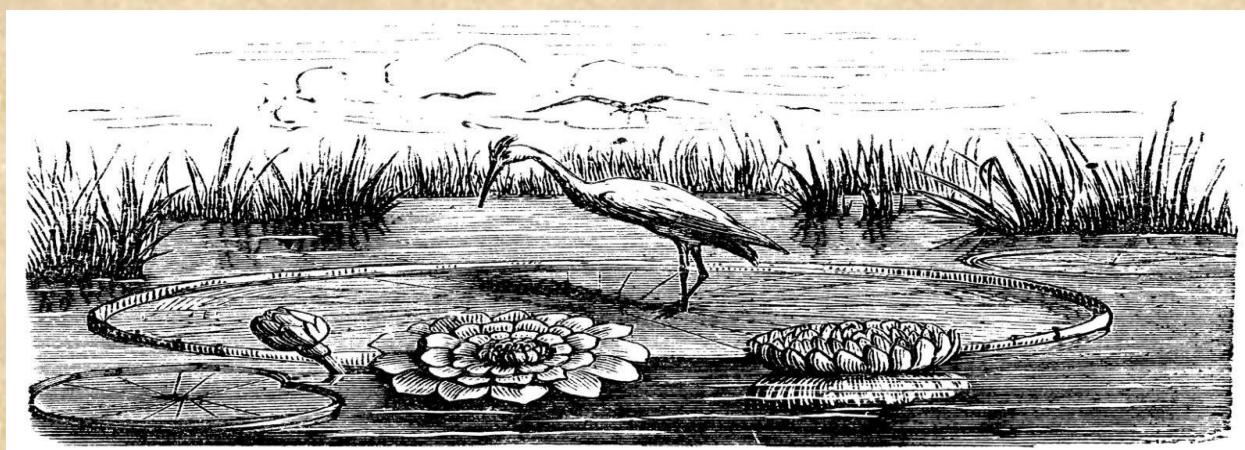


NATURA

Illustrated Newsletter of the Natural Science and Mathematics Group of the AS of GB



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Poetry

Epirrhema

You must, when contemplating nature,
Attend to this, in each and every feature:
There's nought outside and nought within,
For she is inside out and outside in.
Thus will you grasp, with no delay,
The holy secret, clear as day.

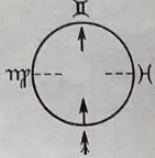
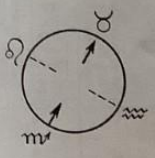
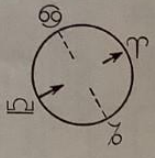
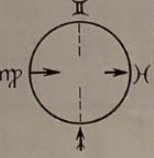

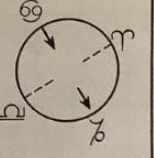
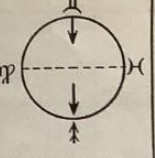
Johann Wolfgang von Goethe (c. 1819)
Translated by Christopher Middleton

Articles

Plasticity

This article is partly a response to Maarten Ekama's paper on Rudolf Steiner's Occult History published in the 2019 Spring Summer Science and Maths group newsletter. It also considers some of the wider issues involved in comparing Steiner's view of Evolution with modern Geological thinking. An attempt to bridge the differences is made by considering recent research on rock plasticity.

Readers may be familiar with some of the following sources; two books "Occult Science" and "The Inner Nature of Evolution" by Rudolf Steiner, "The nature of substance" by Rudolf Hauschka, "The living Earth" by Walther Cloos, "The Evolution of Mankind" by Guenther Wachsmuth. I have also referred to www.hindawi.com for recent engineering research on rock plasticity. This paper is intended to open questions rather than give definitive answers.

