

CORRESPONDENCE

OF THE NATURAL SCIENCE SECTION OF THE ANTHROPOSOPHICAL SOCIETY IN AMERICA

DECEMBER 2018

VOLUME 1 ISSUE 4

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***Understanding Mammals:
Threefoldness and Diversity***

By Wolfgang Schad

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Editor's Note

With this December issue we resume with reports of Geology Group meetings from past years. In this issue, we have an extensive report on the 2016 Geology Group meeting, hosted by the Water Research Institute of Blue Hill, Maine.

Again, we announce that Wolfgang Schäd's [Understanding Mammals](#) has become available (see p.14) and can be ordered at a 25% discount until January 15th. This new two-volume, expanded edition of Schäd's *Man and Mammals* will set the theme for Natural Science Section, AWSNA, and academic conferences in the works.

In this issue we also announce again the availability of a video archive of each evening's lecture for those who could not attend the "Bridging" conference with Prof. Dr. Heusser last month (see p.3).

The *Correspondence* welcomes pilot research reports, comments on current scientific research and news, book and article reviews, letters from readers, reports on meetings and workshops, and announcements. There will be editorial review. **For submissions**, click [here](#).

We look forward to hearing from you. Please send **feedback** [here](#).

Blessings for these Holy Days and Holy Nights,

Barry Lia, Ph.D.
Correspondence Editor

Please Support Our Work

We call upon our readers to participate in the Correspondence by sending us notes and commentary on what you are encountering in relation to science and technology. Feel free to contact the editor [here](#).

We also ask that you please consider making a financial contribution in support of our mission to bring a discerning and unique perspective on developments in science and technology into today's culture.

Furthering the epistemological foundation of anthroposophy is not only a matter of scientific method. It is important to know that there *is* a scientific basis for a monistic science of spirit/matter and to know *what* that basis is. This is important for *all* of us working with anthroposophy to further our culture today, be we teachers, farmers, doctors, therapists, artists, entrepreneurs, or anyone seeking to heal the contemporary worldview.

The video archive of Dr. Heusser's public lectures presenting this theme will be a great aid to organize workshops across the country, reaching the broader audience that should take interest in these matters.

With these videos, together with the inauguration of the *Correspondence*, we have made a substantial advance in our outreach capability. We ask you to consider furthering this work financially.

Your donation of *any amount* will help us better serve the Society.

(It is possible to set up recurring monthly donations.)

To donate, click [here](#).

Or mail check payable to "Natural Science Section" in care of our Treasurer, Barry Lia at:
Anthroposophical Society in America, 1923 Geddes Ave, Ann Arbor, MI 48104

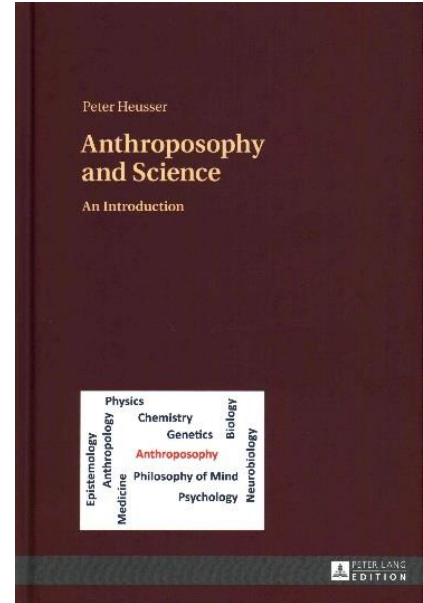
Thank you kindly for your consideration.

For a copy of our Case for Support, contact Jennifer Greene: jgreene at waterresearch dot org.

Video archive of Prof. Dr. Peter Heusser's Public Lectures



BRIDGING NATURAL SCIENCE AND SPIRITUAL SCIENCE



We wish that more of you readers could have joined us for the “Bridging Natural Science and Spiritual Science” conference in Spring Valley in early November.

However, you can now view Prof. Dr. Heusser’s Public Lectures archived on our website.

These four lectures stand as a summary of his book and will hopefully serve as the basis of regional workshops continuing this work to promote an understanding of Rudolf Steiner’s epistemology on a modern, scientific basis.

