain times of day while at other

Figure 2 Shadows under Magheraboy dolmen, April 2021 & October 2021

times of day, currents were perceived coming up from the earth which revealed knowledge about the priest's congregation. In his account given later in Vienna, Steiner talks of monthly and seasonal variations in colour in what can be perceived in the shadows beneath the stones. Such perceptions were applied by the Druid priests to quite practical areas such as when to sow seed or when to organise the mating of the bull with the cows.[iv]

The present author, having a long-term interest in the study of shadows, decided to regularly visit one such site. Near to where this is being written, on the north Antrim coast, there is a group of three related *Passage Graves* which most people in N. Ireland today would call dolmens. The third and largest of the group is called Magheraboy which means "Yellow Plain".[v] Magheraboy appeals to most peoples' mental picture of what a dolmen should look like – upright stones with a massive slab perched precariously on top. See Figure 1.

These descriptions from Steiner[vi] prompted the present author to try some observational/experimental studies of the Magheraboy dolmen, starting in January 2019. The basic idea was to visit the dolmen once a month and attempt to directly perceive the qualities in the shadow beneath it, also taking physical measurements such as time of day, air temperature, general weather conditions, colour temperature readings and colour photographs. This experiment has run and run over the past four and a half years and even the photographic aspect has involved (in various years) – colour negative film, colour slide film and digital photography[vii].

In the 2021 series of visits, a simple Nikon L23 digital camera was used with the colour balance fixed to daylight. In that particular series, a close-up photograph in the shadow area under the dolmen was taken on each monthly visit, along with a photograph of the sea and landscape in the distance – to give a general impression of the overall daylight conditions. The idea with the photographs was to gather the series of 24 for the year and then to look for any subtle variations of colour by comparing them. See Figures 2 and 3 – the close-up photographs of the shadows under the dolmen in April and October 2021.

By placing the photographs side by side, one can see that the photograph from April 2021 (24.04.21, around 3pm BST) shows a distinct warm-cool polarity between the upper stone (underside of the slab covering the space) and the bluish stone at the

bottom of the photograph. On the other hand, the photograph from October 2021 (28.10.21, 3.38pm BST) shows the same regions under the dolmen with an overall even colour tone – there is no obvious warm-cool polarity in this photograph. Questions like these arise: Are the colour differences due to well-known factors such as the colour temperature of physical daylight varying in complex ways beneath the dolmen? Or: Are the colour differences related to technical photographic factors such as the use of JPEG image compression? Or: Could any such colour differences be due (or partly due) to the camera responding to spiritual and soul qualities in sunlight – or secondary effects of these – penetrating through the stones? See Figure 4.

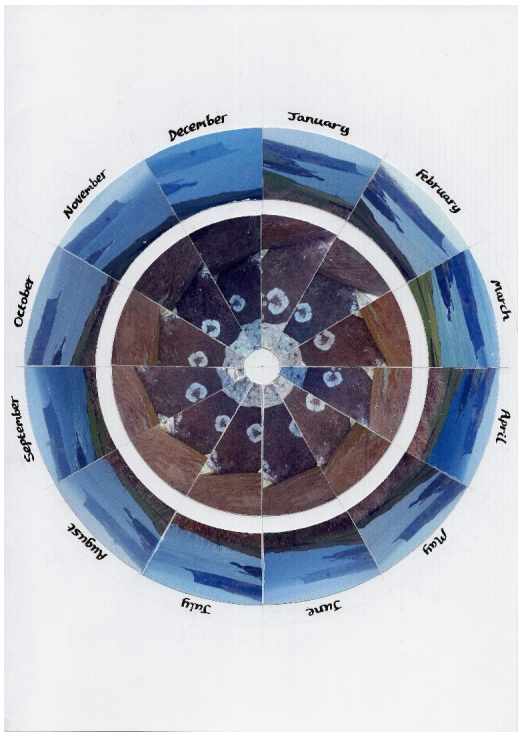

Figure 4 Montage of 24 images taken in 2021, arranged to facilitate visual comparisons (see end of newsletter for a full page diagram)

This is a 'round table' presentation of 24 images, two for each monthly visit. The outer photographs give a general impression of the light conditions over the landscape on each occasion.[viii] The inner images are cut-out sections of the photographs taken in the shadow region under the dolmen. For instance, the April inner 'pie sector' is a part of the whole image in Figure 2. Arranging the photographs in this way facilitates visual comparisons – useful to help in seeing any subtle colour differences.

