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Wasser, das universelle Lebenselement
Wolfram Schwenk

The statement ‘no life without water’ raises the question of the interconnections of life and water. Water reveals its life sustaining activities especially in its liquid state, thus the view presented here is focused on the liquid aspect of water. Water’s functions in living organisms are its renewing and, at the same time, sustaining activities.
These happen on the one hand through its dissolution of substances, thus enabling them to take part in processes and come into interrelations with each other, and on the other hand through its way of moving according to the laws of organic formative processes, which can exert their influence when physical forces, competing within water, pass across unstable phases of equilibria. Moreover, the laws of the generation of flow forms within fluids can be shown to have a cosmic nature too. An outlook on the history of consciousness regarding water shows the transition from experiencing it in antiquity as a divine being to looking at it nowadays as a mere physical substance – a way which may be brought to a turning point by spiritual science.

Das Wasser in der Nutzung durch den Menschen
Norbert Pfennig

The establishment of the first towns of early civilisations after about 3000 BC were made possible through sufficient food supplies from agriculture and the management of drinking water, sewage and rainwater. All human activity resulted from a harmonious connection with the natural world which was experienced as the work of the gods. The traditions were continued during the intellectual civilisations of the Greeks and Romans (800–500 BC). But in the Middle Ages people largely forgot the knowledge of hygiene that had been gained and infectious diseases proliferated. With the development of technology in the 19th century the first rational solutions to supplying drinking water and disposing of sewage were constructed; though with these the living context was largely overlooked. Later it was possible through knowledge of hygiene and science to put right earlier mistakes in some regions. However, a culture of squandering drinking water became established and lack of attention to proper handling of rainwater continued. Today no lack of knowledge can be brought forward for the sensible management at all levels of drinking water, sewage and rainwater as well as toxic environmental pollutants.

Die Gründungen der ersten Städte in den Hochkulturen der Menschheit seit etwa 3000 v. Chr. wurden ermöglicht durch Nahrung aus Landbaukultur und dem sinnvollen Umgang mit Trinkwasser, Abwasser und Regenwasser. Alles Handeln geschah aus einfühlender Weltverbundenheit mit der als Götterwirken erlebten Natur. Alle Traditionen wurden in den Verstandeskulturen der Griechen und Römer fortgeführt (800 v. Chr. bis 500 n. Chr.). Im Mittelalter war das Wissen um hygienische Kultur weitgehend vergessen und Seuchen breiteten sich aus. Mit der Entwicklung der Technik im 19. Jahrhundert wurden in den Städten erstmals rationelle Lösungen zur Trinkwasserversorgung und Abwasserableitung gebaut; dabei blieben zumeist die Lebenszusammenhänge unberücksichtigt. Später konnten durch die Erkenntnisse von Hygiene und Naturwissenschaft regionale Missstände beseitigt werden, jedoch bürgerte sich ein verschwenderischer Umgang mit dem Trinkwasser ein und die sinnvolle Handhabung des Regenwassers blieb unbeachtet. Heute fehlt es nicht an den

notwendigen Erkenntnissen, wie auf allen Ebenen sinnvoll mit Trinkwasser, Abwasser und Regenwasser sowie den chemischen Umweltgiften umgegangen werden sollte.

Water as a Mediator for Life
A. John Wilkes

We are embedded within, surrounded by and dependent upon rhythms of all kinds and yet they remain a mystery. Life and rhythm are indeed one. Water is the most sensitive carrier and mediator of rhythm. George Adams during the mid years of the 20th century was concerned with the influences particular mathematical surfaces might have upon water. These so-called path-curve surfaces are intimately involved with generative forms such as buds, cones and eggs that occur in a natural healthy context. Due to extensive morphological studies the question which attracted my attention in 1970 could be expressed as follows: "Would it be possible to create for streaming water a vessel or indeed an 'organ' which would enable it to manifest its potential to order and metamorphosis?" As a result of experimentation it became gradually clear to me that rhythms are the result of resistance rather than some kind of mechanical process. The resulting Flowform Method which demonstrates a rhythmical lemniscatory process, made evident the close relationship between surface, proportions and rhythm. It immediately became possible to show that the influence of path-curves, combined with rhythms could be investigated regarding their influence upon the quality of water when correct relationships were made available. The redeeming of life-supporting energy in water will remain predominantly the subject of our investigations in the Institute.

