

Touched by Water

THE 2011 HANSGROHE WATER SYMPOSIUM



hansgrohe

Touched by Water

WHAT CONNECTS PEOPLE TO WATER



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Words of Welcome

SIEGFRIED GÄNSSLEN & KLAUS GROHE

“Water constitutes the principle of all things because all things are water and everything turns back into water.” These words by the Greek philosopher Thales of Miletus in the sixth century B.C. reflected his perspective on the state of being. Today, more practically than philosophically, we would add that there is no life without water.

The fundamental significance of water is certainly one reason why we humans feel connected to it in the most elementary of ways, as the elixir of life. Being in and around water is restful and relaxing, and at the same time it gives us new energy. Our thinking, our feelings and our behavior are all deeply shaped by our relationship with this precious fluid. Water enriches and influences our existence and consciousness, whether when taking a shower, doing sports, seeking health, exploring our personal limits, or facing the daily struggle of obtaining clean water.

In all spheres of life water plays a supremely important role. It touches each and every one of us, albeit in very different ways. Water touches and involves all our senses; when we experience waves, swirls, whirlpools, raindrops, rapids, wisps of mist, snowflakes, waterfalls, cascades, ice crystals, and the vastness of the oceans. Water touches us not only as water – it is often a mirror of our souls.

We also experience water as sound – children splashing in a pool, rain hammering against a window, breakers crashing in a stormy sea, the murmur of a river’s flow, the roaring of a waterfall, the burble and gurgle of a spring, or the gentle spray of drops from a jet shower-head in a sauna.

Similarly, we taste water – as a nutrient in the form of bottled water, as a beverage in the form of tea, soft drinks, vodka, or sherbet, as salty brine when bathing in the Dead Sea, or as a thirst quencher directly from a natural spring while on a mountain hike.

We can also smell water – the smell of refreshing summer rain just before a cloudburst, or after a thunderstorm when steam rises, leaving everything looking fresh and clean, or the fine essences that make the moist air in a steam room so deliciously fragrant. But there are unpleasant odors too, like the rotting smell of brackish water in a pond, more often than not



caused by human activity. Lastly, we can feel water – in the sea when waves gently wash around us, under the pleasantly invigorating spray of a massage showerhead at home, or in a heavy downpour when raindrops pelt down upon us. We feel the dew when walking through a meadow on a cool

morning, and we sense the immense power of water while wading barefoot through a mountain stream.

How do people experience the diversity of sensations created by water? In what ways do they feel connected to water? These questions were the focus of the fourth annual Hansgrohe Water Symposium held on the 6th and 7th of October 2011 in the Hansgrohe Aquademie in Schiltach in Germany’s Black Forest.

Under the heading “Touched by Water,” thirteen international water experts from different disciplines gathered to explore this topic. They included an extreme swimmer, an aid worker, a spa architect, a river engineer, a sculptor and a radio correspondent. We were especially pleased that our keynote speaker, Anupam Mishra from New Delhi and a founder of the Gandhi Peace Foundation, could tell us about the wise management of water in his homeland and traditional irrigation systems in India. You will find his presentation, as well as all the other contributions to the symposium, in this book.

We would like to take this opportunity to thank all who contributed to the success of the 2011 Hansgrohe Water Symposium and helped to make this book possible. May reading it be an interesting and stimulating experience, and may you enjoy being touched and fascinated by water’s many wonderful qualities.

Siegfried Gänsslen

Siegfried Gänsslen
Chairman of the Management Board
Hansgrohe SE

Klaus Grohe

Klaus Grohe
Chairman of the Supervisory Board
Hansgrohe SE



Up close: the fourth Hansgrohe Water Symposium explored the relationship between people and water.

The 2011 Hansgrohe Water Symposium

The fourth annual Hansgrohe Water Symposium was held on the 6th and 7th of October 2011 in Schiltach, and had a special thematic focus. Unlike previous symposia, which had all addressed scientific and technological aspects, the 2011 event focused on people's interaction with water.

What sensations, feelings and inspirations do people experience when they deal with water, when they come into contact with it? In what way can we let water touch us? This event was not about the abstract and general kind of information scientific research provides, but more about the very personal and individual ways in which we all experience water.

The title of the 2011 symposium was "*Touched by Water*", and speakers approached the subject from very diverse points of view. Hansgrohe had invited international water experts, reflecting a broad range of knowledge and interests, to share their stories. Among them were a historian, a spa architect, a river engineer, a radio correspondent, a water therapist, and an extreme swimmer. From their individual perspectives, they all described how contact with water influences humans both physically and emotionally, and how it can be a source of inspiration to us all.

As at all previous Hansgrohe water symposia, lectures were complemented by workshops in which participants were given the opportunity to enjoy hands-on experience in rediscovering water. Creative artistry was expressed in film and sound projects, and the spiritual side of water was sensed during a meditation walk on the banks of Schiltach's two rivers. Even the Hansgrohe ShowerWorld lab was open to anyone who wanted to enjoy firsthand contact with water in a variety of ways.

International speakers on the second day of the event shed light on how the significance of water and ways to manage it can be very different in other parts of the world. Impressive reports and images from India, Bangladesh and the Middle East helped cast a critical look at our European perception of water as a resource available in abundance at all times. This is after all the goal of our Hansgrohe water symposia – to widen our horizons and reinforce our respect for this precious element.



Dr. Klaus Lanz

Chemist, journalist and water researcher –
Evilard, Switzerland

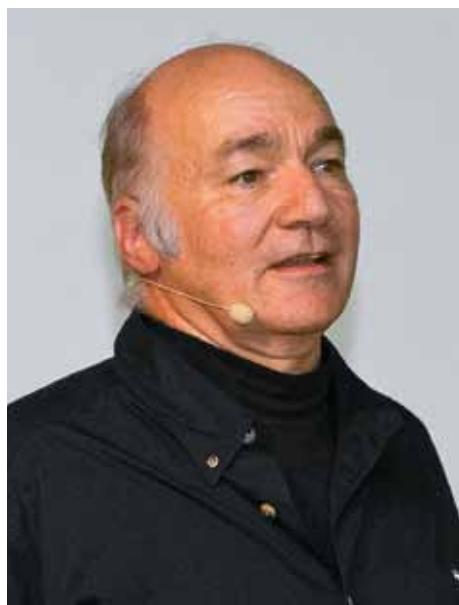
After receiving his doctorate from Giessen University, Dr. Lanz worked as an environmental and water researcher in the United States and in Switzerland. Early in the 1990s he managed Greenpeace Germany's water campaign and wrote "*The Greenpeace Book of Water*". In 1995, Dr. Lanz founded International Water Affairs, an independent research and consulting institute in Hamburg, today based in Evilard near Biel/Bienne in Switzerland. The institute specializes in services for the political, industrial and educational sectors. The focus of the institute's consulting and educational activities is the broad and interdisciplinary integration of science, culture, economics and politics.



Dr. Dieter Alfter

Director of the museum at Bad Pyrmont Castle – Bad Pyrmont, Germany

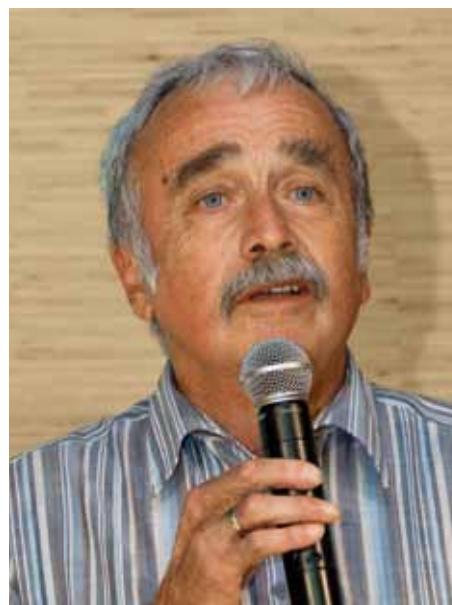
Dr. Dieter Alfter studied art history, archeology and educational sciences in Munich and Hamburg. In 1984, he developed the idea for a museum of municipal and spa history in Bad Pyrmont. Since then he has lived and worked in the Weserbergland region. Dr. Alfter has also lectured on European garden art history at the Ostwestfalen-Lippe University of Applied Sciences. He was responsible for developing and realizing Bad Pyrmont's contribution to the EXPO 2000 world exhibition in Hanover. The theme "Water Health: Myth and Visions".



Alexander Lauterwasser

Author, water researcher and media artist –
Heiligenberg, Germany

Alexander Lauterwasser studied philosophy and psychology in Munich and Heidelberg. He has been involved in the study of morphogenesis and the morphology of organic forms since 1984. In 1993, he began exploring cymatics – sound and vibration made visible – based on the work of Hans Jenny. He conducts his own experiments and research investigating how vibrations, sounds and music influence shaping processes. He also gives lectures, organizes exhibitions, and does live projections at concerts of sound images created by water.



Otmar Grober

Master river engineer and river manager –
Bruck/Mur, Austria

After finishing his training as an industrial engineer, Otmar Grober worked in plant engineering in the field of environmental technologies. As master river engineer for the Austrian state of Styria, he explores and seeks to implement natural approaches to sustainable flood protection. He has carried out nature-based river conservation and revitalization projects since 1989. Mr. Grober has been an active member of the Schuberger Society for Promotion of Natural Technology since 1997. In 2001, he was awarded the state of Styria's environmental award.



Michael Bradke

Musician and music educator –
Düsseldorf, Germany

Michael Bradke studied musical science, ethnology, educational sciences, percussion, double bass and singing in Cologne and Duisburg. In addition to his many appearances as a musician, he has spent many years working as a musical cultural educator and sound artist. In 1987, he founded his Mobile Music Museum in Düsseldorf; some of its exhibitions have traveled internationally. Michael Bradke was given the special honor of performing at a children's festival held by the president of Germany and received Germany's Children's Culture Award in 2000.



Karin R'hila

Designer and communication artist –
Düsseldorf, Germany

Karin R'hila's agency, For People and Places, is based in Düsseldorf. After conceptualizing and realizing numerous design and architecture projects, Karin R'hila completed training in communication and energy techniques such as NLP (neuro-linguistic programming), hypnotherapy, meridian energy techniques, chakra balancing and ritual work. She is currently dedicated to offering holistic-creative counseling and support to people and companies who have the courage to change when they face challenging situations, reorientation, and crises. Since 2003, the element of water has become increasingly important in her work.



Jan Heisterhagen

Head of Hansgrohe product management –
Schiltach, Germany

Jan Heisterhagen holds a degree in industrial engineering. After serving as product manager at Vitra, an office furniture manufacturer, he joined Hansgrohe in Schiltach in 2001. He is responsible for the research and development of new showerheads, especially the successful Raindance range.