5th Post-Atlantean Period. The Present	6th	7th	1st Period of VI. Phase. Fig 35-36	2nd	3rd	4th
Prototype I  Ca. 100 B.C. -2500 A.D. Summer II Spring)(Prototype II  Ca. 2500-4400 A.D. Summer ♂ Spring ≍	Prototype III  Ca. 4400-6300 A.D. Summer ♀ Spring ♂	Prototype I  Ca. 6300-8600 A.D. Summer)(Spring ♂	Prototype II  Ca. 8600-10,800 A.D. Summer ≍ Spring ≍	Prototype III  Ca. 10,800-12,100 A.D. Summer ♂ Spring ≍	Prototype I  Ca. 12,100-15,400 A.D. Summer ♂ Spring ≍
Mystery of Golgotha Mystery-wisdom becomes tradition. Change of consciousness in middle ages 1413 A.D. Fifth period begins. Technology, industry, materialism. Civilisation affects entire earth. Fission of matter (atomic forces). Conquest of space. New spiritual Science.	Man recovers spiritual perception. Faculty of Inspiration. New stage in mastery of vital processes in nature and of cosmic forces.	Through scientific-spiritual knowledge man realises unity with the cosmic organism. Faculty of Intuition. Spiritually oriented social order. <i>War of all against all</i> <i>Survival of small group</i>	Severe alterations in earthly processes. Gradual disappearance of old forms of reproduction. Decrease in warmth. Gradual approach of Moon to earth.	Further differentiation among men. Some develop body-free consciousness, some remain completely tied to body. Shift to a new ice-age and rigid phase in certain areas of earth.	Increased union of higher human consciousness and spirit-cosmos. Gradual dying out of body-bound human types.	Transformation of forms and rhythms of human incarnations. Increased metamorphosis of cosmic evolution. Probable peak of new ice-age.
	2	2	The above phases follow those shown in Table VII.			

Future Phases of Evolution

TABLE XI

Fig.1. From "The Evolution of Mankind" by Guenther Wachsmuth. Copyright Philosophic Anthroposophic Press Dornach, 1961 For educational use only.

Walther Cloos mentions rock plasticity. He describes how pockets of granite plasticity were discovered during the excavations of one of the Alpine tunnels. Today, clearly defined mathematical formulas are used by civil engineers for designing projects at risk from this phenomenon. Plasticity occurs when rock, in a contained environment, is put under excess pressure. The rock actually softens and can lead, for example, to collapse in a tunnel. If the rock is not contained, then the opposite happens, it becomes brittle and shears. Another sort of plasticity phenomena, experienced sometimes during earthquakes, is soil liquefaction. Soil and clay strata become liquid and can swallow up whole villages. This happened to Petroba in Indonesia in September 2018 and to a lesser extent in Christchurch, New Zealand in 2011. Soon after the event, the ground quickly firmed up again.

These concepts around plasticity may be helpful for the following discussion. Steiner's vision of Earth evolution is very much connected with plasticity, not just in the event of earthquakes or unusual pressure events, but as a tendency affecting the whole earth. So, for example, Walther Cloos draws our attention to Steiner's comments that 15000 years ago the earth became temporarily softer which resulted in some considerable earth movements. This eventually led to the end of Atlantis and beginning of the Post Atlantean epoch. To my knowledge, there is no evidence of this, at this time, in modern day Geology. Maarten suggests that Steiner made errors over the dating of the ice age and that his assumptions were made based on the state of Science at the end of the 19th Century. Steiner gave four lectures in 1919 entitled "The influence of Lucifer and Ahriman, Man's responsibility for the earth". In these lectures, Steiner describes the geological thinking of his time as a logical fantasy. He asserts

that changes to the earth are not prompted by consequent geochemical reactions but by influences coming from the spiritual world. So there appears to be an impasse. The purpose of this paper is to find concepts to bridge this divide.

One of the most marked differences in Steiner's evolution is the emphasis on imminence as compared with vast millions of years described in modern geology. Walther Loos quotes Steiner as saying that time cannot be computed beyond 20,000 years ago. He explains, this is because of the departure of part of the earth to become a satellite, our present moon, during the Lemurian period. For Steiner, this event significantly changed all the calculation parameters currently used by modern geologists. Modern geologists retort, there is no geological evidence for this event during this period of earth history.

Can the differences be explained because each system of knowledge carries a different concept of plasticity? Steiner's descriptions imply an in-breathing and out-breathing of hardness and softness of the earth which facilitates, at times, quite rapid changes. Modern geology cannot permit such thinking, as it insists that change can only take place according to currently known phenomena and chemistry. So it has to construe millions of years of development to explain the record it sees in the earth strata. Steiner would say, that what modern geology sees in the earth record, happened in a series of recapitulations beyond their imagination, and some events occurred much more recently.

So this article asks the reader to keep an open mind and not assume that Steiner was mistaken or unduly affected by the science of his time. His source of knowledge was quite different, based on Cosmic memory. Steiner described this as a spiritual faculty which in due course will become a normal faculty of cognition. But with all spiritual cognition, it is difficult to pinpoint precisely the time in earth history. Errors do occur, but it is important to be clear that these are not errors of millions of years!