With regard to the present author's attempts to directly perceive subtle colours in the shadows under the dolmen, the only honest answer is 'God loves a trier!'. However, an unexpected result of such endeavours is a greater sympathy for such places – the solitary monthly visitor may meet one with a particularly long and faithful dedication to its task, almost entirely unappreciated by the human beings on earth today.[ix]

Coming back to the physical observations and photographs of the shadows under the dolmen, no clear conclusions can be drawn at this stage – the exercise thus far has shown how complex, subtle and fast changing light conditions can be in the natural environment. It is important to admit and even embrace inconclusive results in scientific endeavour. The world of professional natural science is currently undergoing a kind of 'crisis of confidence' and one aspect of this crisis involves problems arising from the strong incentive for scientists to publish a decisive result. Such strong motivations to produce headline affirmations of theory can lead to bias in handling results, inflated claims and sometimes downright dishonesty. Stuart Ritchie has charted some of these problems in his book *Science Fictions* (2020) although it should be remembered that many previous writers have highlighted the potential pitfalls in scientific literature, such as J.W. Goethe[x] and various recent philosophers of science such as Bruno Latour[xi].

Looking back to the wider context of Steiner's interest in the dolmens/cromlechs and the subtle colouring of the shadows beneath them, there is most probably a link to a 'crisis in confidence' among Steiner's followers that occurred in autumn 1922, about a year before the journey to Penmaenmawr. A visitor from England, V.C. Bennie, challenged a claim made by Steiner in his *Light-Course* lectures regarding the kind of reality exhibited by coloured shadows produced in artificial experiments.[xii] V.C. Bennie, working from notes of the *Light-Course* lectures, first convinced himself in London that Steiner had made a mistake, then convinced some of Steiner's natural science co-workers during a working holiday in Dornach in 1922, eventually leading to two evenings of experiments where Steiner was publicly humiliated in front of his colleagues. The confidence in the *Light-Course* lectures was seriously damaged and this sad episode is likely one of the main reasons that anthroposophically oriented natural science has been so poorly developed over the past 100 years. Financial markets rise and fall on that delicate *intangible asset* called 'confidence'.

The present author has been carefully examining all the available evidence surrounding this affair and

although Bennie was promoting a valid viewpoint, he went far too far, managing to persuade those around Steiner (and many others in later decades) that Steiner incorrectly stated the result of an experiment with coloured shadows. What no-one involved appeared to recognise was that these issues had already been debated about 80 years before and that leading figures in science such as G.T. Fechner, Hermann von Helmholtz and the rest of the community of colour science researchers all agreed with the result of the experiment as stated by Steiner, if not his interpretation of the result. Therefore, Mr. Bennie had effectively undermined Steiner's authority by implying (probably unwittingly) that the leading 19th century workers in this field were also mistaken in their observations! This is a salutary lesson in the importance of everyone involved in a scientific debate needing to know the history of the field of study. As Goethe wrote in his *Theory of Colours*: "…the history of science is science itself."[xiii] Steiner's focus on the dolmens/cromlechs and the subtle coloured shadow phenomena beneath them may have been his way of transforming a severely damaged impulse from the year before. If any Members wish to read an in-depth discussion about the controversy involving V.C. Bennie, please contact the author on the telephone number below. Long term Members of the Science Group may recall a lengthy debate in the pages of this Newsletter between Ron Jarman and the present author about this ongoing controversy regarding the nature of coloured shadows. New historical evidence relating to Bennie has been found since that 2003 – 2006 debate of correspondence[xiv] in this Newsletter and there are new perspectives to convey, if any Members are motivated enough to survey this evidence. The contest of authority that developed between Bennie and Steiner is probably the most significant event that has occurred in anthroposophically oriented natural science thus far - it has repeatedly undermined various impulses to renew natural science for over a century. With the 100th anniversary of the Anthroposophical Society in Great Britain this year, this 101 year open wound needs healing, not ignoring, and the Anthroposophical Movement in England has a special responsibility in this direction.