Markus Heinsdorff

Installation artist – Munich, Germany

Installation artist Markus Heinsdorff has been the recipient of many awards and has been a visiting professor of architecture at various Chinese universities for many years. His preferred material is bamboo and his work reflects his dedication to the element of water. In the summer of 2011, in cooperation with the Technical University of Munich, he designed an exhibition called Wasser-Werke (Water Works). He was commissioned by Germany's Foreign Office to develop textile pavilions to be exhibited as art installations in seven Indian cities in 2011 and 2012.



Ernst Bromeis

Water ambassador and swimmer –
Chur, Switzerland

Ernst Bromeis has a degree in gymnastics and physical education, and is a coach for professional athletes. For the last four years, the extreme sports enthusiast from the canton of Grisons has dedicated himself full-time to our most important resource: water. His motto is: *“If you love water, you love life.”* Ernst Bromeis lives out his passion by immersing himself again and again in water, thereby exploring the deepest reaches of his own consciousness.



Philippe Grohe

Head of the Hansgrohe design brand Axor
– Schiltach, Germany

Philippe Grohe trained as a photographer and then studied business administration. In 1995, he joined Hansgrohe USA. He has since held several positions within the Hansgrohe Group, and has been responsible for Axor, the design brand of the company, since 2001.



Ahmet İğdirligil

Architect – Bodrum, Turkey

Ahmet İğdirligil studied architecture in Ankara and Istanbul. He then worked in Istanbul, after 1983 in Vienna. A grant from the Austrian government allowed him to do research on spas in Austria and Budapest from 1984 to 1988. In 1989, he founded the architectural firm of Sans Mimarlik in Bodrum. Mr. İğdirligil is an internationally renowned expert in the design of spas and hamams (Turkish baths).



Dr. Pierre Walther

Communications and development
consultant – Berne, Switzerland

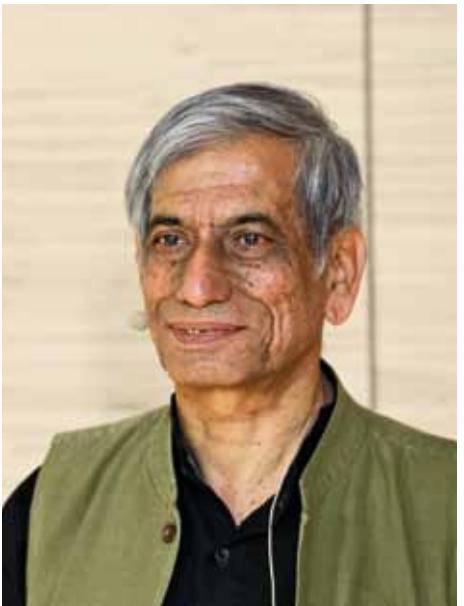
Pierre Walther has had 20 years of experience as an independent consultant in development aid, and specializes in issues dealing with water. As a consultant, he helped the Swiss Agency for Development and Cooperation (DEZA) prepare for the World Water Forum in Marseille. Dr. Walther firmly believes that personal concern and private commitment are essential in solving global problems.



Dr. Sebastian Engelbrecht

ARD radio correspondent – Tel Aviv, Israel

Sebastian Engelbrecht attended the German School of Journalism in Munich. From 1988 to 1994 he studied Lutheran theology in Heidelberg, Berlin and Jerusalem, and in 1999 he was awarded a doctorate in Leipzig. He was a freelance journalist in Berlin for many years, working for radio stations such as Deutschlandradio Kultur and Deutschlandfunk, and for the Frankfurter Rundschau newspaper. He has been an ARD radio correspondent in Tel Aviv since 2008.

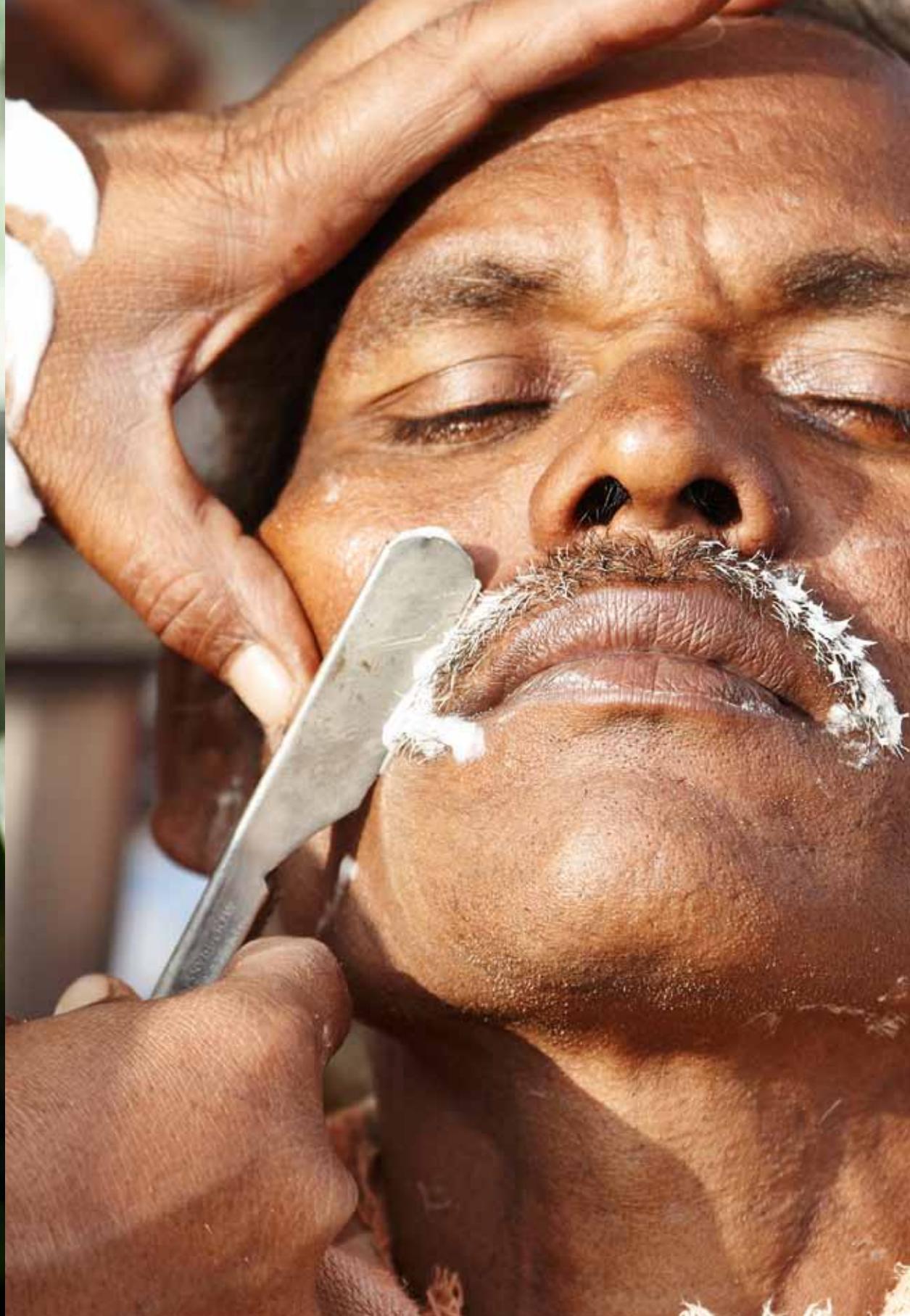


Anupam Mishra

Gandhi Peace Foundation – New Delhi, India

Anupam Mishra spent his childhood in various Gandhi communities in central India. After studying Sanskrit, he joined the Gandhi Peace Foundation in 1969. He was committed to helping communities that were at risk of disappearing from India's public awareness. Since the 1980s, he has been deeply involved with the issue of water. He has written two books on traditional methods of harvesting and storing rainwater in Rajasthan, where to this day ancient methods of securing water are still in use. Anupam Mishra lives in New Delhi and is the publisher of Gandhi Mag.











CHAPTER 1

Knowledge

How can people let water affect them? How can they understand its nature and appreciate its value? These questions were addressed in lectures by Indian sociologist Anupam Mishra, river engineer Otmar Grober from Austria, and German photographer and water researcher Alexander Lauterwasser. Each speaker approached the subject from an entirely different perspective. We learned how villagers in the desert of Rajasthan use age-old knowledge handed down through the generations to manage their scarce water resources; we discovered that it is possible to get to know individual rivers and persuade them to let us guide their flow; and we explored and were touched by the beauty of water's interaction with sound vibrations.

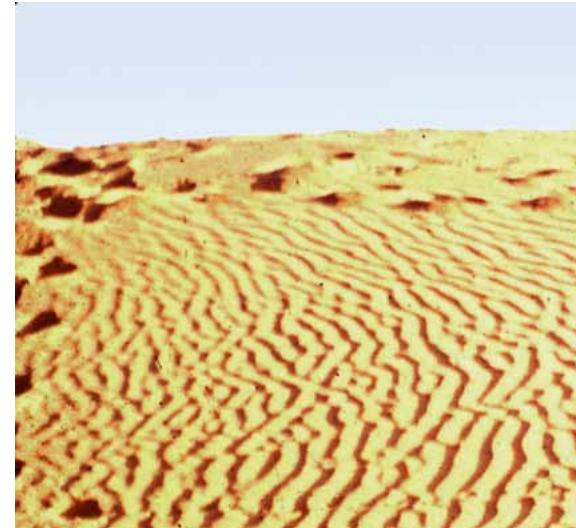
The Radiant Raindrops of Rajasthan

ANUPAM MISHRA

Social scientist and author Anupam Mishra has spent decades studying the culture of water practiced by the local desert communities of Rajasthan. His lecture reflects his fascination with the amazing water wisdom of traditional desert societies, and their social organization in the management of scarce water resources. At the same time, he describes a vast universe of experience, wisdom and adaptability. In order to better understand Anupam Mishra's contribution to this symposium, we would like to draw the reader's attention to Annie Montaut's afterword, in which she provides an in-depth look at the basic principles of Anupam Mishra's work.



Namaskar. During this session, please allow me to rename the theme of this symposium, "Touched by water" for this session only to: "Touched by very little water." I will take you



Fascinating landscapes and the most basic of living conditions: the Thar Desert in Rajasthan (Fig. 1 and 2).



A rare sight: clouds over the desert (Fig. 3).

to a desert, which will shower you with some new ideas. They may seem new but they are a thousand years old. Nature teaches us an important lesson that we tend to forget: nothing is that new, actually. What seems new to us is a continuation of what has been around for a long, long time. Nature's calendar runs into several millions of years.

Welcome to the desert, the golden Indian desert, the Thar in Rajasthan (Figure 1). It resembles other areas which are deemed underdeveloped. The roads are not like the roads



Kunds and tankas have been used to collect water through the centuries (Fig. 4).

you might find in Europe (Figure 2). Villages, hospitals and schools are few and far between. What is truly surprising, though, is the percentage of the population with safe drinking water: 99.7 percent of the villages here in the desert have drinking water. These arrangements are made by a very big government, but not by our national government, nor the World Bank. You can open schools in villages here, you can build roads in villages, but you cannot provide water if you are not big enough, big enough to understand this vast desert. The biggest government is the society here. A very enlightened society that has already done most of what is necessary to supply water without waiting for the government or for the World Bank. Not waiting for anybody. The society has solved its problems because it knows its desert, its secrets. They know their drops of water.