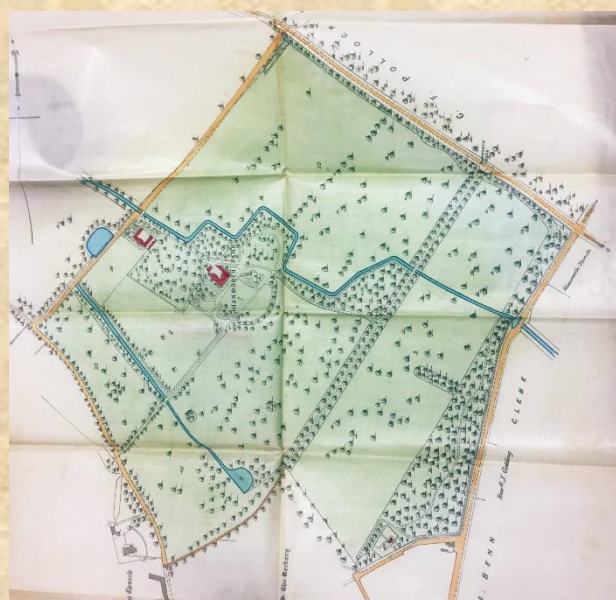
As a last postscript on this theme, I would like to mention Willard Libby's discovery of radio carbon in the late 1940s. Radio carbon is formed in the atmosphere by the interaction of cosmic rays and nitrogen (see Wikipedia *Radio carbon dating*). This radio carbon combines with oxygen to form radioactive carbon dioxide. This radioactive carbon dioxide is incorporated into living substance and can be

used to date past events because there is a known rate of decay for radio carbon. This hypothesis depends upon assumptions about the known rate of decay. I suspect Steiner would have a few things to say about that!

Adrian Lamont
Sculptor

Diary of a Science Teacher

Every teacher gives a perspective of themselves when teaching, or that's what I have found out over my 9 plus years of teaching science and outdoor curriculum in Waldorf Schools. In fact, my teaching in parent and child group could add ~ 3 years on to that. Or in addition my time working and studying at the Department of Earth Sciences, UCL/Birkbeck College. And, if this diary is to start here, in *Natura*, then it needs an introduction.



So, I will begin with a little about the area, a ‘Spirit of Place’/‘Genus Loci’ type opening to the place in which I teach and live now: The St Michael Steiner School, Hanworth Park (south side), nearest train station, Feltham. Near the beginning of the M3 and blessed for some (the airplane fanatics) and not for others by the planes from Heathrow.



The park itself is a hidden jewel on the edge of London Town. For the locals it is blessed with history; of Henry XIII as a hunting ground or as the landing spot for Amelia Earhart, 89 years ago, in May, as she made her record breaking solo journey across the Atlantic.

During the lockdown, as for many, we have travelled less further afield and so my local park has become a haven which I have grown to love and look after. I have lain in the park with students and studied the clouds. I have walked across it while out with my wee dogs and I have studied it during ecology blocks with my Class X-ers. It is used to be our P.E. Department and other teachers in our school. It is a natural resource which needs looking after. So in April, I have been actively engaging the local community. With more people in the park during lockdown and fewer park bin collections by the council more litter was noticed. My local councillor told me their policy in the past was fewer bins meant to encourage park-goers to take their rubbish home. But the litter was becoming problematic as the collections had lessened and the people in the park, increased.



To bring the spirit back to our park I joined the local Friends group and set-up some litter picks to help encourage “community” while supporting the biodiversity and enjoyment of the park. We all commented during the monthly social-distanced gatherings on the increase in bird song as the traffic had decreased and how we enjoyed the wide-eyed vista of the park especially at sunset. Looking after our urban green spaces is so important and so the future activities will include foraging walks, botanical observation, bird spotting workshops, history and cloud gazing. Activities to help the public really see what is in front of us and appreciate it, obviously bringing Goethean observation to all.

So, this little known park will become an even more loved space. It is acid grassland and home to a variety of plants: Birds foot Trefoil, Tormantil and Harebell. Ground nesting skylarks reside between the ant-built hummocks on the park and more recently there have even been sightings locally of an

adder. Buzzards can be seen flying high, while greater spotted woodpeckers can be heard drilling their new holes in the monolith ash.