Malin Starrett, D. Phil Tel.: 0044 (0)28 20730628

Discovering 'interfluence' of creatures from the ancient seas of Kimmeridge Bay

As you walk along Kimmeridge Bay, which I try and do every year with my students, the first thing they notice immediately after a 'wow' moment of seeing the sea cliffs of Kimmeridge for the first time is a lack of mobile phone signal. They are teenagers, and for them their contact with the digital world is important. They have their phones so they can take photos of their observations/finds to create a poster back at school. They all want to find a fossil as we jump from rock to rock aware of the potential cliff falls beside us.

They will visit Lulworth Cove and the Etches Collection during the same trip. I'm trying to show these class 9 students in a block on geomorphology, the polarity of the dark, grey Jurassic muds along the near straight coast of the Bay compared with the white Cretaceous chalk at the near circular cove at Lulworth.

I like them to imagine the relationship between the creatures which lived in the Jurassic seas of the time; the pliosaur, ichthyosaurs, the long-necked plesiosaurs, marine crocodiles and the smaller belemnites and ammonites. Pyramidal indent marks on a plesiosaur limb bone at The Etches Collection suggest they have been

Snout of the pliosaur found by Phil, April 2022.
Photo: Philip Jacob

Extraction of the skull of the pliosaur from the cliff. Photo: BBC studios

nibbled on by something bigger whereas ammonites have the back of their shells removed suggesting the internal organic mass was sucked out of its shell, implying its prey was smaller, different. And so, with detailed observations, 'interfluence' of relationships of these sea creatures can be revealed.
It's a remote place, visited by surfers, local swimmers, walkers and the odd fossil hunter. Steve Etches is one of those. I first met him on a visit to the Jurassic coast with Judyth Sassoon on a bright, cold Winter's Solstice. Steve has a remarkable collection of fossils from the coast once housed in his garage. Now they are contained in the Collection which is a delight to visit. I got to see 'back of house' and Steve gave me and my daughters a tour of his preparation and storage area. He showed me various fossils and asked me while smiling what I thought one was, I said 'well it looks like poo!' and it was; coprolite. I remember vividly him telling us, while we walked the Bay, that in the past scientists didn't think the Kimmeridge held any decent fossils. They'll eat their hats now!
When Phil Jacobs found the tip of the snout of the pliosaur lying at the base of a shaley cliff, too heavy to carry, he would have had to walk back along the coast and up to the village to fetch Steve. And with the sea coming in, returning with a makeshift stretcher this wouldn't have been a quick task. No mobile signal to call easily from the beach.
Later with a drone they took a closer look at the cliff, this led to a gathering of a team of palaeontologists and climbers to excavate the site while dangling on ropes from the cliffside. They uncovered in 3 weeks, not only the jaw, but nearly a complete pliosaur skull and now they are fund raising to extract the rest of the body from the cliff.
When I visited with my students last summer the museum preparation area was shuttered up and we could hear drilling behind. I asked Steve what he was up to, at the time it was all hush, hush. But I knew something special was going on.
More reports came out just before Christmas 2023, with a showing of the BBC documentary on New Years Day 2024. Here it's revealed that the skull measures a staggering 6'5" long with 130 razor-sharp teeth, each of which is ridged at the back to help it slice into its prey. The striations on the tooth are believed to allow for easier biting of flesh. Scientists say this discovery is one of the most complete pliosaur skulls ever found and may even represent an entirely new species (Dr. Judyth Sassoon).