Clouds seldom visit this region (Figure 3). The average rainfall is 16 centimeters or 160 millimeters, which is nothing compared to other parts of India or even Germany. Groundwater is found 100 meters below the surface. If you do find it, you realize it is mostly saline. The technologies supported by multinational organizations like UNICEF will, at best, pump up water from great depths. But its salinity will ensure that it is not potable. Then somebody might suggest desalination plants, but they work on paper only, not in the desert. So people here decided to measure rainfall not in centimeters, inches or feet. They learned to measure the scarce rainfall in millions of raindrops. They look at the countless small, crystal-like drops and believe that nature has provided them enough water. They focus on catching these silver drops. No centimeters, no inches. Their dialect contains some 40 different terms



The rainwater tanks are kept meticulously clean; they are the only source of drinking water (Fig. 5).

describing clouds. Some are poetic, some scientific, some even political: They say a particular cloud promises you water but will not deliver water to you. There are numerous ways of identifying clouds and of responding to their presence on the ground – all in the collective wisdom of the desert folk.

One system (Figure 4) is called the *Tanka* or *Kund*. You can see a false catchment surrounded by a wall. It slopes to a dome-shaped structure in the center. The dome in this particular image is about 300 years old. The well it covers is 12 meters deep. The lining of the well is of a quality, which does not allow a single drop to seep out. There is no seepage loss. Raindrops in the catchment are drawn to the center, where filters on the periphery clean the water before it enters the well. Whenever you need water, you climb these beautiful stairs, lower your bucket, and pull up the water. Because it has dropped in from the sky, it's pure distilled water. People make sure nothing contaminates the water before it is collected. But how much is collected? The average capacity of such a structure is about 100,000 liters per season. There is enough from one monsoon to last till the next year's rains. Over the past 10-15 years, the term *rainwater harvesting* has gained currency, even in Europe; the society which devised the *tanka* has harvested rainwater for thousands of years.

This structure (Figure 5) is operational, still in use, although it is 250 years old. Take a moment to consider the practicality of these structures. Their designer is the biggest government of all: society. Our elected governments plan for five years, ten years, perhaps



Simple, and yet efficient: during the monsoon season rainwater is channeled from the catchment area into the tank below (Fig. 6).



A living tradition: the structure on the left has existed for 300 years; the tank on the right was built only recently (Fig. 7 and 8).

20 years. But these structures were built to last hundreds of years. You may notice several filters here. The cleanliness of the structure and its catchment is maintained meticulously. The responsibility to clean the floor is distributed among the villagers and diligently followed – all this to ensure no dirt is washed into the water storage. Once you climb these stairs, you place your earthen pot on a platform where it sits safely secured. Not a single drop is wasted while pouring, and if any water spills, it is collected for the



birds. A caring society remembers all its members – its birds, its cattle and every living being.

The structure in Figure 6 may remind the viewer of a flying saucer. It is only a water collection device, a much simpler one, though, without elaborate walls. It comprises only a raised platform which collects rainwater and funnels it to the center. One indication of the value of each drop is to remember the summer temperature in this desert: it reaches 50 degrees Celsius. Moisture is the difference between life and death here.

The structure in Figure 7 was built by a family some 300 years ago. In their will, they set aside funds for its maintenance from generation to generation. The money is given to another family, who cleans the structure regularly, especially its filters. There are often strict social regulations; for instance, I cannot enter the central area with my shoes on because pure drinking water is collected here. If I need water, I must ask the caretaking family. One of its members brings me water outside. Everybody knows who is in charge. Please also note the embellishments on the wall protecting the water collection area.

Water management in the desert centers on people. The man in Figure 8 has two colored flags under his arms. It tells you he is a gatekeeper at a level crossing of the railway department. He is among the lowest paid employees of Indian Railways, perhaps the largest railway company in the world. When he lowered the gates across the desert road, along the railway line, he noticed people waiting on their camel carts for the train to pass. He realized they might need water. So all by himself, he constructed this device. He designed it, engineered it, he is its architect and its fundraiser. If you happen to wait at this crossing in your car, he will enquire if you need water. After he has quenched your thirst, he will tell you that he built the structure by himself, and ask for a contribution. Some people contribute in cash, some in kind, some help carry stones, others provide building material. When cracks appeared in the structure, he was worried that they would gradually spread, creating many leaks. So he decided to install a T-pipe to allow an escape route for the air that expands in the tank due to the desert heat. His tank collects 70,000 liters of water from rainfall in an unpaved catchment. Nobody knows his name – of course we know, and we can tell you – but he is the best civil water engineer in that area.

The two village houses in Figure 9 also display water collection technology. In this region of the desert, population density is as low as the rainfall, with no more than five people per square kilometer. The next village is several kilometers away. No centralized system will ever



The monsoon rains are collected from the roof and the courtyard of the village houses of the desert, and stored in tanks below ground (Fig. 9 and 10).



Monsoon rainwater is collected from the surrounding hills and flows through canals down into the main tank in Jaipur (Fig. 12 and 13).



This 300-year-old tank near the fort in Jaipur holds up to 23,000 cubic meters of rainwater (Fig. 11).

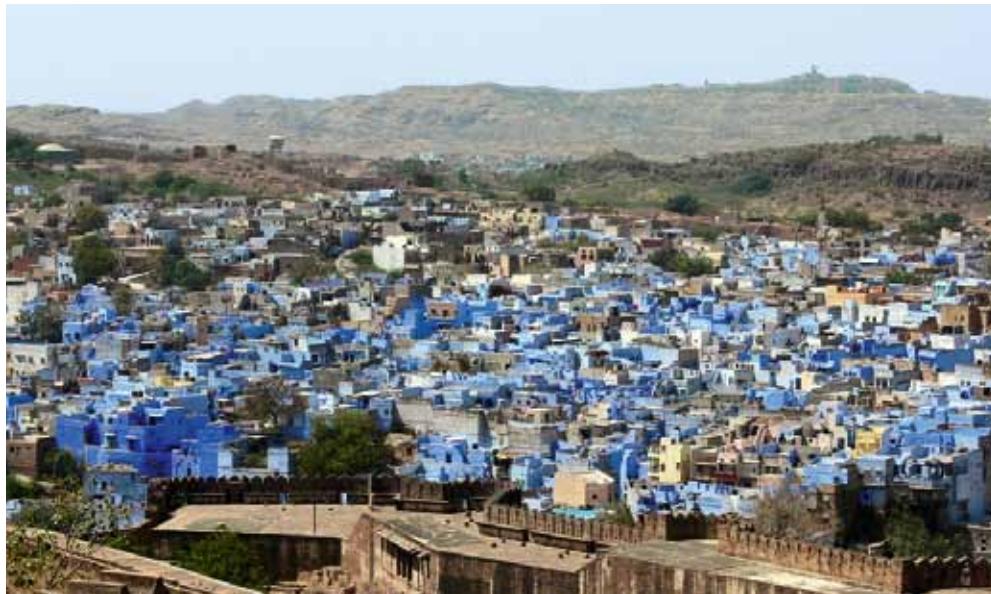
be able to provide drinking water to a small number of people scattered over such a vast area. So the people here worked it out for themselves and constructed raised platforms beside their entrance doors. You rest here if you are weary from your travel, sleep here at night, or spread out vegetables for drying. When it rains, the 5-meter deep tanks collect water from both the roof and the courtyard. And each and every house has its own platform – two doors and two

platforms are visible in the image, decorated with cow dung and the colors of sand. Each tank collects about 30,000 liters.

This Rajasthani house is exemplary (Figure 10). All shoes and footwear have to be left outside. This is to keep the courtyard clean, because it is a rainwater-harvesting surface. Before the rainy season, the entire area is swept clean to ensure the quality of the water going into the tank. Throughout the year, you can draw out water by merely opening the lid. This courtyard collects 20,000 liters each season.



Strict rules ensure that the drinking water drawn from the tanks is always clean (Fig. 14 and 15).



Houses in Jodhpur are traditionally painted blue as a reminder of the importance of collecting rainwater (Fig. 16).

There are a large number of structures that harvest and store from 20,000 liters to 50,000 liters of rainwater in the Thar Desert. However, this one (Figure 11) has a capacity of some 23 million liters. It collects water from the surrounding hills. The storage is 12 meters deep, 47 meters long, and 43 meters wide, practically the entire area of this building. A 15-kilometer long canal (Figure 12) feeds this underground reservoir. It is wide enough for two cars. It was built 400 years ago and has functioned without any interruptions for repair or maintenance, making water available in this famous fort of Jaipur. Compare it to the small road adjacent to it, which had to be repaired several times in only 25 years (Figure 13).

The sign in Figure 14 is in Hindi, so let me translate: "Remove your shoes and enter carefully, because this is a site for collecting drinking water." A small lock secures the door. You can see somebody fetching water from a depth of 12 meters (Figure 15). Do not fail to notice that the water is colorless; the water level of the reservoir is also visible, attesting to the effectiveness of the canal that feeds it and its high maintenance standards. Sometimes people mistakenly think that the canister is empty. Let me assure you it is brimming with water just like distilled water. And since I've tasted it, I can tell you that it is very, very sweet.

Figure 16 is a landscape of rooftops in Jodhpur. The city was built 800 years ago in the driest part of the Thar Desert and was once a prestigious trade center on the silk route, similar to Dubai today. It rains precious little here and the groundwater is too saline to drink. People had no option but to devise various methods to manage water. For one, all houses in Jodhpur have been painted indigo for a long time, to remind everyone of an invisible river (Figure 16). This translates to collecting all the rainwater falling on the roofs. So you can imagine a river running along these structures. Then they designed 52 beautiful bodies of water, like these in the town of Jaisalmer (Figure 17). Again, the reservoirs are 800 years old – note the elaborate architecture, the quality of masonry. It was the biggest fresh water reservoir in that area. Everybody participated in building the waterworks, from the mighty king to the local carpenter.



The splendor of the architecture of the buildings on the manmade lake of Gadi Sagar in Jaisalmer highlights the importance of this fresh water reservoir (Fig. 17).

The reservoir in Figure 18 is called Gadi Sagar and located in Jaisalmer. Several intriguing stories are told about it. Its name is a metaphor. For example, a person indulging in a boast could be asked to go wash his face with the water of Gadi Sagar. There are a number of qualities attributed to it and it is beautiful in every season. Whether the water level is low or



Water reservoirs as cultural attractions: pleasure islands and water level indicators at Gadi Sagar Lake (Fig. 18 and 19).

high, there are pleasant meeting places there large enough to hold a symposium, but also smaller venues, surrounded by water and accessible only by boat. The catchment for this reservoir is about 125 square kilometers and, let me remind you, all this was built about 800 years ago.