As teachers we may think big and look out to the world for ecological areas of study but sometimes forget what is directly under our nose! What's under yours? DO send photos of your local, natural environment. Do send photos to the editor of Natura. And ofcourse, I will also bring some of our science work to you here.

Sarah Houghton

References/Thanks:

<http://earchives.lib.purdue.edu/cdm/ref/collection/earhart/id/88>

Friends of Hanworth Park House & FORCE – photos

News and Views

Reports

**Minutes of the Annual General Meeting of the Natural Science and Mathematics Group of the Anthroposophical Society of Great Britain.
Online Zoom meeting held on 31st October 2020**

Present: Sylvie Small Maarten Ekama Philip Kilner Alexander Murrell (Minutes) Simon Charter (Chair) Adrian Lamont Chris and Ann Addison Charles Tolman Paul Jenkins Denis Wight Raoul Spiegel Ann MacMillan We were later joined by Sarah Houghton

Apologies: Judyth Sassoon Aonghus Gordon Simon Reakes Malin Starrett John Byrde Margaret Stornach Angela Clarke Pat Toms Jennifer Greene

After a brief introduction to one another we heard the presentation by Philip Kilner -This was well received and very stimulating. Water phenomena at different scales within living organisms Whereas Goethe wrote that telescopes and microscopes violate the immediate reality of nature, Philip expressed the idea that Imagination is a truth seeking faculty even into very large or very small domains. He cited Denis Noble: “ There is no privileged scale of causation, so one-sided reductionism does not really explain things. Both reductional and contextual views together give a more complete imagination of what is going on in the world.. A better imagination than particles at the atomic level would be *kinemorphodynamicals*! Gerard Pollack and Mae Wan Ho have researched water in hydrophilic gels and membranes, and describe what they call a liquid crystal phase of water. In living cells water is rarely more than 10 microns from a membrane, and current research indicates that the state of water in such proximity likely to be in this different state of matter. Blood capillaries at 7 microns in diameter are also at the scale where quite different forces come into the fluid movements. Philip drew our attention to Merlin Sheldrake’s book: “Entangled Life”. Fungal filaments which have a very large role in the ecology of nature are at a scale of about 5 micrometres. Finally Philip characterised the role of the heart, which forms in the embryo when still at the millimetre scale, as preserving “ unity in diversity and complexity” and “ continuity in continual change”. Alexander Murrell presented some facts about the forthcoming great conjunction of Saturn and Jupiter- for the first time since 1107 in the constellation of Capricorn. The 800 year cycle of the great conjunction triplicities through the tropical zodiac perhaps links up with the “seven to eight hundred year” phases in mankind’s evolving consciousness which Rudolf Steiner identified in his book Riddles of Philosophy. From an astronomical view point there are good reasons to see 1921 as a midpoint in the new 800 year period that Johannes Kepler and Tycho Brahe announced at the beginning of the seventeenth century. Rudolf Steiner’s cosmosophy lecture courses began immediately in the wake of the great conjunction of that year. Perhaps we can look at the phenomena of these approaching planets as a challenge to overcome dualisms of all kinds, for example spirit and matter, or mind and heart. Rudolf Steiner bridged some of the divisions in modern consciousness by , for example , developing the concept of the etheric body as a middle between the psychic and physical parts of human beings. 1107 is also the beginning of the final seventh

of the Greek Roman Age during which the great Cathedrals were built. In the next decade we shall be completing the second seventh of our intellectual-scientific – technological age which began in 1413.

REPORTS: A report was read out on Judyth Sassoon's developing connection with Exeter University Department of Sociology Philosophy and Anthropology. They are exploring "Typological thinking" in evolutionary biology. A report was read out from Simon Reakes on progress with the Goethean Science Course run by Ruskin Mill Trust. Also the new "In Dialogue" Journal has published its first edition available as a download from the Field Centre website and on request as hard copy. There will be an "In Dialogue" conference at Trigonos early next year. This initiative is a collaboration between Troy Vine and Philip Frances who was editor of the Holistic Science Journal for many years. Jonathan Code is teaching at the Agricultural University in Cirencester and intends to hold a natural science conference there on "Ways on knowing and ways of growing" looking into how science can become adequate to the present challenges and how to contextualise the reductive and mechanistic approaches currently most prevalent.