Wir sind in Rhythmen eingebettet, von ihnen umgeben und abhängig, und doch bleiben sie ein Geheimnis. Leben und Rhythmus bilden eine Einheit. Wasser ist der empfindlichste Träger und Vermittler von Rhythmen. In den Fünfzigerjahren des 20. Jahrhunderts hat sich George Adams mit den Einflüssen beschäftigt, die bestimmte mathematische Oberflächen auf Wasser haben können. Die so genannten Weg-Kurven-Oberflächen sind eng verbunden mit generativen Formen, die in gesunden Naturzusammenhängen vorkommen und z.B. an Knospen, Zapfen und Eiern beobachtet werden können. Nach intensiven morphologischen Studien konnte die folgende Frage formuliert werden, die mich seit den Siebzigerjahren beschäftigt: «Ist es möglich, ein Gefäß oder gar ein ‹Organ› zu bauen, in dem fließendes Wasser sein Potential für Ordnung und Verwandlung zum Ausdruck bringen kann?» Experimente zeigten allmählich, dass Rhythmen eher als Ergebnis von Widerstand als von irgend welchen mechanischen Vorgängen betrachtet werden müssen. Die *Flowform-Methode*, mit der rhythmische, lemniskatförmige Fließbewegungen erzeugt werden können, machte eine enge Beziehung zwischen Oberfläche, Proportionen und Rhythmus sichtbar. Darüber hinaus konnte gezeigt werden, dass der Einfluss von Wegkurven in Kombination mit Rhythmen untersucht und in ihrer Wirkung auf die Wasserqualität bestimmt werden kann, wenn sie in einer richtigen Relation zueinander stehen. Der Erhalt der lebensunterstützenden Energie im Wasser wird weiterhin ein zentrales Forschungsthema unseres Institutes sein.

Wasser in Pumpen und Turbinen
Christian Liess

If one wants to approach the question of whether and in what way water is damaged by passing through turbines or pumps, one has first to get a clear and detailed picture of the flow conditions in these machines. This is what the present contribution intends to provide by comparing the water movements in hydraulic turbines and centrifugal pumps to those in a

natural water course. It is shown that in the latter there is a great variety of different movements and rhythms with relatively small changes in the velocities and pressures. The movements in the turbines and pumps, however, are found to be extremely monotonous and rhythmless, but with strong variations of velocities, pressures and shear stresses concentrated in the runner of the machines. The water is here subject to movements based on purely technical and economic reasoning and it is to be expected that this reduces or even destroys its life supporting capabilities. This has to be investigated in a next step.

Wasser und Energie
Georg Sonder

Energy flow can be traced from a stream or river to a hydroelectric dam and thence via the turbine and generator to the electricity transmission lines. A particular aspect of energy, its 'sensory imperceptibility' is examined. The energy flows with the water and circulates through the moving parts of the machines to the electrical conductors which carry it away to the consumer. The energy flow moves as if in a space which is inaccessible to human senses. George Adams shows that energy as a physical quantity, the product of force and distance, is on the border of the perceptible Euclidean space and the imaginable 'counterspace', to which he assigns etheric forces.

Es wird der Energiefluss verfolgt, wie er im Bachlauf oder im Fluss bis zur Staumauer, durch die Turbine, den Generator und bis zu den elektrischen Leitungen verfolgt werden kann. Ein Aspekt der Energie – ihre «nicht sinnliche Wahrnehmbarkeit» wird gezeigt. Die Energie strömt mit dem Wasser mit, wandert durch die sich bewegenden Maschinenteile bis in die elektrischen Leitungen zum Abtransport zum Anwender. Der Energiestrom bewegt sich wie in einem den menschlichen Sinnen nicht zugänglichen Raum. – G. Adams zeigt, dass die Energie eine physikalische Größe ist, die als das Produkt von Kraft × Weg dem euklidischen (oder Anschauungs-) Raum und dem polareuklidisch zu denkenden «Gegenraum» zuzurechnen ist. Dem Gegenraum ordnet G. Adams die ätherischen Kräfte zu.