Devising such a reservoir is not merely a matter of technology, but of culture too. For instance, the ordinary task of calculating the amount of water in the reservoir was turned into an aesthetic project with the help of stone statues on its banks (Figure 19). People know whether the water will suffice for four or six months by the level it reaches. If water touches the horse's feet – nine months, if the horse gets submerged, that is water for the entire year, right until the rains next year. There was no need to read the newspaper to know about the city's water reserves – a very transparent and beautiful way of offering people information. You might have heard the name of the pond in Figure 20, but perhaps you are seeing it here for the first time. This is in the region of Pokharan where India tested its nuclear devices and then faced sanctions from the world's nuclear powers. The Indian government was keen on nuclear power and this region was chosen because it is sparsely populated and considered deserted. But people do live here, and with little or no government help. As almost everywhere else in the Thar Desert, the groundwater here is saline. This pond is the only freshwater supply for Pokharan village. People look after it and maintain it because it is so precious. It is said these days that the Third World War will be fought over water, not land or energy



Varied solutions: a simple village pond and an ingenious rainwater reservoir (Fig. 20 and 21).

sources. The people of the Thar Desert know the real power, the power of life, lies in the sensible management of water.

The structure in Figure 21 is no less than 400 years old. It is a large water reservoir. During the monsoon season, water fills this entire area and the circular structure is submerged. Then, after the rains cease, water gradually retreats from the outlying area due to usage and evaporation. Water supply is ensured even in the hottest months of April, May and June. The idea is to confine water inside a deep structure that minimizes evaporation. During summer, the heat inevitably evaporates all water unless it is confined in such a structure. Hundreds of camel carts take away water from here to supply nearby villages. But water is never sold here; it is not a commodity.

Blue and green are not colors usually associated with a desert (Figure 22). Yet the blue and green of this lake indicate the depth of its water. Deep waters lend a blue hue. This pond is 12 meters deep – and it is right in the heart of the desert. It is yet another example of a deep understanding of local natural conditions. The pond was made above a gypsum layer running at a depth of 12 meters. Gypsum is impermeable, which means there is no water loss due to seepage; it is like water in a glass container. The people of the desert knew the gypsum



Not a Fata Morgana: a 12-meter deep freshwater reservoir in the middle of the Thar Desert (Fig. 22).



Many towns in Rajasthan depend on rainwater from rural areas (Fig. 23 and 24).

layer would work as a bottom seal, and created a pond in the sand above it. The bank holds the water on one side, while the catchment on the other brings in rainwater. Note the lush green cover on the bank, which strengthens it. Remember, again, that this is in the heart of the Thar Desert. A small building is visible only by the reflection it casts in the water. It is a one-room inn, where anyone is welcome to stay.



Monuments of water wisdom: 800-year-old stone pillar marking a water collection area; the huge pulley of a deep well (Fig. 25 and 26).



Desert folk are immersed in the lore of water. In contrast, the towns and small cities of the desert have lost their water wisdom in recent years. That is why you can find an advertisement like this in towns today (Figure 23): medicine, local phone, water tanker. And where does the tanker get the water? From the villages (Figure 24); the city may have lost its water management culture, but the village hasn't. The phone numbers are important, for they guarantee fresh water. The government supply and all other local water sources are saline as the groundwater they pump up is saline. The only fresh water in the area is collected in rainwater harvesting structures. So it is important to remember these numbers; who knows who may need them some day.

One of the Thar's secrets is its stone pillars (Figure 25). This one is 800 years old. You will find such pillars wherever you approach a body of water. It has been erected to announce to everyone that a water collection area is lying ahead. It signals: Do not litter, do not spit, do not do anything that may contaminate this catchment in any way. Treat and respect this area as your own – not the government's property, not a private property, but it is yours all the same. These pillars are respected and worshiped by society. They are about 2 meters high. The effort, time and money that must have gone into creating these works of art is obvious; the inspiration, though, can only be felt. It is an aesthetic and surefire way of ensuring the sanctity and collective ownership of a body of water, far more effective than a board that warns: "Do not enter here, by order of law."



Aboveground a building, belowground a well: 400-year-old architecture in Bikaner (Fig. 27).



Stone pillars indicate the vicinity of a water reservoir (Fig. 28).



Toda Rai Singh Baoli, a water storage well in the Tonk district of Rajasthan was built in the 11th century (Fig. 29).

Most of the examples we have seen so far harvest surface water directly from raindrops. Let's now move on to groundwater, which is usually saline in the Thar Desert, but there are also pockets of fresh water. Hundreds of years ago, when there was no sign of modern technology, people discovered ways of finding these pockets of fresh water, and then created an entirely different set of waterworks for such areas. They built marvelous wells, some up to 100 meters deep. The pulley in Figure 26 is so large because it takes a lot of rope to reach the water in such a deep well. Figure 27 also shows a well in the city of Bikaner, only it looks like any ordinary building. There are 12 rooms and verandas inside this building, and a well. Built some 400 years ago, it not only supplies water but also provides office space for a new world, in this case for the state government. Government officials work virtually on top of the well.

Once again a pillar (Figure 28) announces you are close to a body of water. You remove your shoes and climb these stairs, for the view on the other side is nothing short of spectacular. Built in the eleventh century, this open stepwell is named *Toda Rai Singh's Baoli* in the district Tonk of Rajasthan (Figure 29). You enter right at the top and climb down at least eight flights of steps to reach the water. During the dry months, when the groundwater drops, more flights of steps appear; in the rainy season the water table rises and submerges them. When



Applied geology: *habur* stones are highly sought after for the construction of wells (Fig. 30 and 31).

the water recedes, it unveils beauty; when it rises, the water itself is an embodiment of beauty. The ambience is impressive due to the playful interaction of light, the steps and the water, giving you the feeling of entering an entirely new world. Three sides of the well have steps, the fourth is overlooked by a four-story building.

Figure 30 shows a special stone called *habur*, a kind of limestone. People here noticed its special qualities some 1,000 years ago. When British geologists surveyed India 200 years ago, they found this stone and they named it after the village where they found it: *Habur*. This is also its traditional name in Rajasthan. *Habur* has special qualities with regard to water. It tolerates water well and does not erode or dissolve easily, which means it can be reliably used in waterworks. It also helps maintain water quality by softening hard water. Villages in the region are desirous of using this stone in their water structures. Figure 31 shows a well made using *habur* stone. People go as far as 200 kilometers on camels to get this material.

In contrast, let me make some remarks on the outcome of using modern water technology in the desert. I do not wish to deride our governments in the least. Their strategy is to drill deep tube wells, pump out the water and fill tanks (Figure 32). The tanks are supposed to supply water to cattle and sheep. However, this tank started to fall apart and became useless within five years. The animals have long gone back to the water places which sustained them for generations.

The people who have devised, designed and built the traditional water structures of the desert, the people who keep them running, are the best civil engineers I have met in our country. They are skilled enough to serve as visiting professors at universities and international organizations such as UNICEF. Provide them with a good interpreter and they will help you solve any water problem.

To close, let me return to one of the water awareness pillars worshipped in the heart of the desert (Figure 33). Here, in an area with no more than 8 centimeters or 80 millimeters of rainfall, you can see a crop of wheat. Agricultural experts will tell you it is impossible to grow wheat in the desert – absolutely impossible. What they do not know is that a layer of gypsum runs about three meters below the surface. It prevents rainwater from seeping away, retaining the moisture in the upper layers of soil. This moisture is all that the people here need to grow wheat (Figure 34). In an area condemned as desert, as deserted, they combine an understanding of geology, agriculture and collectivism; everybody gets a share of this precious field. About 40 families live around this field, and everybody will get a share. The collective farms of communist Russia and the Kibbutzim of Israel came much later, and their success is disputed. But here in the desert, there are no slogans and no claims to ideology. People have been farming collectively for centuries; raising wheat on equity.

The water philosophy in the Thar Desert is well summarized in a two-thousand-year-old tattoo called the *Sita Baoli* (Figure 35). It symbolizes a body of water in the desert. In the middle is the center of life, surrounded by waves on the water's surface. Along the sides, there are the stairs of a stepwell like the one described earlier, crowned by trees protecting and



Even well-meaning government waterworks projects are doomed to fail without the water wisdom of the desert. (Fig. 32).



This stone pillar is not the only sign of water in this desert clime (Fig. 33).

shading the water. In the four corners, you will recognize the flowers which add fragrance to our life. Without water, there will be no fragrance. So we come back to the theme of this symposium: Touched by water, touched by very little water, touched by the fragrance of water. I thank you very much.



Almost a miracle: wheat grows despite the area's scarce annual rainfall of 80 millimeters (Fig. 34).



Two-thousand-year-old tattoo symbolizing the existential significance of rainwater harvesting in Rajasthan (Fig. 35).

Anupam Mishra's Rajasthan

An introduction to his work about the desert and water culture of northwestern India, by Annie Montaut, based on her preface to Anupam Mishra's book, "The Radiant Raindrops of Rajasthan".

Rajasthan is an Indian state in the northwest of the country, sharing a border with Pakistan and very often referred to as a desert: the Indian Desert, the Rajasthan Desert or the Thar. The whole of the Thar can be regarded as part of the Afro-Asian desert belt, stretching from the Sahara to the Gobi. Almost 58 percent of western Rajasthan is made up of sand dunes, low infertile hills and land high in mineral content.

The Thar is enclosed on the west by the Pakistani border, and on the east by the Aravali hills from where the river Luni (the salted one) flows down to the south.



Anupam Mishra in his office at the Gandhi Peace Foundation in Delhi.

Despite grim descriptions by early European travellers, no one visiting this region has the feeling of being in a desert. Even in Jaisalmer, the least populated district (four inhabitants to the square kilometer), one can see villages and fields everywhere, at least during the monsoons. This is a very different picture from the Sahara or Australian deserts, an image in total contrast to the stereotype of deserts being arid, sparsely populated and on the fringes of civilization.

Aridity cannot be defined by only one parameter such as annual rainfall. This would mean lands receiving an annual rainfall of less than 100 millimeters

would be desert, and those receiving 100 to 400 millimeters would be arid, in which case the Thar Desert in its totality would not be defined as a desert but be placed in the second category since even Jaisalmer, the district with the lowest rainfall, receives 160 millimeters of rain. One must keep in mind two other factors: first, the distribution of rain throughout the year, meaning that 90 percent of rainfall occurs during the monsoons from July to mid-September, and second, the torrential nature of rainfall, which does not allow optimal usage. Winds, a powerful agent of erosion and evaporation, also contribute to the desertification of an already arid region. If we add the temperature factor (in May the minimum temperature in Jaisalmer is around 27 degrees Celsius and the maximum around 43 degrees Celsius, and this range is barely lower in Jodhpur and Bikaner), we can accept using the term desert for Rajasthan, as Indian geography classification has always done.