Lecture 1: ***Is there a place for the spirit in physics and chemistry?***
– ***On the importance of epistemology for natural science.***

Lecture 2: ***Is there a chemical or genetic explanation of life?***
– ***A closer look on causality and agency in modern biology.***

Lecture 3: ***Does the brain cause consciousness?***
– ***A way out of neurobiology’s current doctrine.***

Lecture 4: ***From natural science to spiritual science.***
– ***Rudolf Steiner’s contribution to the evolution of science.***

Click [here](#) to register for video access.

NORTH AMERICAN ANTHROPOSOPHICAL GEOLOGY GROUP – 2016 MEETING REPORT

“Asking the Granite itself” was the theme of the 2016 meeting of the *North American Anthroposophical Geology Group*, hosted by the Water Research Institute (WRI) in Blue Hill Maine. We attempted to do this by visiting outcrops and reading the phenomena from the rocks. 12 people were present for the meeting. To revisit last year’s theme of fluidity and movement in the mineral kingdom, Jennifer Greene led us in multiple water experiments.

On Tuesday evening, the 23rd of August, the meeting began with a reading of the Foundation Stone. Each panel was read first in German by Jim Hindes and then in English by Jerry Kruse. This was followed by a brief round of introductions and sharing of biographies. Lectures during the week were given by Jennifer Greene, Amy Watson, Duncan Keppie, Jim Hindes, Michael Judge, and Jonathan Swan. While the granite and other rocks visited did not give us an answer about their origin, they did answer with a variety of phenomena.

LOCATION

This year’s meeting took place in the Coastal Mountains of Maine, located southwest and sub-parallel to the Appalachian Mountains. The Appalachian Mountains stretch roughly 1500 miles along the eastern seaboard of North America, from Alabama in the southeastern United States to Newfoundland in Maritime Canada.

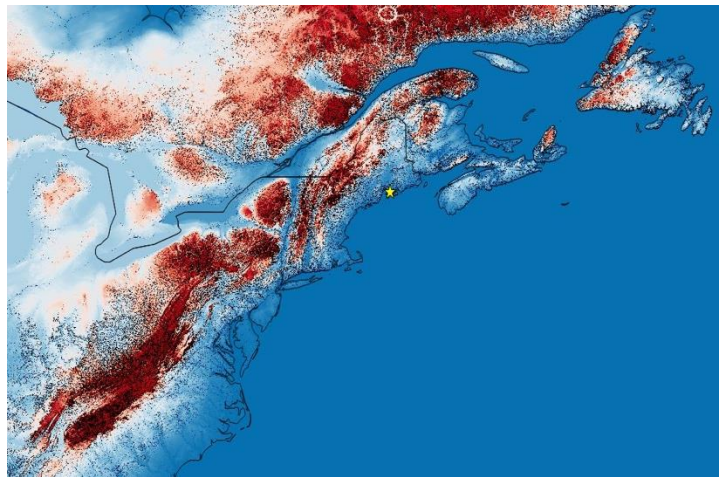
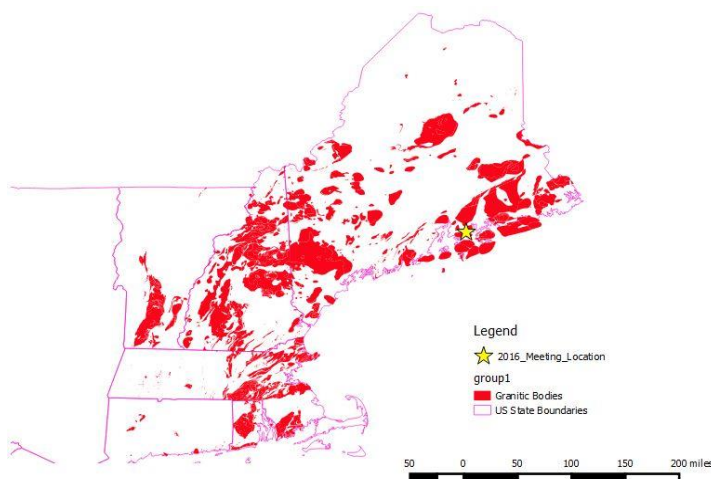


Figure 1: Shaded relief map of the Appalachian Mountains. The yellow star marks the location of the 2016 Meeting. Map created by author using GTOPO30 data from the USGS.