"I stake my life the rest of the animal is there," Steve told BBC News, "And it really should come out because it's in a very rapidly eroding

environment. This part of the cliff line is going back by feet a year. And it won't be very long before the rest of the pliosaur drops out and gets lost. It's a once in a lifetime opportunity." (https://www.bbc.co.uk/news/science-environment-67650247)

As for school, I sent the BBC documentary film to my class 9 students to watch. We are in the midst of a class 9 biology block on the senses and rhythmic system. I hope they will be intrigued by the pits on the snout (foramina) and the parietal eye of this massive pliosaur. I can imagine an engineer will be interested in its 4 propelling flippers and Dr Luke Muscutts' model to look at its hydrodynamics or the ingenious craft built by a local farmer, Rob to lift the fossil up the cliff. My class 12 evolutionary biologists will love the link between penguin and pliosaur. So many interfluences to discover.

I can't wait for our next trip down to the south coast to see the pliosaur at the Etches Collection. I wonder what else we'll find on the beach….

Sarah Houghton
High School Science Teacher
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Various links for you to do your own research on the pliosaur:
https://www.bbc.co.uk/iplayer/episode/m001txg2/attenborough-and-the-giant-sea-monster
https://www.theetchescollection.org/giant-sea-monster
https://www.theguardian.com/tv-and-radio/2024/jan/01/attenborough-and-the-giant-sea-monster-review-quite-possibly-the-most-deeply-joyous-show-ever-made
https://research-information.bris.ac.uk/en/persons/judyth-sassoon/publications/
https://www.swanage.news/purbecks-deadly-sea-rex-to-go-on-display-at-kimmeridge-museum/?fbclid=IwAR0ogKSpwSklAdSjtNgcQ-NFZvwUNfQF82XYrAEO77znwKml2B-_xpTFZnU
https://www.facebook.com/photo/?fbid=10228443781746166&set=a.10228443788546336
https://www.newscientist.com/video/2407737-pliosaur-discovery-on-jurassic-coast-is-very-likely-a-new-species/?utm_source=rakuten&utm_medium=affiliate&utm_campaign=2116208:Skimlinks.com&utm_content=10&ranMID=47192&ranEAID=TnL5HPStwNw&ranSiteID=TnL5HPStwNw-hQbdGPJAqhUS4cH2Oxu9Pg

Forthcoming meetings and Events

Goethean observation practise mornings, Stroud
Contact: simon.charter@live.co.uk

Winter day	January 27th
early Spring morning	March 2nd
Spring day	April 20th
Summer day	June 15th
Summer morning	July 27th
early Autumn morning	September 7th
Autumn day	October 19th

Annual Projective Geometry Workshop and Research Seminar
Thursday May 30th 6pm - Sunday June 2nd 12 noon
Field Centre, Nailsworth, Gloucestershire.
Registration: alexandermurrell@hotmail.com
This event is always open and accessible to those with little experience of projective geometry as it involves many practical drawing exercises. Research themes continue on:

- George Adams work- Space and the Light of Creation- especially the second chapter Music of Number.
- The Pentagons in relation with the four members of the human being referred to in the lecture cycle Wonders of the World.
- The archetype (George Adams name) of the Dodecahedron / Icosahedron with its 31 lines and 31 points.

Summer preparation conference for Waldorf Teachers (includes science elements)
17-19th July
St Michael Steiner School, Hanworth Air Park, London.
Details TBC.

Evolving Science 2024
Herbsttagung der Naturwissenschaftlichen Sektion
10th – 13 October
Natural Science Section, Switzerland

Natural Science section AGM and conference
8th -10th November
Stroud
with Matthias Rang from the Goetheanum, provisionally looking at the 'warmth and air aspects of the earth organism.'

Membership

Note from the Treasurer and Membership Secretary.
The subscription for membership of the Science Group (including receipt of Newsletter) stands at £10 per year. If you have not already done so, please update your standing orders and let me know when this is done. I can still accept cheques but the local bank has closed so paying cheques in is more difficult. Standing orders or direct payment are preferable.
Our account is "The Science Group"
Sort code: 20-23-97
Account No. 90800007 with Barclays.

Membership subscription is £10 (UK), £12 (Europe) or £14 (elsewhere). For all membership and subscription queries please contact Simon Charter, simon.charter@live.co.uk, 01453 882114.