If Rajasthan offers a very different impression of a desert, the explanation lies in the way the water it receives is so parsimoniously managed, one could say drop by drop. In his books and speeches, Anupam Mishra documents how the ingenuity and patience of people down the centuries have made it possible for life to be maintained in the desert, with inhabitants applying their technical knowledge to collect each and every drop. Drops become all the more precious given their scarcity, suggested by the very title of his talk on "*Rajasthan Ki Rajat Boonden, The Radiant Raindrops of Rajasthan*" (also the title of his groundbreaking book on the topic). *Rajat* in Hindi means silver but also ivory; it therefore connotes luminous whiteness, radiance and value. It is to each precious drop that local society has dedicated its effort, its love, its intelligence, in fact all possible human means to obtain optimal advantages. But local society does not view itself as the sole agent in this endeavor to make the desert suitable for human life. More specifically, it acknowledges a partnership from the offset; human intervention is always associated with supernatural forces and all the concomitant ethics deriving from this interaction. In fact the myth of the practice of water harvesting in Rajasthan is founded on human activity responding to a divine gift.

But as Anupam Mishra explains with so much sensitivity and discernment, the people of Rajasthan did not wait for manna to drop from heaven. Instead, they evolved a whole *riti* or *voj* (tradition) around their *shram* (labor) in water conservation. A *riti* is established on a deep partnership between nature (the environment), human action and its ethical as well as religious framework. The same spirit permeates Anupam Mishra's work as well as that of the Gandhi Peace Foundation, for which Anupam Mishra has worked the major part of his life. Anupam Mishra's work on traditional water harvesting and storage systems is an invitation to understand what these systems have to offer even in the present day. There are *kuins*, deep and narrow wells which access the capillary water trapped between the brackish water table

and the surface. Then there are ponds and water tanks, *kunds* and *tankas*. These range from the modest *tanka* which each family has on its roof, or the small *kundi*, which looks like a lid, to the enormous *tanka* of Jaigarh which contains several hundred million liters of water and the *kunds* which look like flying saucers. Other devices are retention pools of all sizes. In some cases, entire seasonal rivers are retained, their beds transformed after the monsoon into oases called *khadeens*. When the bed is dry, it is blocked on three sides by mounds of earth to retain water instead of letting it run off. This offers the possibility of having two harvests (*kharif* and *rabi*), the second one relying on moisture still in the soil. Anupam Mishra suggests that although this Indian model cannot be universalized, it does offer hope by providing a modern example of the efficiency at economic and social levels of self-managed traditional techniques.

Each technique has a particular function in the social and ethical fabric of local communities because such traditions cannot be separated from the philosophical and religious culture of the people who forged them; in fact this culture offers a way to manage natural and social resources and to integrate human beings with the natural environment.

Technique and ecosystem – a way of life

And so, essentially through describing technical devices to manage and preserve water, invented and maintained over the centuries by the very special society of the desert, Anupam Mishra's objective is to illustrate the culture of a society bonding itself to the environment which keeps it alive, no different from elsewhere in India, but perhaps more pronounced here due to the hardship of natural conditions. In turn, society keeps the environment alive by transforming, respecting and cultivating it without exploitation. The same idea also permeates the most interesting facts. For example, Cherapunji in Bangladesh is a region with one of the highest rainfalls in the world, a minimum annual rainfall of 5 meters, yet it is listed as a district with severe water problems. On the other hand, Jaisalmer has always had drinking water – with just 160 mm of rainfall. In one case, the environment is conducive to symbiosis and a patient dialogue with the realities of nature, in the other it is not.

The insistence of Anupam Mishra on the special Rajasthani attitude (*tevar*), the virtues of frugality and modesty, in no way reflects a moralizing nostalgia for the past; on the contrary it underlines the awareness Rajasthani society has of the value of each drop of water. The drop is a fragment of the usable capital of water (*pani*). In fact, water is offered to the honored guest whereas others are offered milk; this capital of water, religiously maintained, is the fruit of a dialogue nurtured through the centuries by an entire culture and a mythopoesis between people, earth, heat and water.

When we say “a dialogue nurtured through the centuries,” we must know that archaeological traces of sophisticated water structures have been found at the Harappan site of Dholavira in Kutch, dating from the beginning of the third millennium B.C., when the Harappan civilization flourished in the Indus valley and the Thar Desert. There are also indications that there would have been a technology transfer in Balochistan with its gabbarband system reminiscent of the Iranian *qanat*. As early as the eighth or ninth century, the *Agni Purana*, an important medieval Vedic text, mentions tanks, lakes, reservoirs and step wells, describing the various rituals to be performed before consecration. Another more detailed treatise, the *Aparajita Pricha*, describes a complete typology of hydraulic works. From the beginning, we see that water techniques are also a ritual and a religious tradition and it is this tie that enables them to make the desert humane and fit for life.

Excessive heat and all too scarce water are not the only challenges people have to face to tame this difficult environment. The water table is salty in an extensive area of Rajasthan; in fact, the Jodhpur museum exhibits salt sculptures from Sambhar and marine fossils which confer historicity to the legend of Hakdo, the ocean which is supposed to have existed in the region before it turned into a desert. It is therefore a range of difficult conditions that society at large (*samaj*), meaning communities, has transmuted into a *raison d'être*, and which has generated social cohesiveness through work.

The name of this work is *shramdan*, the Gandhian concept meaning gift of labor or *seva*, service offered in a religious and respectful spirit. The gift of labor, in the interest of all, is the underlying spirit behind water harvesting and conservation work, from the smallest of *kundis* to the narrowest of wells and the vast step wells, from the family *tanka* to the big reservoirs of Jaigarh. That gift of love rests on a social cohesion which is itself linked to economic and cognitive structures. The notion of a good deed to serve all, the environment included, is considered *punya* (sacred and virtuous) because the relationship between society and nature which nurtures it is *punya*; on the other hand, paid work which is governed by individual profit does not belong to this way of thinking but to the structure which modern India has ultimately imposed based on an economic and technical modernization principle of democracy and secularism. In other words, the spirit of participation does not spring from a social void but from a global and holistic system.

The situation existing until the 19th century reflected this. Private property or collective property in the communist sense of the term was not prevalent. But the commons, the communal fields (*gocchar*), the communal woods, and the wastelands accounted for 80 to 90 percent of people's resources (firewood, water and fodder for herds). Rivers, springs, and

their beds, which could be used once they were transformed into irrigated land, the *kha-deens*, catchment areas of lakes and reservoirs, the lakes and wells themselves, as well as fallows, all belonged to the commons, and in many cases, so did personal habitats. Their collective usage and development, under the control of village assemblies, were efficient because in practice they concerned everybody, traditional rights being the legal mode of managing the few conflicts. Artisan knowledge also served the common good. Specialized communities such as the *Odhis*, who worked stones and earth, the *Agariyas*, who were blacksmiths, the *Gajdhars*, who were architects of well-making, the *Shilavat*, who were stone sculptors, and the *Ghumantu Samaj* of the Banjaras, nomads trading in grain and salt, were all recognized as *gunijanakhana* (literally meaning people with expertise); in other words, they were skilled workers and specialized engineers of their time. Today they are members of a social group which, since it does not belong to the educated class and no longer answers the new needs of modern technology, has been reduced to nothing, economically devalued and robbed of its sense of belonging to the general community.

Modernization losses

What has brought about this metamorphosis within a century? Among the various causes responsible for this degradation, apart from population growth, one can list changes in the management of natural resources. Toward the middle of the 19th century, British colonization brought about privatization on one hand and state control on the other. In 1863, the Public Works Department (PWD) was created, thus withdrawing from the village community local control of its water resources, the *johars* and *talabs* (ponds and lakes). Similarly in 1865, British colonial government authorities took over the commons; the wealth and income earned from them were subjected to tax and taken from the people to be handed over to the British Crown. This mainly marks the end of the commons, and it translated into a considerable decrease in community resources. It also marked the end of the community's interest in upkeep and of its religious reverence for these resources, although local folklore still bears traces of these aspects. It heralded the beginning of the degradation of natural resources as well as the major harm done to soil due to erosion resulting from the degradation of forests and plant cover. The same process was witnessed in a more vigorous way in post-1950s modern India, which valued both privatization and state control as the sole means for modernization and progress, thereby further weakening the involvement of people with their natural environment. From the 19th century onwards, and even more so since independence in 1947, the government staked everything on the development of big basins. It encouraged projects linked to big dams and the large-scale development of river valleys to facilitate extensive irrigation through centralized control. One such project is the Indira Gandhi Canal, begun in Rajasthan in 1958 and yet to be fully operational.

All this has led to increasing bureaucratization, which involves bureaucrats alien to the culture of the region and ideologically removed from the uneducated masses. This in turn has perversely led to privileges for a select few, the creation of local mafias, and ultimately the plunder of natural resources, as portrayed in several Indian novels.

The next generation seems to have succumbed to a growing feeling of powerlessness, not to say defeatism. The great importance of the state, which on one hand encourages the privatization of agriculture while on the other wishes to play the role of the provider state through centralized control of water and forests, has led to the total disinvestment of society, now bereft of its control over resources and faith in their value. The abolition of pastures for the benefit of private agriculture, within the framework of changed access to property, with a subsequent change in the commons regime and its traditional rights to a partly private, partly state regime, has entirely dismantled a system which was once the foundation of the collective's participation in works of common interest. This explains the failure of welfare politics.

Too often the new impetus given to the *Panchayati Raj* (local or village administrations), which partly entrusts the management of local problems to the village councils, remains artificial. While the reactivation of the *Panchayati Raj* reflects a tacit acceptance of the failure of centralized policies, it brings about a resegmentation by cutting and splitting the structured networks of ancient communities and adopting a top-down approach. The central government's hope of getting back the people's trust and stimulating its participation is not realistic. Plans have a very low success rate because real self-management, the prime motor of participation, is lacking. What is also lacking is the psyche emanating from the notion of *dharma*.

This notion, much larger than that of religion, into whose vocabulary it is often translated, is central to the rapport humans have with their environment. This is all the more so in regions where the environment is fragile, whether in the Himalayan states of the north or in arid zones like Rajasthan. It is true that environmental problems are very often tackled from the angle of physical, if not economical, degradation, but this cannot be divorced from the sociological dimension in which the religious grounding, underpinning local popular culture, plays an important role. The idea that agrarian cults (fertility rites, worship of divinities associated with particular trees, and so forth) are at the core of an agrarian morale rests on a concept of human rapport with the universe which is not anthropocentric and in which humankind is not in a position of control vis-à-vis the universe. On the contrary, to worship humans and to substitute that for the worship of natural forces or the gods, leads to a will of might, control and exploitation of nature (which will sooner or later be devastating).

The decline of nature can be traced back to the error of seeing one part of the universe as if it were the whole.

It is not possible to understand the life of traditional agrarian societies if natural, social and spiritual resources are disassociated from each other. The individual is linked to his or her environment in the same way as to his or her social group, clan or village and this interdependence is seen in the framework of devotion to the local protecting divinities which impose on the whole community the sacred ‘service’ of environment in exchange for their protection. So much so that any degradation of the villager’s perception in any of these three spheres (physical, social, supernatural) has an impact on the others. Thus, whoever wants to soundly address environmental problems in a traditional milieu needs to consider spiritual resources as well, whether they spring from imaginative originality, cultural and intellectual capital, or religious practices.