The area from the Hudson River Valley to Newfoundland is collectively referred to as the Northern Appalachians. Throughout the New England portion of the northern Appalachian Mountains there is an abundance of granitic bodies present which enabled us to see different types of granite. The granites are intruded into stratified rock layers of varying compositions, textures and forms.

Figure 2: Red polygons represent the locations and extents of granitic material present in the Northern Appalachians. Dataset from the USGS and map generated by author.

Blue Hill is located in the mid coast region of Maine in a range of hills that are bounded to the north and west by the Norumbega Fault zone and to the south and west by the Atlantic Ocean. Some Geologists have called this region the “Coastal Maine Lithotectonic Block”, while some others call it “Avalonia” after its proposed parent continent.

Figure 3: Shaded relief map of the Northern Appalachians on the US side. The yellow star again marks the location of the 2016 meeting. Dataset from the USGS and map generated by author.

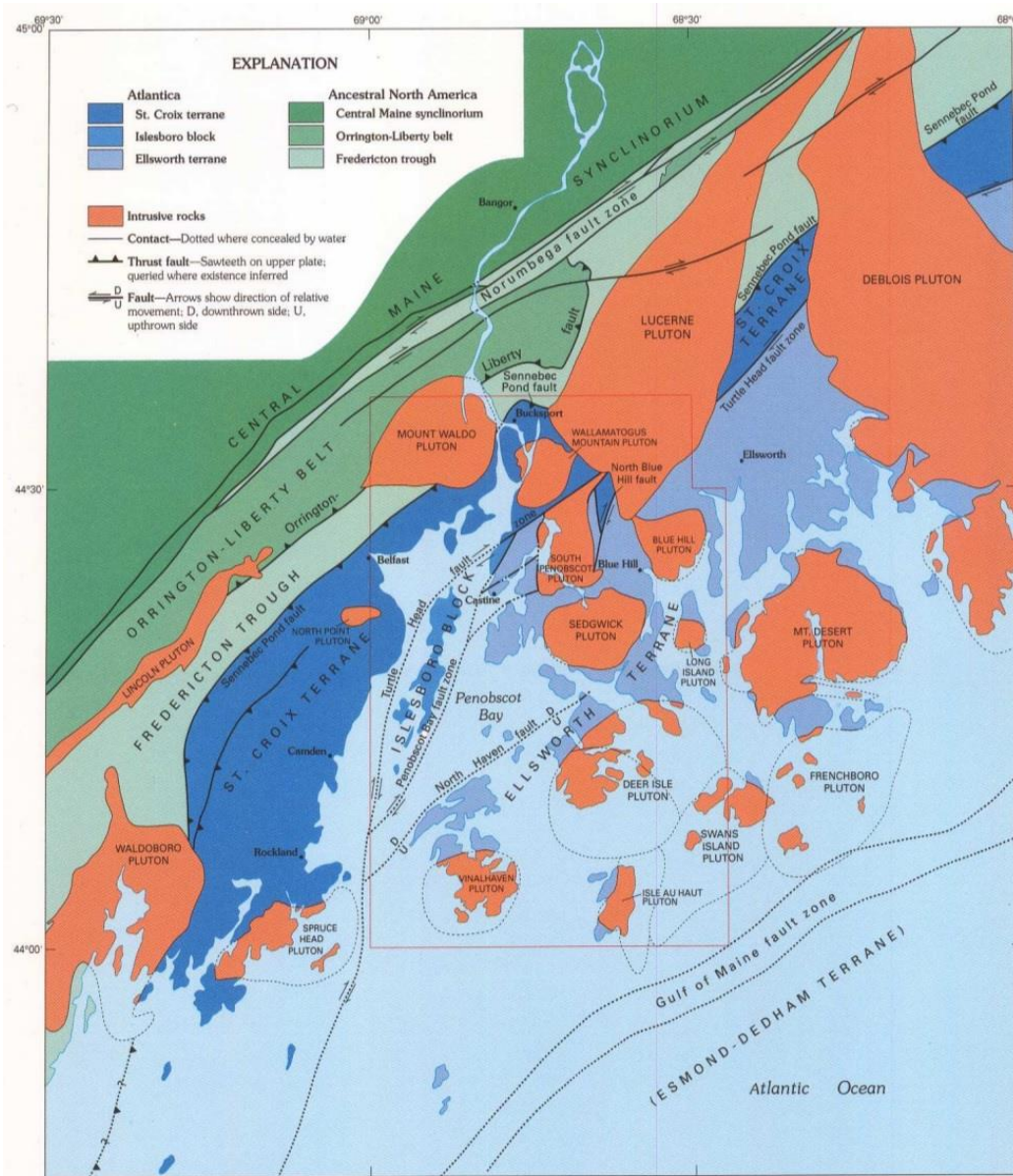
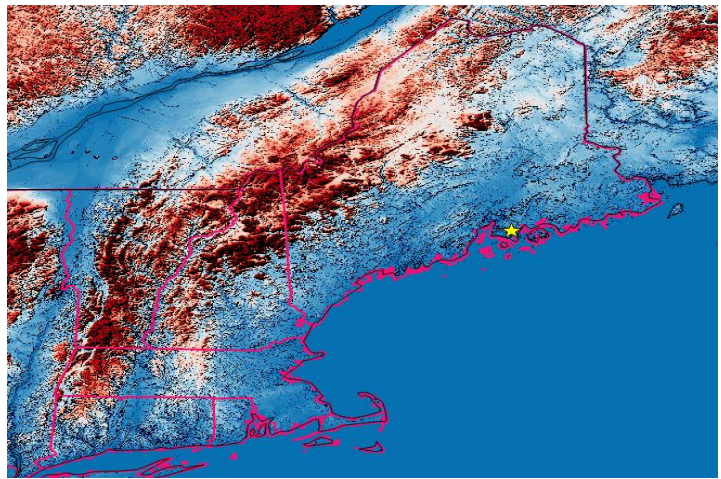