Next Issue & Thank You

This newsletter wouldn't happen without you! So dear readers if you have made it this far, and hopefully you have, then please send copy to the editor by 1/7/24 and let's hope for a bumper summer/autumn edition prior to our next AGM.
Email: sarahhoughton@stmichaelsteiner.com

Disclaimer

The opinions expressed in the published reports and articles are the authors' own and do not necessarily reflect the views of the Editor or members of the Science and Mathematics Group of the AS of GB.

A very rare example of a chicken egg drawn path curve within their path curve surface (thanks to Chris Addison, photo Simon Charter)

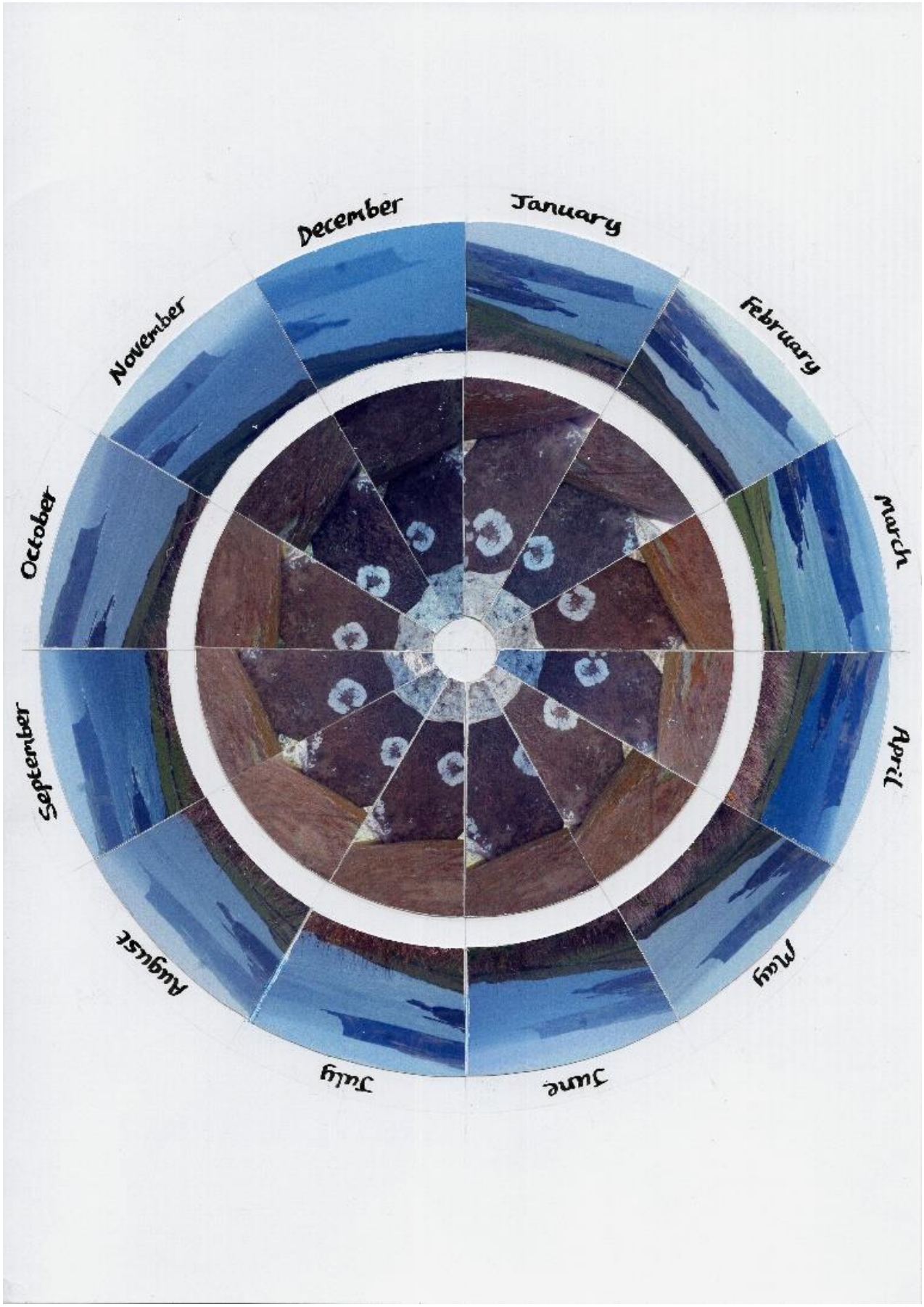

Figure 4 Montage of 24 images taken in 2021, arranged to facilitate visual comparisons (Malin Starrett)