The loss of the vitality of popular belief and the degradation of the local cultural ethos in past decades cannot be disassociated from Rajasthan’s growing environmental problems: drought, overgrazing, and wind erosion. The risks of resource degradation cause concern in the middle term. The weakening of the traditional mutual aid system, and the dissolution of social cohesiveness under the influence of privatization and market laws, have contributed significantly to the degradation of common resources, the reduction of biodiversity (diversity in crops and cattle was a traditional strategy to defend against the vagaries of climate), and the reduction of agricultural activities.

Today, the folklore linked to the traditional belief system, the specific expression of spiritual resources, has been discredited to a very large extent (precisely for being folkloric and thus retrograde and obscurantist) during the decades of ‘enlightened progressivism.’ It is thus difficult to rehabilitate its validity in the technological cultural-integration regime so prevalent now. This is all the more so because the Indian government is increasingly encouraging the construction of big and centralized water systems, supposedly beneficial to entire states. The Rajasthan Canal was followed by the Narmada Dam, which involved the displacement of numerous tribal communities, and then by the Tehri Dam, in spite of virulent local and international criticism.

Indian scholars have shown in their analyses of famines following droughts that the main problem of unequal access to resources can only be managed by a ‘moral economy,’ this is based on the notion of each person’s entitlement to the management of food resources and therefore water resources.

In order to revive this empowerment, it is certainly not simply nostalgia to remember the holistic system of a society which built water systems that still function. It is in fact in direct line with the modern slogan of “think globally, act locally.”

In his writing and talks, Anupam Mishra continuously illustrates this concept. He consistently explains technical terms with the help of discreet but recurring metaphors and references to classical culture as well as local legends. This is done to express, without being explicit or resorting to arguments, that the local technology of the region is an integral part of local ethics, the social fabric and the very foundation of Rajasthani culture. Anupam Mishra’s work is an ode to local knowledge based on a deep knowledge of the ecology of a place.

Understanding Rivers

OTMAR GROBER

Otmar Grober is considered the founder of nature-based river engineering. His methods are based both on Viktor Schauberger's findings and the flow patterns of bodies of water in their natural state. The methods used in nature-based river engineering aim to prevent flood damage, but they also improve the ecological quality of the water and create river landscapes which are aesthetically pleasing and beneficial to humans.

It is water that shapes its surroundings, not the other way around

River engineering has adapted in the last 150 years to the needs and demands of the times and developed continuously. Initially its main focus was on the use of waterpower, but with ever-encroaching land development, flood damage became a more pressing problem and the importance of flood protection increased. Engineering changed after large machinery could be used, and entire river courses were straightened, oxbows cut off and wetlands drained. There was a growing tendency to alter the natural state of rivers and their natural surroundings.

But construction methods that do not heed the laws of nature fail in the long run to provide effective flood control nor do they create a beneficial environment. Flood protection measures have robbed entire landscapes of their natural beauty, vitality and quality of life. We can manage rivers and streams in a careful and sustainable manner only if we understand that water has a life of its own and responds like a living organism – violence breeds further violence and constraint provokes attempts to break out. To avoid these negative outcomes, we must approach the phenomenon of water with respect and humility, and invite water to cooperate with us.

Sustainable and nature-based river engineering must be based on observing and understanding rivers much more comprehensively than we have done so far. This applies to rivers as well as to their banks and surrounding flood plains. If we allow river floodwaters to flow over banks and into the landscape in a controlled manner, we can take advantage of the enormous storage potential of soil in these plains. In this way we can buffer peak flow and reduce



floodwater speed. The quality of the soil plays a pivotal role here however. Where topsoil is still deep and rich in humus it can absorb nearly all the precipitation. Water seeps directly into the ground, collecting in the soil's deeper layers so that floods do not even occur in the first place. This is why it is so important to encourage and support the widespread recovery and conservation of humus in agriculture – primarily as a flood protection measure.

But how do we know what a river needs, and what the interactions and dynamics between a river and its floodplains are? To find out, we closely observe river flow patterns in areas where surrounding landscapes are still in their natural state. Since such places are rare today, we frequently resort to looking at old maps. It always turns out that the inner dynamics of water are characterized by water's propensity to flow in a meandering, pendulating way, and that the frequency of this movement is adapted to the landscape and its unique biogeological features. In a way, we could think of rivers and streams as resonating bodies tuned to the character of a landscape, similar to a musical instrument. But since the landscape – its valleys, valley floors, sediment and its biological features – was itself created by water, it is water that leads the orchestra. It shapes the landscape and determines its own course through it.

With the help of our river installations, we prompt water to flow harmoniously in a different way, thereby relying on water's own distinct disposition. Ideally we make use of water's

natural energy to deflect its flow towards the center of the riverbed and thereby prevent damage to riverbank areas. This at the same time restores continuity between the river and its surrounding landscape and has a welcome side effect – the river landscape looks highly organic and becomes aesthetically pleasing, a place where both water and humans feel at home. So we see that our work also serves an important social function.

As far back as the 1930s, Viktor Schauberger urged us to view bodies of water from the inside out. Hardly anyone could follow his ideas at that time, and only today are we beginning to understand what he meant. River engineering still all too often uses the wrong approach by removing riverbank shrubs, for instance, and simply widening waterways. In spite of these measures, the river does not stay within the wider bed, but shapes its own new banks. It takes advantage of the first flood to seek out alternative ways to flow through the landscape, frequently in exactly the same way it did historically, as we see on old maps.

Naturally occurring landscape features such as valleys and river bends can be seen on a smaller scale in the flow radius of water vortices. Water's creative force explains why these forms, whether large or small, are so closely related. If we look at a landscape as a river's resonance chamber, its form determines a characteristic sound in the same way the shape of an instrument determines the tone the instrument produces. About 80 percent of the time I can blindly recognize the waters of my native area – just by their sound.

A modern approach to river engineering can achieve far more than just flood control. It can improve ecological quality and the ability of rivers and streams to cleanse themselves. In successful projects, the water below the construction measure is of better quality than the water above it. We see this in the plant growth on riverbanks and a balanced pH value. What is particularly impressive is that it takes only a short time for species of fish that have not been sighted for decades to repopulate these stretches (see the section below on flow funnels).

We have also recorded frequency patterns, the distribution of sound vibrations underwater, to analyze the outcomes of our construction measures. In the process we have made astonishing discoveries. Not only do frequencies measure differently before and after the installation of pendulum ramps, but the composition of the stone blocks we use have also turned out to be a determining factor. Limestone generates completely different frequencies than silica. Rock sediment transported by the river's flow – the bed load – evidently communicates information of some sort to the water. But the lower reaches of most rivers lack this information because dams and control structures keep sediment from the river's source from moving

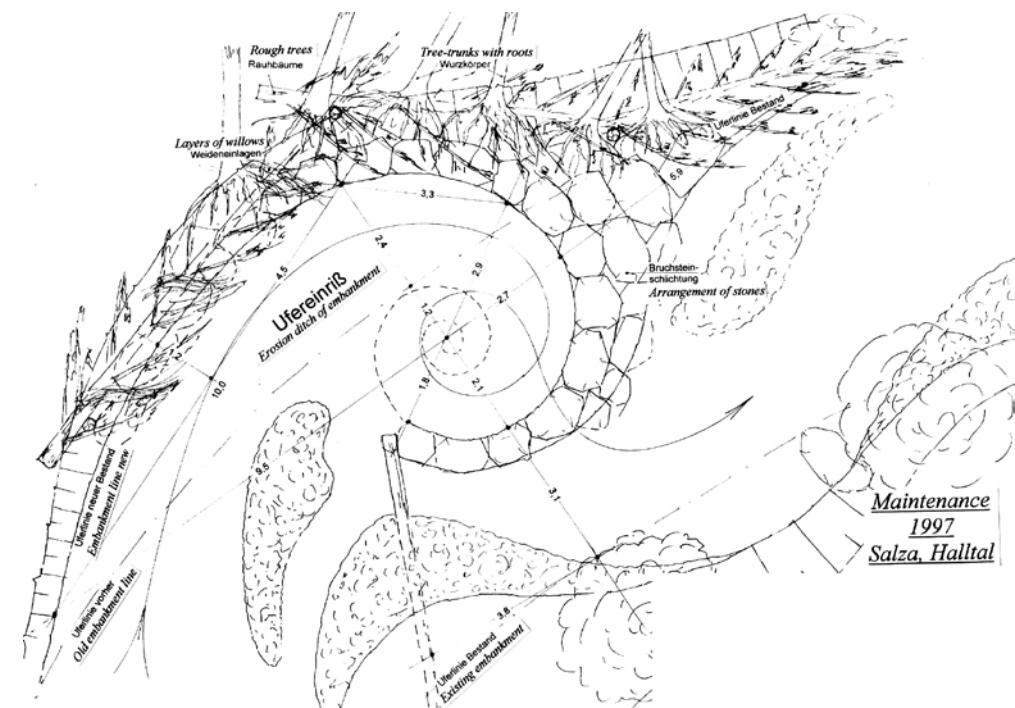
downstream. The bed load transports information from the entire catchment area; we could say it performs an update function for the waterway. Without this material, the river lacks a reference value essential for its well-being (see the section below on the importance of bed load).

In the next sections I will describe the construction techniques we currently use and their effects on rivers, and the significance of bed load for rivers. This will be followed by some observations on the Kinzig River adjacent to the Hansgrohe Group's headquarters, based on comparisons of its current state to its appearance on old maps.

The most important structural designs

Water snails

We use a design based on the shape of the water snail wherever banks have crumbled due to strong changes in the direction of flow, or where streams try to carve new paths for themselves. Boulders are an important structural element; depending on the course of the river they weigh from three to ten tons. The snail-shaped placement of individual rocks generates a current that flows in inward spirals, and the flow energy of the water is deflected from the inner banks down towards the streambed. The water snail installation protects the river's outer banks. We also use natural materials, which are both lightweight and inexpen-



The construction of a water snail (Fig. 1).



Flood waters flowing through a water snail: calm water at the river's outer bend and a strong wave effect at the inner bend (Fig. 2).

sive, to effectively stabilize the banks. Another positive effect is that the turbulences caused by the snail favor sedimentation.

Rivers frequently respond to abrupt changes in the direction of flow by forming sediment bars at their inner bends while at the same time carrying away bank material from the outer bends. The strategic placement of rocks and boulders (Figure 1) causes the river to redistribute material by itself. The current's inward flow then erodes the sediment bars, with the river providing the energy needed to redistribute the bed load.