Figure 1.—Regional geologic map of south-central Maine showing tectonostratigraphic terranes and principal geologic features. Area of geologic map of northern Penobscot Bay (this report) is outlined.

We visited the Southern portion of the Blue Hill Pluton, the Deer Isle Pluton, and the Mt Desert Pluton.

Figure 4: Map of the intrusive rocks in the Penobscot Bay. Source: USGS Publication I-2551 Bedrock Geology Map of the Penobscot Bay

FIELD TRIPS

Borderlands Beach – East Blue Hill Granite

Duncan Keppie led us on a field trip at the edge of the Blue Hill pluton located in the Borderlands property in East Blue Hill. Duncan offered the following description of the field trip.

“Borderlands: what a great location for the geology group conference during the last week of August entitled “Asking The Granite Itself About Its Origin” because Jennifer Greene’s house lay on the border of a granite pluton (Blue Hill granite dated at 374 ± 10 million years: Devonian) that intrudes polydeformed and metamorphosed sandstones and shales of the Ellsworth Formation containing detrital zircons as young as 509 ± 1 million years (Cambrian). The granite on the shore in front of Jennifer’s house is composed of quartz, feldspar and white mica (muscovite), the latter mineral telling us that the granite was derived by melting sedimentary rocks. This granite contains many xenoliths of the Ellsworth Formation that were deformed several times prior to intrusion. Walking eastwards into the pluton reveals two other granite, two-feldspar biotite granite and hornblende granite, indicating an igneous source. The different types of granite suggest three pulses of intrusion probably from a ring vortex. Explosive intrusive activity produced by a buildup of pressure during the last stages of intrusion is shown by explosion breccia cutting across the muscovite granite. Weathering of the granite is producing sand and gravel composed of quartz, feldspar and clay, which, in future, will produce sedimentary rocks similar to the Ellsworth Formation. Thus, this location reveals representatives of the rocks cycle: sedimentary -> metamorphic -> igneous -> sedimentary. Participants were asked to choose a rock, then using Goethean methods, imagine and draw its place in the rock cycle and the processes before and after its formation. Other features of Borderlands included the drowned landscape produced during the ice age when the shoreline lay several hundred kilometers south of the present coastline. Subsequent melting of the ice sheet flooded the coastal area.”

Figure 5: Photos with Duncan Keppie in straw hat.