Shadows of a Dolmen

[iii] Steiner, R. "Oral Description of the 1923 Visit to Britain" 9.09.23, contained in *Rudolf Steiner Speaks to the British* (1998), p.234-237. See also Lecture 1 and Lecture 4 contained in the book *Man in the Past, The Present and the Future…*(1982). Note that there are some contradictions in the stated date(s) of Lecture 4 in that book. A later lecture of 30.09.23 has a similar description, Lecture III in *Michaelmas and the Soul Forces of Man* (1982).

[iv] See reference to lecture of 30.09.23 in note 1.

[v] Place name and meaning from Marshall, J.D.C. *Forgotten Places of the North Coast* (1987), p.93-98, 145-147.

[vi] In the lecture of 30.09.23 – see note 1.

[vii] The lack of detail here is considered justified as this article is only an overview of a project, with no strong claims being made regarding any results. Further details available on request – phone number at end of article.

[viii] Note that the sea appears most blue in the April photograph but the grass is a duller green than in the March photograph, perhaps suggesting an especially blue sky on the April visit. And yet, the colour temperature reading on the April visit was not particularly high: 6750K with a slight green bias (+5CC) but it should be remembered that a colour temperature measurement taken in the open landscape in sunshine will be a *mixture* of the colour temperature of the sunlight in combination with the colour temperature of the sky itself. Therefore, such a reading may not fully reveal how much blue skylight is entering the shadows. However, the warm-cool *polarity* in the shadow under the dolmen in the April photo. is still difficult to account for.

[ix] It is no wonder that spirits of place might be tempted away from their appointed task in the landscape and carried off to the world of glamour and celebrity, serving the entertainment industry instead of the divine hierarchies. Devas becoming Divas!

[x] Goethe's critical approach to scientific literature is particularly obvious in the "Polemic Section" of his *Theory of Colours* (1810). Goethe was able to critically examine Newton's *Opticks* (1704) on multiple levels, in terms of: use of language, rhetorical technique, use of diagrams as well as experimental results. However, not all of Goethe's criticisms are valid, fair or justified. An English translation of the "Polemic Section" appeared recently: Goethe, J.W. (trans. by Duck, M. and Petry, M.) *Goethe's "Exposure of Newton's Theory" – A Polemic on Newton's Theory of Light and Colour* (2016), Imperial College Press.

[xi] Latour, B. *Science in Action – How to follow scientists and engineers through society* (1987), Harvard University Press.

[xii] Steiner, R. *The Light Course* (2001), Seventh Lecture (30.12.19).

[xiii] Goethe, J.W. *Theory of Colours* (1970), M.I.T. Press, Preface to the First Edition, xliv.

[xiv] See issues of this Newsletter from March 2003 to September 2006. The ongoing debate in anthroposophical circles regarding the nature of coloured shadows has recently received recognition from the 'conventional' colour science community in an article by Sik-Lanyi, C., Szücs, C. and Hirschler, R. "Coloured shadows – Why they can be photographed" *Color Research and Application* (2019), p.1-16. They laudably credit Steiner as being the first to suggest using photography to study coloured shadows but their article does contain some considerable distortions of the work of Hans-Georg Hetzel and that of the present author. They also omit to mention the only book of the last two centuries which is devoted to a general discussion of the phenomenon of coloured shadows: Ott, G. and Proskauer, H. *Das Rätsel des Farbigen Schattens* (1979), even though they present a comprehensive literature review (including German language texts). The authors were informed of this omission before publication, but they declined to correct the omission.