DISCUSSIONS: Name of the Group We read out and discussed some questions from Malin Starett about the change of name of the Science Group to include Mathematics. Malin is concerned that such a change should have been more widely consulted about. He is also concerned about the lack of experimental work being done at the moment in the UK and wondered if the change of name could further weaken our commitment to support and encourage actual experimental research. It was acknowledged that Anthroposophical Natural Science research is limited in the UK and there is very little active presence in Universities for example. The people attending the AGM did not feel concerned about the inclusion of mathematics in our title. Although Mathematics is an independent form of thinking from natural science there is considerable overlap. The wish that we include Natural Science in the title was also expressed. The need for support and encouragement of research was recognised, although it was pointed out that research does live in people in different ways, for example through teaching. It was felt also that we need to overcome the "boxing" tendency of specialist studies and it would be of benefit to attract people who have both artistic and analytical capacities.

ZOOM MEETINGS: There was great appreciation expressed for this meeting and being able to receive the presentation. The wish to do them more often was widely felt and Charles Tolman offered a presentation for the next. Given that we have many members in other countries and that physical meetings are not easy for many to attend even in normal conditions (let alone when the world becomes so paralysed through our risk reducing restrictions around a virus) zoom meetings can have great value. The intention to hold these more regularly was strongly formed. The success of this does depend on content of course. However the content does not need to be polished presentations but could be a led discussion on a theme or small contributions and leading thoughts. This will be discussed in the carrying group and hopefully events planned shortly. Simon Charter reported on the Financial situation and membership (see separate attachment). The work of the carrying group was appreciated and those members in the current carrying group, confirmed for another year by the members present. We would like to invite new members to become involved in the carrying group and to infuse it with new, creative impulses.

Simon Charter and Alex Murrell

Meetings

The Scientific works of Lili Kolisko

I have received from a number of sources some original publications of Lili Kolisko about capillary dynamolysis in connection with astronomical events, especially solar eclipses. Whenever possible between 1923 and 1960 she travelled to where the eclipses were visible and carried out her experiments there. I am also looking after the photographic slide collection from her work during the early 1960s. She was initially inspired in her research under the direct supervision of Rudolf Steiner from the foundation of the Natural Scientific Research Institute at the Goetheanum in 1922 and continued working with capillary dynamolysis until the 1960s.

She clearly demonstrate differences in experiments conducted in the morning, evening or at night and had no difficulties with the ordinary cause and effect explanation of these variables for example by the moisture content of the atmosphere. I have visited the place where she did her experiments at the

back of a walled garden where conditions would follow closely any meteorological changes. Her participation in the conditions of the experiments flowed into her interpretations of the pictures which developed. This was not science as usually understood with its control of variables, and the removal from environmental conditions. It is usually a precondition of everything considered scientific that results are independent of the individual scientist. With Kolisko's work her participation on every level, both inwardly as well as outwardly, was essential to the whole project. Rather than proving an astronomical influence on the chaotic phenomena (as we understand these today) I rather think that she *achieved* this astronomical participation.

The challenge for us a hundred years after the founding of the Goetheanum natural Scientific Research institute is to continue this work in the right spirit. There seems to be uncertainty about where all the work led to and if there were repeatable or justifiable conclusions. The scientific test of repeatability means, in this case, a whole-hearted participation on every level by researchers who want to walk the inner and outer path.

I am interested in sharing the historical legacy of Lili Kolisko's work, and also in collaboration with the practical side of performing experiments in capillary dynamolysis. Please contact me if you are interested too.

alexandermurrell@hotmail.co.uk.

Alexander Murrell

Creative Environmental Study days in Chalford near Stroud.

Practicing a closer participation in nature

We would like to re-establish regular opportunities to engage with the natural world, both to get to know aspects of it more fully and to stimulate our own creative response. It is only through living into the life around us that we can develop a sense for the needs and the creative opportunities it presents to us. We will build on the experiences of previous studies done in Stroud and elsewhere, "Encountering nature" and various Goethean study programmes. In order to build shared understanding and also to allow each participant to follow their own interests, there will be some suggested process and some agenda free time in each day. The idea is to establish a community of practice in this way of

engaging with nature and get to know more deeply what is working there.



We will meet on a 2 acre site beside the river Frome in Chalford where there is plenty of birdlife, plant-life, clear flowing water with a wonderful aquatic ecology and a newly built study and craft space. We will start with 4 days per year but if there is a wish for it we can increase the frequency of these events.