The contacts between different types of rocks were of particular interest to Goethe, as is evidenced by his writings and in his rock collections in Weimar. Around the borders of some of the granitic bodies in this region there are small to large pieces of the surrounding stratified country rocks that were broken off and mixed in with the granite. Geologists call these xenoliths (Greek- xeno=foreign litho=rocks). These phenomena are solidified impressions of how the two substances were interacting as they were formed or brought into contact with one another.

Figure 6: Xenoliths present in the East Blue Hill Pluton.



Settlement Granite Quarry, Deer Isle

The Settlement Quarry outcrop is the site of an old granite quarry, which has breathtaking views out over the Gulf of Maine. The Granite of Deer Isle is well known for the orange colored (Potassium) feldspars that are rimmed by lighter colored plagioclase feldspars. The Granites in this area range from fine grained to larger grained.

We took the approach of refraining from all conversation until after observing the rocks for some time. Each person went off on their own, and then after a while we reconvened and showed the phenomena to each other that we had observed. Some of the phenomena in the granite that were observed and discussed were: jointing, iron sulfide mineralization, biotite inclusions, and pink fine-grained aplite dikes cutting through the larger grained granite.



Figure 7: Deer Isle Granite. Pink feldspar (Orthoclase) crystals rimmed by white feldspar (Plagioclase).



Figure 8: Fine-grained pink dike of Aplite running through the granite at the Settlement Quarry.



Figure 9: Black mica (Biotite) inclusion in Deer Isle granite.

Pine Hill Peridotite

On Little Deer Isle there is a mantle-derived rock known as peridotite, which is relatively uncommon on the surface of the earth. This gives an impression of what the substances in the upper mantle of the earth are like. The Pine Hill peridotite on Little Deer Isle is the only known location in Maine where this substance appears. It outcrops there as a large plug or throat of dark green material which protrudes through volcanic beds (Cambrian) with veins of asbestos and serpentine penetrating through it.



Figure 10: Pine Hill Peridotite outcrop on Little Deer Isle (image source: mainetoday.com)

Deer Isle Petroglyphs

Anomalous Lemniscate Petroglyphs can be found around various places in the region. They appear to be carved with tools and are not like any Native American petroglyphs that are found in Maine. Given the short amount of time, we were only able to see one of them.



Figure 11: Lemniscate petroglyph on Deer Isle



Figure 12: Cheryl Martine, Michael Judge, Saskia Huising.

Hull's Cove Gabbro - Mount Desert Island

The Hull's Cove gabbro is located on the northeastern shore of Mount Desert Island. Gabbro is dark heavy rock chemically equivalent to basalt, and it outcrops in various locations around the island. It is a dark grayish colored rock with grain sizes that were detectable by the eye. Gabbro is poor in silica, aluminum, sodium, and potassium and rich in iron, magnesium, and calcium. It was clear that the color and weight were darker and heavier than granite. This outcrop was highly jointed and fractured, and we spent a good deal of time observing the orientation of these joints. Penetrating through this outcrop of gabbro were large red veins of iron, which can be seen in the photo.



Figure 13: Hull's Cove gabbro outcrop with iron vein on northwestern Mount Desert Island.

Observable from the top of Cadillac Mountain were the Porcupine Islands, which are composed of large sills of gabbro. Duncan Keppie had the following to say about the gabbro: *"The gabbro appears to form a rim to the Cadillac Mountain Granite and Hull's Cove Granite, suggesting that the intrusions are ring intrusions with distinct pulses of intrusion that were part of the magmatic arc sitting on and intruded into continental crust (Avalonia)."*

Acadia National Park, Mount Desert Island

We visited the famous Acadia National Park. The first stop was to Sand Beach. Sand Beach is actually composed largely of shell material and is flanked by granite outcrops at each end. Both of the rock outcrops exhibit the xenolith phenomena also seen at Borderlands in East Blue Hill.



Figure 14: Sand Beach on Mount Desert Island (photo source: minitime.com)

The next stop was “Thunder Hole.” This is a large crevice in the granite where the tidal water is forced into it and creates large splashing and loud noises. The dialog between stone and water could be observed here.