Stausee-Großprojekte – Beispiele faustischen Wirkens
Eduard Naudascher

Using the example of a hydroelectric and irrigation dam project in the Senegal valley this paper shows how modern economics and technology transmute natural cycles into money cycles. Natural irrigation, desalination and mud-fertilisation delivered by flood waters free of charge are being replaced with artificial irrigation, drainage systems and chemical fertilisers. As the Gross Domestic Product rises on account of this dangerous almost alchemic process, the natural resources that had been at the disposal of the local population traditionally become depleted and lost. According to the recommendation of a multidisciplinary team, these disadvantages can be minimised by the releasing of annual artificial floods from the reservoir. But even in this way the destructive alchemic process would only be slowed down. A hint of way out of this vicious circle is found in Goethe's *Faust* (Part II) in what seems a hidden message to a future generation finally waking up to the connection between its techno-economic actions and their dreadful consequences.

Trinkwasserversorgung – eine Selbstverständlichkeit?
Walter Jülich

Supplying acceptable drinking water to people in many parts of the world presents problems. Even in Europe it raises many difficulties and unknowns. A few decades ago the Rhine was heavily polluted and although this has now been greatly reduced, new problems have come to light. Apart from flooding, a particular matter of concern is the cycle of artificial substances. Avoiding harmful substances has so far always resulted in the introduction of new ones whose environmental impact is as yet little understood and whose damage to the environment can only be established in the course of time. Some of these substances are also detectable in drinking water. Politicians, corporations and people in general need to rethink this issue. In our consumer society we need space for the view that not everything we can produce should be produced, least of all consumed. Obviously we should do without the less important substances which leave a deep environmental footprint. This calls for individual awareness raising and improved public access to information.

Wiederbelebung von Fließgewässern
Helgard Zeh

Regeneration of flowing surface waters such as streams and rivers can reshape our living environment. After decades of increasingly excluding water from the landscape, the modern approach to water is more and more being considered holistically. Water flows are once again being recognised as having their own dynamics. Water should as far as possible retain the possibility of making its own course, falls, bed, depth, through-flow and banks. The open nature of water with its inner oscillations, rhythms and formative movements is described with examples of developed stretches of flowing water closely approximating to natural conditions.

Beim Wiederbeleben der Fließgewässer geht es darum, den Bächen und Flüssen wieder einen Lebensraum zu gestalten. Nachdem jahrzehntelang das Wasser immer mehr aus der Landschaft verdrängt wurde, wandelt sich heute der Umgang mit Wasser zu einer ganzheitlichen Betrachtungsweise. Den Fließgewässern wird wieder eine gewisse Eigendynamik zugestanden. Das Wasser soll Gelegenheit erhalten, seinen Lauf, sein Gefälle, seine Sohle, seine Tiefe, seinen Durchfluss und seine Uferausbildung so weit möglich selbst zu gestalten. Anhand von Beispielen naturnah ausgebauter Fließgewässerstrecken wird dem offenen Wesen des Wassers mit seinen inneren Schwingungen, seinem Rhythmus und seinen gestaltenden Bewegungen nachgegangen.

Was lernen wir vom Wasser?
Johannes Kühl

Water is looked upon as something that one can learn from. Learning from nature can be seen as human activity returning to nature what it cannot produce, i.e. human culture. It is shown that water teaches that the origin of form is movement. Life means to be open to the context of the surroundings and fluid behaviour is to produce such a context. Finally, water relates to the process of understanding itself. For that purpose some basic processes of fluid dynamics are described and analysed. It is shown that, for fluid processes, the vortex is a primary phenomenon, a term introduced by Goethe.