Initial meeting Saturday June 26th, 9 am – 4 pm
Further provisional dates to be confirmed - September 11th 2021, January 8th, March 5th 2022.

Venue: The Garden Room, Old Mill House, Hampton Lane, Chalford, GL6 8NX

Drinks provided, bring and share lunch, freely given contributions towards venue costs are accepted but not expected.

More information, Simon Charter 01453 882114,
simon.charter@live.co.uk
(prior booking would be helpful)

Jasmin Frances and Simon Charter

Advance notice

Science Group Annual Meeting

Saturday November 6th 2021.

Special guest: Johannes Wirz, joint leader of the Natural Science Section at the Goetheanum.

Publications

“The University at the Threshold: Orientation through Goethean Science” by Nigel Hoffmann

Reviewed by Judyth Sassoon

“We shall require a substantially new manner of thinking if mankind is to survive”.

Albert Einstein

Nigel Hoffmann’s engaging new book outlines the historical background to the University system and offers practical advice on how to implement Goethean science into tertiary level education. The book is very readable and offers clear, helpful suggestions on how to build a multidisciplinary course upon Goethe’s scientific epistemology.

Hoffmann introduces his book rather surprisingly with an ominous reminder of impending ecological disaster: “Slowly and seemingly inexorably we are destroying the earth”. This is an all too familiar message; but Hoffmann dwells no further on humankind’s destructive nature. Instead, he proceeds to elaborate on the human quality of “care”. Citing Martin Heidegger, he presents human beings as “creatures who care” and argues that the human condition is inclined towards constructive care rather than destruction. However “care” needs to be nurtured and educated and not all forms of education engender strong feelings of connection with the world that nurture the delicate tenderness of care. Hoffmann argues that the current position in education arises from a way of thinking that has been cultivated within society and especially at Universities for several hundred years. This way of thinking is founded on a Newtonian (mechanistic-analytical) mode of scientific cognition combined with influences from Kantian philosophy. Hoffmann acknowledges that whilst this scientific mode has been very beneficial to human development, a threshold moment has been reached and the foundation of university education is now ripe for transformation.

The mechanistic-analytical mode of thinking came to prominence during the Enlightenment. It was the basis of science and later spread into other arenas of work and culture. Analysis refers to the strategy of comprehending phenomena by detaching their component parts from their context. The mind focuses on the attributes of each component and assigns

them to different categories. Rules about the categories are then discovered and aim to explain and predict other related phenomena. The analytical method asks for dispassionate detachment and tends to separate the observer from the phenomena being observed. In contrast, holistic thinking situates phenomena within their contexts and pays attention to the connections between discrete entities, such as the components of the objects being observed or aspects of the context in which they are situated. It engages the mind in a way that attempts to grasp the qualitative character of the whole. Holistic thinkers grasp interconnections between events, perceive multiple influences and also understand the cumulative effect of influences on occurrences that appear separated by time or space. Most human beings are able to engage in both activities at different times depending on the situations they need to face. By its very nature, holistic thinking is a deeply connected way of relating to the world around, and also accommodates itself better to the networks and relationships of nature. However, the analytical approach still prevails in scientific research and education and has extended into other arenas, including general education, literature, art, economics etc. Hoffmann proposes that the introduction of more holistic ways of thinking into the University curriculum itself could offer a solution and suggests Goethe’s scientific methodology, which is intrinsically holistic in approach, as a way of going forward.

Goethe’s methodology in science is based on making connected sequences of observations and arranging them in a self-illuminating order, which reflects their inherent structure. The arrangement is itself guided by the phenomena under observation, not by the proclivities of the observer. The idea that arises from the connections between individual observations is the archetype for that series of observations. It is not something separate from the observations but lives within them, and the phenomena themselves are all expressions of it. Goethe’s method is an intimate, focused and unhurried form of engagement with a strong participatory aspect. The observer does not detach from the observations, but instead dwells in the phenomena, deepening them through recreating them exactly in imagination. Goethe emphasised the inner activity and participation of the subject in constituting the observed phenomenon through the imagination such that the activity of thinking and imagining becomes a powerful, lived experience of participation within the phenomenon. Goethe referred to his method as “deli-

cate empiricism” because it was a delicate response to the overbearing detachment of Newtonian empiricism. Goethe’s methodology in science, which has application in science and other spheres of work, accommodates itself more to the activity of the living world because it works holistically, relationally and interactively. Holistic thinking, which Hoffmann calls “living thinking”, can nourish the natural human quality of “care” because it grasps the realm of the living world directly and involves itself with it.