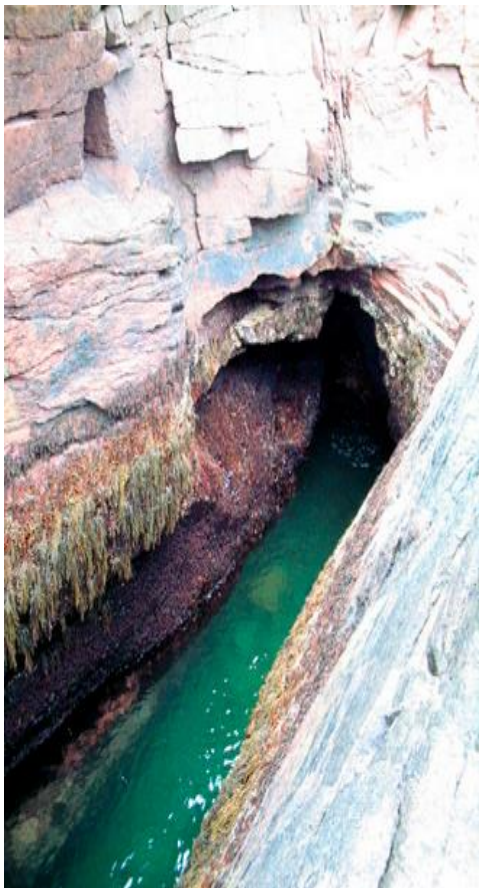


Figure 15: “Thunder Hole (image: city-data.com)

Blue Hill Reversing Falls

Figure 16: Atop Cadillac Mountain. Left to Right: Jim Hinds, Jerry Kruse, Michael Judge, and Ken Stewart.

To conclude the trip to Acadia, we drove to the top of Cadillac Mountain, which offered a spectacular view of the granite islands and ocean. The most noticeable phenomena were the jointing of the granite on the bare mountain surface.

A short visit was held to the Blue Hill Reversing Falls. The Water fall reverses each time the tidal water is forced through the narrow inlet and let out again. One can observe many of water's mysteries at this location. This is considered to be part of the laboratory of the Water Research Institute.



Figure 17: Blue Hill Reversing Falls (source: wn.com)

LECTURES

Lecture and Water Workshop by Jennifer Greene

Jennifer Greene led us in performing multiple water phenomena experiments. Boundaries, Periphery and Center, Flow and Fluidity were observed in the following experiments: Drop Fall, Train of Vortices, Vortex Tube, and Ring\Toroidal Vortices. Jennifer also gave a talk and a slideshow on movement and water phenomena. A lively Discussion ensued on if, how, and where these flow phenomena can be found within the mineral kingdom.



Figure 18: (Top Left) Michael Judge (front) and Jerry Kruse(back) and John Moses (TopRight) performing the "Drop Fall Experiment."



(Middle Left and Right) Jennifer Greene creating a Ring Vortex.



(Lower Left) Discussion about the Ring Vortex (Lower Right) Observation of a Vortex in the large Vortex Cylinder.

Lecture by Amy Watson

A Waldorf Teacher named Amy Watson gave a truly heart-warmed talk about her experiences teaching Maine Geology at the Ashwood Waldorf School in Rockport, Maine. She led her students on field trips (over the course of a full 8 year cycle) throughout the various geographical regions of Maine. She stated that teaching geology began with sledding in the snow and thawing out the frozen mittens and gloves from the playground. They visited Frank Perham in the famous precious gem bearing Pegmatite districts of Western Maine, and she told many touching stories about how the children were exposed to various aspects of the geography and geology of Maine.



Figure 19: Amy Watson sharing her experiences teaching geology in Waldorf Schools.

Lectures by Duncan Keppie

Duncan Keppie gave two lectures. He offered the following descriptions of his lectures.

His first lecture was called “Archetypes in Rocks.” In this lecture, he revisited and extended the dynamic approach initiated by Goethe to discover the archetype of plants, animals, and rocks. He also explored the extension of this method by Rudolf Steiner to arrive at the successive veils that hide the interior of the Earth and the human being. He followed this up with a look at the nested archetypes used in contemporary evolutionary developmental biology and applied them to the Earth itself.

His second lecture was called the “Body, Soul and Spirit of the Earth”. In this lecture he began lifting the veils in the earth: (a) surface = skin, (b) lithosphere/asthenosphere = body, (c) mesosphere = soul, and (d) core = spirit. He identified examples of earth archetypes including magma, crystallization, heat, mantle convection, ring vortices, and the geodynamo. He concluded that the optimal environment for life produced by the biosphere is being upset by humans. Some of the potential solutions included re-awakening knowledge and love of the Earth, as well as the use of primal energy sources, which include deep geo-thermal energy and artificial photosynthesis using cyanobacteria. Cyanobacteria can further be used as a natural fertilizer and food supplement.