Once the water snail has been installed, material is no longer washed away and erosion of the outer bank is halted (Figure 2). The sediment bar at the river's inner bend disappears. There is no longer a need for embankment structures to protect the outer bend as the water's flow energy effectively spirals inwardly. We have also observed that the water snail causes the pH value to improve by 0.2 points and the number of fish populating this particular section of the river increases, probably due to the lower pH value. This affirms that the right flow pattern even improves water quality in rivers. Another remarkable observation is that the fish in this part of the river remain completely motionless and do not show any signs of predatory behavior. To me it seems as if they are listening to something.

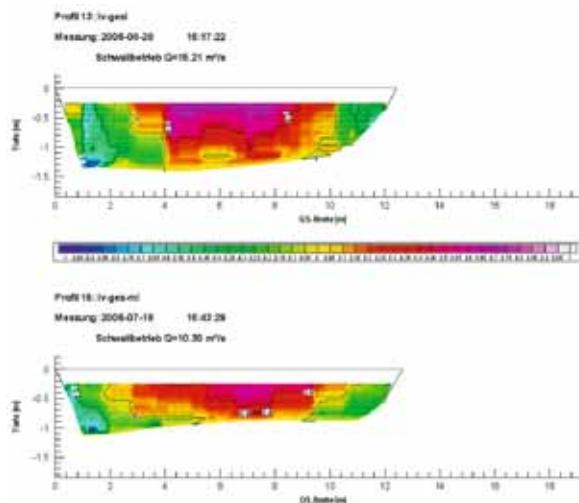
Flow funnels

We always look to nature for inspiration when we are working on appropriate designs. Flow lines that have taken shape during hundreds of years of undisturbed development cannot be wrong, so we use them as our models. We installed a flow funnel in the Mura River in the vicinity of St. Stefan ob Leoben in Austria, and for the first time we succeeded in protecting the banks of a larger river system without having to alter its natural state. Our method not only safeguards riverbanks, it is also very cost-effective. The entrance to the funnel is secured by two smaller piles, one on each side, of root balls from trees uprooted in storms. Once inside the funnel, water is concentrated and the speed of flow increases. The outer flanks of the funnel slow down the overflowing water and furl it back inward. Downstream, a spiral vortex moving on the water's surface towards the outer banks (on the right side in a clockwise direction, for example) flows gently down along both riverbanks. The banks are spared from destruction and the stronger current in the middle of the river moves sediment. This results in more heterogeneous river bottom conditions and a mix of shallower and deeper waters, creating ideal habitats for various types of fish.

Flow funnels increase the dynamic flow of sections of river with low flow rates. They also protect the banks by concentrating flow force in the middle of the river. A flow funnel effectively channels water flow down stretches four to five times its length. This construction, which is both extremely unobtrusive and cost-effective, allows us to successfully protect entire river sections against floods, rehabilitate bed load and significantly improve living conditions for fish and other aquatic organisms.

Viktor Schauberger studied this kind of longitudinal vortex flow as early as the 1930s and pointed out that flow energy is virtually sucked away from the riverbanks. What is important here is that the flow funnel causes the spiral vortex's direction of rotation to reverse. At the river's banks, where water usually swirls up from below (in other words, on the right bank it usually whirls counterclockwise), with a scouring effect and stripping material away, the water now swirls downward without attacking the banks.

We use highly sophisticated measurement techniques to closely monitor the rate and direction of flow in a given section of a river. Figure 3 uses colors to illustrate flow conditions in a flow funnel. Blue and green indicate reverse flow, yellow indicates stagnant water, and red and violet indicate the strongest flow. As the water along the banks flows downward, the main current is concentrated in the middle of the river, deepening the riverbed. This is always possible as long as there is no solid rock.



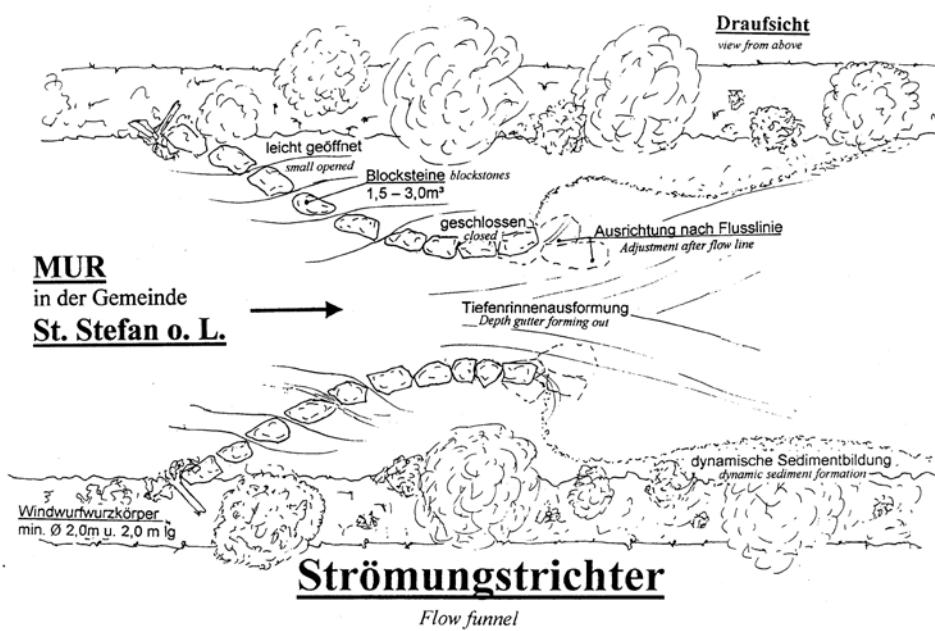
Measurement of flow rate in a flow funnel: water at the center of the river flows fastest (Fig. 3).

the water is calm and hardly moves – it rises only to catch grayling. But if these conditions are not present, the Danube salmon is endangered because the fish it feeds on are no longer there.

Most regulated rivers no longer have this kind of inward flow dynamic and many species of fish have disappeared along with it. The Mura River, one of the most important habitats of the Danube salmon, is at risk. The Danube salmon is a large fish measuring up to 1.5 meters, so it needs deeper waters; it also feeds specifically on grayling and trout. Grayling prefer areas closer to the surface with strong currents like those created by the flow funnel, while Danube salmon prefer deeper levels where



A flow funnel in the Mura River near St. Stefan ob Leoben in Styria, Austria (Fig. 5).



The construction of a flow funnel (Fig. 4).

Administrative authorities for the environment initially did not want to believe that flow funnels could have an impact on fish populations, so they carried out their own fish counts. The data they gathered showed that four species of fish that had disappeared from the river long ago had reappeared in precisely the 15-kilometer stretch where we had installed various sickle-shaped bottom dams with flow funnels. In fact, this happened just two to three years after our project was completed.

The aerial photograph in Figure 5 shows a flow funnel in the Mura River near St. Stefan ob Leoben shortly after one of the worst floods of the last century. On the left we can still see the last of the floodwater in the meadows. The funnel structure survived the flood without damage and the riverbanks remained intact.

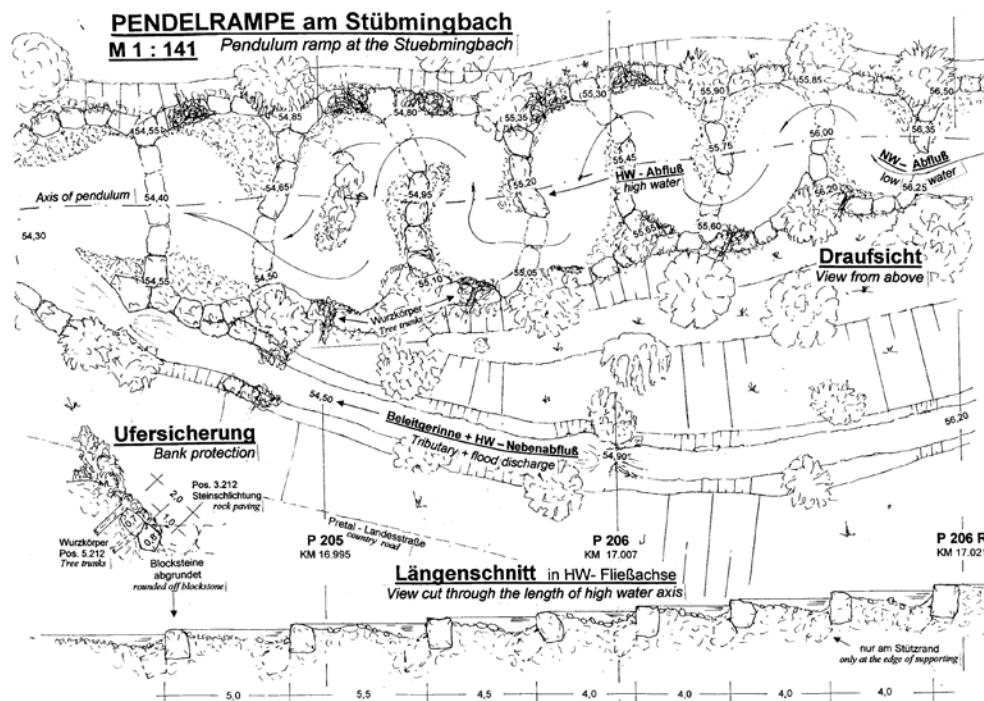
Pendulum ramps

One of my own designs is the pendulum ramp, which creates dynamically alternating flow patterns and is particularly useful for bridging drops and steep gradients. Pendulum ramps also ensure the continual transport of bed load and facilitate the passage of fish. It differs from conventional structures in its energy-channeling design. The pendulum ramp is a staircase-like structure which guides water on each step from one side to the other. Instead of

flowing straight down from one step to the next, water first covers a significantly larger area on each level before flowing on downward. The total flow path is extended, becoming similar to the stretch the water would flow down if there were no steep gradients.

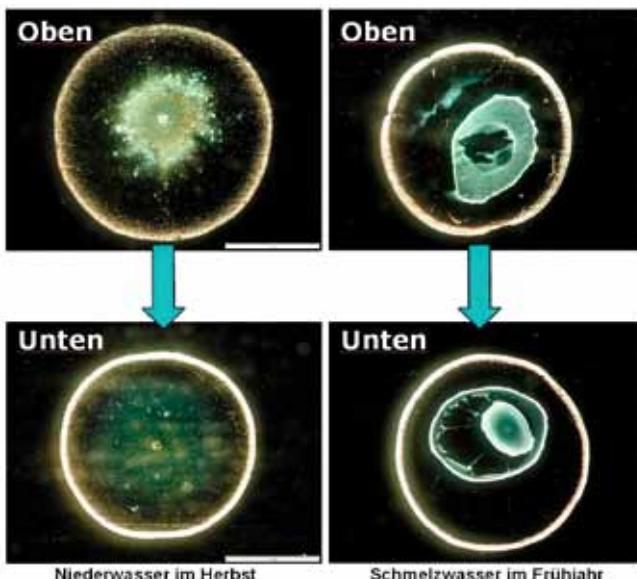
Although higher water levels progressively flatten pendular motion, the underlying currents continue to flow against each other, thereby canceling each other out. This reduces the stress on riverbanks and they can be stabilized using simple and inexpensive methods. As these photographs show (Figure 7 and 8), there is no evidence of riverbank erosion, even where only very minimal bank protection measures are used. On the contrary, we can see that vegetation has begun to overhang and shade the water.