Hoffmann argues that teaching and learning using Goethean methodology encourages radical changes in ways of thinking about phenomena. It is important to understand that he is not encouraging the teaching of Goethean science as a theoretical topic in a course, but rather to teach courses through the method of Goethean science. Founding teaching upon this method could do several things: firstly, Goethe’s method applied in different disciplines would educate students in the application of different ways of thinking; secondly, if a University implements this system, it would itself have to make changes from within its own structure to enable it to begin teaching courses in this way. Thus, by introducing this form of education, both students and educators would be transformed. Since educators and students make up the institution, the institution itself would also undergo a metamorphosis. Hoffmann rightly points out that while Goethean science still holds on to Goethe’s name, it is a more extensive, cultural current in Western civilisation. This current arose to manifestation in the 18th-19th century but remained below the surface until the present time. Now may be the moment when it can be recognised as something separate from Goethe the individual, and acknowledged as a legitimate science of the living world in its own right.

Before going into the details of how to implement Goethean science into the curriculum, Hoffman presents his interpretation of the development of Western education and then discusses the history of Universities. Education, according to Hoffman, passed through three stages, which addressed their emphasis to different aspects of the human being: bodily activity (will), feeling and the cognitive aspect. In ancient times, education laid great emphasis on bodily learning and “know how”. In Classical Greece, the healthy mind, which was developed through the “liberal arts” was balanced by developing a healthy body, through harmonious movement arts, music and gymnastics. Hoffmann cites Plato’s Republic as his source and speaks of the emphasis on music and

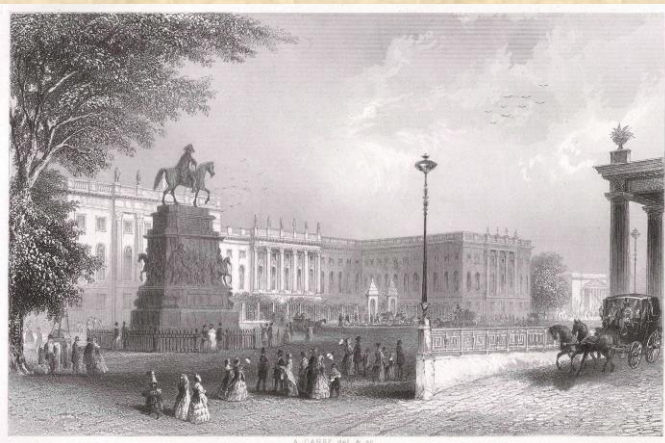
gymnastics in the Greek *trivium* and *quadrivium*. Over time, the educational emphasis changed, and a greater importance was placed on the art of “rhetoric”, formerly also part of the Greek *trivium*. This developed further in Roman and Medieval institutions, where the teacher-Rhetoricians were masters of dialectic. Verbal debates and exchanges worked at the level of feeling because they brought the debating parties into strong relationship. Over time the actual knowledge that someone possessed became greatly valued and of even greater importance than their skills in expressing themselves through speech. This marked the beginning of what Hoffman calls the Doctor/Professor ideal – the Doctor or Professor is the one retains many facts and is licensed to profess knowledge. We still see this in our own time where the encyclopaedic knowledge that someone possesses and remembers gains great respect. I would argue that in modern times there is now a greater recognition of other kinds of learning as well. Recently, much has been written on the role of “artisanal epistemology” - the bodily knowledge inherent in the skills of craftsman, and how that structures and supports intellectual development. Also the role of artisanal knowledge in the history and development of science is becoming more and more recognised. However, Hoffmann claims that we are still predominantly at the stage where the “doctor” education prevails within University institutions.