Figure 20: Duncan Keppie closed each evening, playing the accordion.

Lecture by Jim Hindes

In his lecture Jim addressed the question: “How did pure spirit become matter as we know it today?” Jim offered the following description of his lecture.

“This was a long process requiring four long stages known as Old Saturn, Old Sun, Old Moon, and Earth evolution. Beginning with divine love manifesting as sacrifice, warmth came into existence with the creation of Old Saturn, the most spiritual form of the mineral world we can imagine. Sacrifice always enkindles spiritual warmth and fire. In the next step, which unfolded on Old Sun, some of the fiery warmth was transformed into a gaseous form of spirit, and some into light freed of the fire with which it had been previously united. Along with the light there appeared the light ether and the first rudimentary form of electricity. Then on Old Moon spirit appeared in a watery, liquid form along with the gaseous air-like state and warmth was still present. So too the chemical or sound ether appeared to accompany the light ether, while electric and magnetic forces manifested. Only on earth was spirit prepared to appear in the solid, hard mineral form in which it currently manifests, while life ether and the atomic forces that hold the earth together joined the magnetism and electric forms of spirit. He went on to describe the incarnation of the planet earth itself through the stages of recapitulation with the concomitant precipitation of the mineral, plant, and animal worlds up to the appearance of the human being.”

Lecture by Michael Judge

Michael Judge offered this description of his presentation:

“Michael Judge's presentation involved geology, paleontology, anthropology, archeology, and history. The presentation of his research was given in the spirit of scientific peer review for correction and/or confirmation. The individual of today needs to cultivate a Goethean Scientific approach in order to bring Natural Science and Spiritual Science into coherence.

Rudolf Steiner as a Natural Scientist and Spiritual Scientist asserts that genuine Spiritual Science and genuine Natural Science are in agreement. One can proceed here by assuming Steiner's assertion and then beginning to test if Steiner's assertion and his spiritual research does match Natural Science. On the surface Steiner's research hardly seems to agree with Natural Science. Steiner asserts that Natural Science views reality from an outside perspective and Spiritual Science views reality from the inner perspective. Grasping phenomena and matching-up and translating back and forth the unique vocabulary used in each Science is key.

The biggest foe to this is "label thinking". It is possible to show a coherent and plausible match between the two Science's view of evolution of the earth and the human being. The challenge of the esoteric vocabulary used in Spiritual Science is enormous. Mainstream Natural Science is reflexively contemptuous of words like "Lemuria", "Atlantis", etc. There is a need to accurately translate esoteric vocabulary used by Spiritual Science into modern scientific vocabulary, thereby disarming this surface problem. The geologic record needs to be read accurately to demonstrate straightforward clear coherence of the two Sciences. There is a need here to unfold this coherence without resorting to fixed paradigms, intellectual contortions, vagaries, or beliefs.

At this summer Geologic Conference in Maine, Michael Judge presented material to demonstrate a Goethean approach, bringing a more precise understanding of the phenomenon labeled "Lemuria, Atlantis, and the Fifth Post-Atlantean". The above stated Natural Scientific fields were employed. Michael Judge presented a Spiritual Scientific picture of the origin of the Precambrian earth through to the Holocene matching the Natural Scientific vocabulary and concepts.”

Lecture by Jonathan Swan

Jonathan Swan gave a brief overview on the Geography and Geology of Maine. Attempting to follow an indication Rudolf Steiner gave on teaching Geography to Waldorf children, he led the group in observation of the planet as a whole, to the North American continent, to the mountain ranges, and down into local geological maps, and finally into hand specimens. This was to orient attendees with the particulars of the geographic region and its geology. Jonathan did this by using physical maps of the Earth, North America, The Appalachian Mountains, and the bedrock Geology of Maine (as shown in the figures at the beginning of this report). He showed the landforms and a general overview of the geology of Maine.