Universities are founded on a high ideal in which a community of students and scholars is engaged in the search for impartial truth. They pride themselves in a degree of autonomy from religious and political interference and intellectual freedom in research and teaching is paramount. The historical background to Universities is fascinating and Hoffmann identifies three broad stages in what he calls the “historical metamorphosis” of the University institution:

- 1) Medieval universities and institutes of higher learning were characterised by work with classical texts and debates to establish the truths of theology and science. Aristotelian logic featured and the curriculum was an act of dedication to the wisdom of bygone thinkers and their books. Thus, the emphasis was on reiterating the works of the past.
- 2) Humboldtian University. The model of the modern University arose from the reforms of Wilhelm von Humboldt in Prussia and began with the University of Berlin (founded in 1810). It was deeply influenced by the works

of Immanuel Kant and consequently laid emphasis on philosophy and reason. It thus emancipated itself from the past and the learning of philosophy overstepped theology. This Humboldtian ideal of an institute balancing teaching and research shaped universities in the U.S. and was maintained throughout Europe until the late 20th Century, where in some areas it was superseded by the growth of institutes of mass higher education.

- 3) The modern Universities as “multi-versities” serve mainly pragmatic, socially and economically defined ends. They lay more emphasis on career pathways and provide for the individual interests of students offering numerous, diverse courses but have no real unifying philosophy within the institution.



Humbolt University (Friedrich Wilhelm University), Berlin 1850

Young people meet the University at a “threshold” in their lives, a time of transition from youth to maturity. One of its roles is to help students towards responsible citizenship and making a difference in society. Students starting University often feel they are ready to take on the world and hope the opportunities it offers in making new friendships and the chance to try out new things, will give them a “leg up” into the real world where they hope to achieve greatness. Universities as institutions are idealised and to “go to University” is still considered a major achievement. Nevertheless, there are many who believe today’s Universities are in a state of crisis and in need of further reform. Hoffmann cites several authors who argue that “multi-versities” are now run like businesses rather than educational institutions, with significant negative impact on teaching and learning. From some traditionalists, there is a call for return to the “old standards”. In contrast,

Hoffmann argues that rather than returning to the old forms, the present situation is a “threshold moment” for Universities, a moment of potential transformation and Hoffmann suggests that orientation programmes based on Goethe’s scientific method would be a positive step towards initiating the “metamorphosis” to the next developmental stage.

Hoffmann identifies the following key elements within Goethe’s method: gesture, polarity, intensification, metamorphosis, law of compensation, Type (*Typus*), Archetype, archetypal phenomenon, delicate empiricism and exact sensorial imagination. He builds a tertiary level educational programme, choosing subjects that particularly illuminate one or more of these elements. He outlines a curriculum structure that specifically addresses the human being at three cognitive levels of learning; intellectual, emotional and motor sensory (thinking, feeling and willing). He also stresses that his suggested course is not about Goethean science, but rather an opportunity to experience Goethe’s delicate empiricism experienced through many different disciplines. The chosen disciplines are not taught for their factual content, but rather to demonstrate the multiple applications of Goethean methodology.

The cognitive intellect is addressed through philosophical topics, especially the background to the key ideas in Goethe’s method e.g. the influence of Kant and Schelling on Goethe, and also the philosophical foundations to the idea of the archetype, for example contrasting the Platonic archetype and Kant’s *intellectus archetypus* with Goethe’s mobile, developing archetype living within observed phenomena.

Cognitive feeling is cultivated through putting Goethe’s delicate empiricism and exact sensory imagination into practice, and the cognitive will is addressed through creative activity such as work with colour or clay. Hoffmann recommends applying Goethean methodology in a number of disciplines, and gives many clear and useful examples. The following subjects comprise his recommended curriculum: music, sculpture, art, plant studies, zoology, human anatomy and history. For the latter, he uses the example of the French Revolution, demonstrating how the causes of the French Revolution can also be studied using Goethe’s method of manifolding and making connections. It is an excellent demonstration of how a historian can become active in the process of history through the power of thinking and imagining. Similarly interesting is the last section of the book, in which Hoffmann demonstrates how to apply the Goethean method in teaching economics.

As society gradually recognises that there are different ways of knowing, and accepts qualitative epistemologies as valid, it should become easier to implement an orientation course based on Goethe's methodology into a degree programme. I believe Hoffmann's book is a timely vision of a future that could easily be realised and hope that readers who perhaps are responsible for creating tertiary level orientation programmes will be inspired enough by the suggestions in this book to try them out.

Judyth Sassoon

Acknowledgments

We would like to thank the Ruskin Mill Trust for their help in printing the Newsletter.

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Next Issue

This newsletter is usually issued to members twice each year, in the spring and autumn. Once more this year, publication of the spring issue was delayed by the covid crisis. The next newsletter is scheduled for autumn 2021. Please send copy to the editor: js7892@bristol.ac.uk

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