CLOSING DISCUSSION

The group did spend some time at the lab helping clarify some of the concepts that were missing or unclear to the folks present. One of the ideas we went over was the theory of plate tectonics. We looked at the land forms of the Appalachian mountain ranges using Digital Elevation Models. We looked over some rock samples from Maine, and questions began arising about a pegmatite sample. So, Jonathan held a short course on Pegmatites, their gestalt and mineralization with a sequence of phenomena from Plumbago Mtn.

Jonathan also gave a brief glimpse of Goethe's relation to Maine and American Geology through Goethe's early 19th century correspondence with two American men from New England (Parker Cleaveland and Joseph Green Cogswell). Joseph Green Cogswell, a student of Parker Cleaveland (Geology professor at Bowdoin College), actually met J. W. von Goethe three times face to face.

In closing, a business meeting was held Saturday afternoon. The Geology group and its relation to the Natural Science Section work was discussed. Jerry made a proposal for next year's meeting being in the westerly side of the Acadian Orogen, where there are Paleozoic fossiliferous limestones near Cincinnati on the Ohio/Kentucky border. Jennifer Green proposed possibly dovetailing next year's Science section meeting around the work of Wolfgang Schad/Martin Lockley and our field trip. A discussion was had with Jerry Kruse about being the treasurer for the group. Jerry said that he had interest but would think about it. In closing, Ken Stewart recited a poem by Albert Steffen. Special Thanks go out to the Jennifer Greene of the Water Research Institute and the Natural Science Section of North America.

Report written by Jonathan Swan



Figure 21: Large xenoliths of surrounding country rock embedded in within the outer edge of Mount Desert Island granite.

Book Announcement

Understanding Mammals: Threefoldness and Diversity

(The new, expanded 2-volume edition of *Man and Mammals*)

by Wolfgang Schad

[Adonis Press](#), NOW AVAILABLE

2-volume set, 6.5 x 9.25 inches, 1313 pages

\$125 **LESS 25% through January 15th**. ORDER [HERE](#).



Within the approximately 5,400 species of mammals there is a baffling diversity: from the Etruscan shrew, barely an inch long, to the 100-foot-long, over 200-ton blue whale. And yet all mammals, including the human being, share a common organizational structure: They all have a sensory and nervous system centered in the head, through which they perceive their surroundings and process their perceptions, and they have a metabolic-limb system, through which they take in and digest nourishment and move through their environment. And mediating between these two systems, which are polar opposite in nature, all mammals have a rhythmic respiratory and circulatory system.

In *Understanding Mammals*, Wolfgang Schad shows how the multiplicity of shapes, sizes, and coloration, of behaviors, preferred habitat, and embryonic development among the mammals can be understood as a manifestation of how this dynamic threefold structure plays itself out: whether the nerve-sense system predominates as in the shrew, the metabolism as in the blue whale, or the rhythmic system as in the leopard.

Overall, readers will come away with a new perspective on the expression of form and pattern in the world of mammals and how human beings play a central role in illuminating relationships among all the diverse forms.

Calendar of Events

2019

January 14: **MysTech Beginners' Study Group**, 10 Classes on Zoom, Mondays 8:30-9:30 ET.

[Email](mailto:Andrew.Linnell@gmail.com) Andrew Linnell at jandrewlinnell at gmail dot com

February 17-21, 2019: **Winter Course on "The Nature of Animals and Developing Dynamic Thinking"** with Craig and Henrike Holdrege (Nature Institute, Ghent, NY)

<http://natureinstitute.org/calendar/index.htm>

March 29-31, 2019: **Mathematics Alive! Negative Numbers and Linear Equations** with Henrike Holdrege and Marisha Plotnik (Nature Institute, Ghent, NY)

<http://natureinstitute.org/calendar/index.htm>

April 27-May 4: **IPMT 2019 - International Postgraduate Medical Training** (Chestnut Ridge, NY)

<https://paam.wildapricot.org/International-Post-Graduate-Medical-Training/>

June 2019-July 2020: **Encountering Nature and the Nature of Things: Foundation Course in Goethean Science**, a year-long, low-residency program (Nature Institute, Ghent, NY)

<http://natureinstitute.org/calendar/index.htm>



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Treasurer: Barry Lia, c/o Anthroposophical Society in America, 1923 Geddes Ave, Ann Arbor, MI 48104

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