The dynamically alternating flow patterns and vortices in the pendulum ramp match natural conditions, and they seem to have a direct effect on the water's quality. A first indication of this was the faster growth of plants on the river's banks here compared to growth rates along other parts of the river. In an experiment with willow saplings, willows upstream from the ramp grew 80 centimeters in the first year, whereas those downstream grew by 220 centimeters. Butterburs below the ramp showed considerably stronger growth than normal, measur-





Pendulum ramp in the Stübing Bach, Austria; downstream view (Fig. 8).

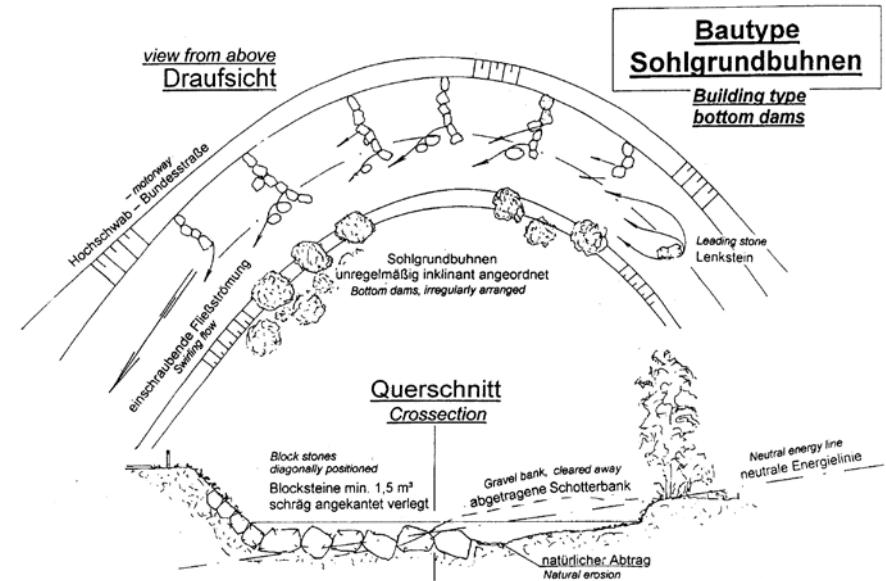


The drop imaging method created by Ruth Kübler and Prof. Kröplin of the University of Stuttgart is used here to analyze dehydrated drops of water from above and below the pendulum ramp in the Stübing Bach (Fig. 9).

methods. The better the quality of the water, the more regular the pattern found in the dehydrated drop of water. Perhaps these patterns can tell us even more about water than technical methods of measurement do. We have compared the water drop scans made in spring to those made in autumn and discovered obvious differences (Figure 9). I personally believe that I can discern the embryonic stage of the season in the spring scans, and serenity and experience in the autumn scans.

Bottom dams

Bottom dams are particularly useful for preventing the buildup of sediment bars in a waterway's inner bends and stabilizing riverbeds in the outer bends. A newer development is the sickle-shaped bottom dam, which vitalizes the current in reinforced waterways and



The construction of a bottom dam (Fig. 10).

increases the dragging force needed for sediment transport (for instance in the vicinity of hydropower plants). The latter is not only desirable from a hydro-ecological point of view; it also helps maintain hydropower plant capacity. The primary current is guided away from the outer bank towards the inner bend by the sickle-shaped installation of rocks and boulders, which are placed facing upstream on a slight incline. This prevents erosion of the outer bank. In terms of dynamic stabilization, the flow energy is altered, creating a more neutral flow pattern and producing more diverse flow structures.

The importance of bed load

The new bio-resonance measurement method developed by Pier Rubesa (www.sonoscope.ch) helped us discover that rock composition has an influence on water and its inner structure. This could be the basis for an entirely new approach to river engineering.



Naturally occurring pendulum ramps in the upper reaches of the Ill River (Fig. 11).

We are considering making the resonance (vibrations) prevalent in alpine tributaries at river's sources available again to the lower reaches of rivers by installing pendulum ramps made of rock material with the same properties found upstream; we would be updating the rivers' own information, so to speak. The lower reaches of rivers lack these vibrations because their bed load – the sediment that communicates this information to water – is often held back by dams. If water does not come into physical contact with this rock material, the river lacks the characteristic vibrations found at its source. This means that the river we are dealing with downstream is completely different from what it would be if it were still in touch with its original bed load.

It is important to ensure that rivers remain in contact with their sediment. The sediment is a river's very own unique – often crystalline – reservoir of vibrations from which it can always draw to recharge itself with information. In my opinion, this is one of the most important

challenges in the future of river engineering. Bed load also has many other important functions. It is an essential energy factor in the balance of water bodies. Rock material carried away by a river during a flood is about 2.8 times heavier than the water itself, and it slows down the flow enormously. Without bed load, water is greatly accelerated by the gradient and aggressively attacks banks and the riverbed. It scours material away from the banks to create new bed load for itself. By the time a natural balance has been restored, riverbanks have been destroyed, bridges have collapsed, humans have been injured and their possessions damaged.

Aquatic biologists too believe that a balanced sediment load is important for rivers. Many species of fish spawn on gravel, and if this pebbly part of the load is missing, they cannot reproduce. This happens wherever riverbanks have been cemented and the riverbed sealed off. We revitalize such waterways by creating flow patterns like those in nature. The pendulum ramps in Figure 11 are not man-made; they developed naturally. What is also surprising to see is the regularity of the spacing between the individual steps. I believe that these naturally occurring pendulum ramps prove we are on the right track. Dammed rivers with control structures lack the bed load needed for such ramps to develop on their own. That is when we humans must step in and lend a helping hand.

Giving rivers a home

If we succeed in learning more from water, in recognizing and reading the forms and structures found in a naturally flowing river, then the right solutions will materialize on their own. We are creating a Schauberger Park to show how much more carefully and respectfully we should manage flowing water. We will demonstrate this in a waterway that has been greatly eroded due to human intervention and whose banks are collapsing. The conventional river engineering approach would be to build back or enlarge the river by widening it and removing any vegetation from its banks. Giving a river more room in this manner is the simplest but not the best solution.

It is much more important to return a river to its home, the meadow flood plains it once flowed through. We should let it go back to this landscape, especially when water levels are low; this also improves shading. A river does not need much room for water under normal conditions; it only expands during floods. The absorption of floodwaters does not depend on the width of a river's channel, but on the entire river landscape, its original home. Highly destructive flood crests will not occur if we allow waterways to overflow naturally. We want to allow them to meander through the landscape, even when water levels are low, so that during floods water can steadily flow over into surrounding meadows. Banks should

be opened at specific points for this purpose. This also allows for the creation of calmer areas, protected from currents, where fish can find shelter during floods. Wherever a meadow is used for other purposes such as drinking-water wells, and riverbanks must therefore remain intact, flood control measures can then be installed only within the old course of the river. Here we construct sickle-shaped bottom dams and flow funnels so that a channel can still form even when water levels are low; this also serves to revitalize the water.

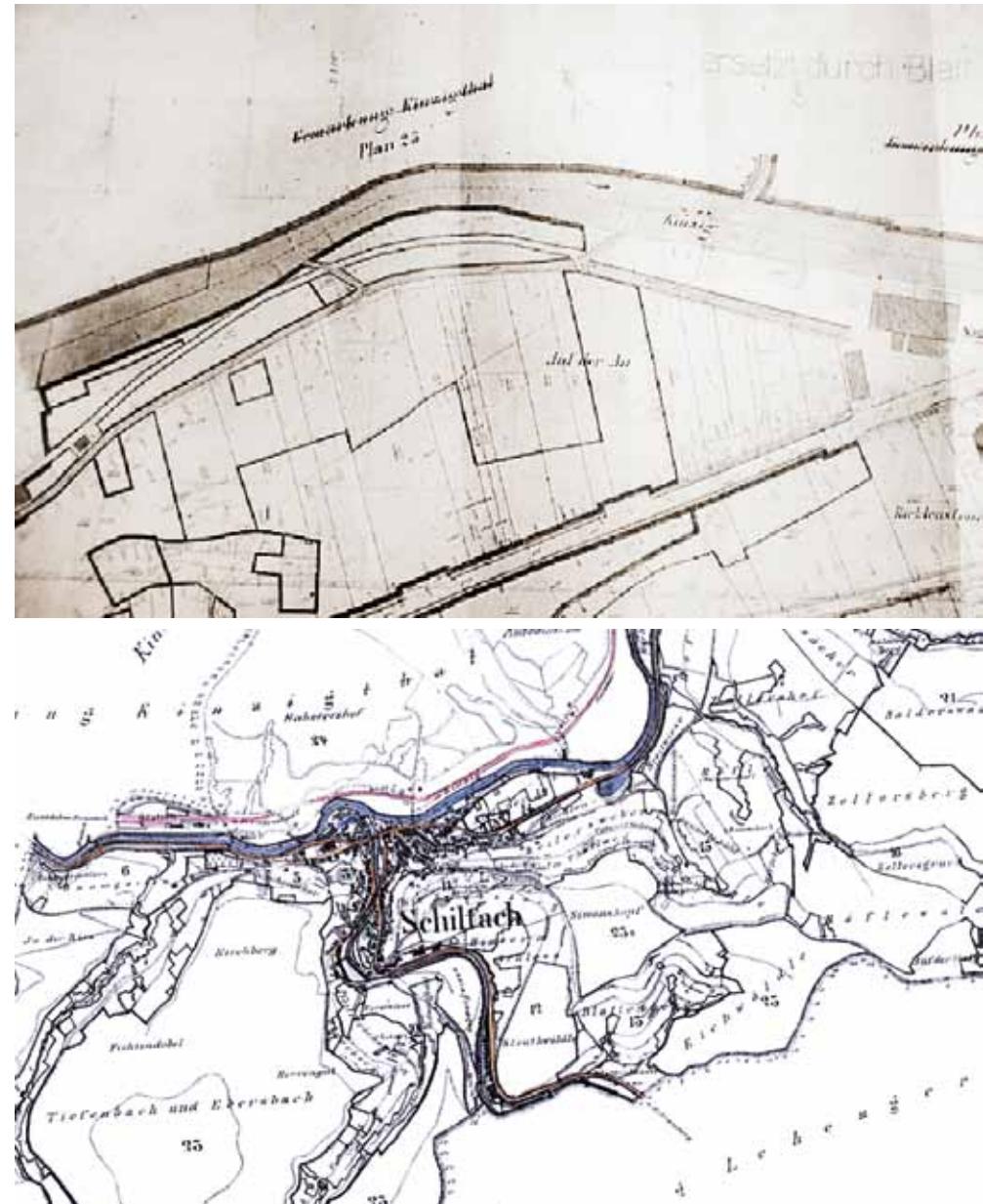
The Schuberger Park project will be completed in 2012. It will show that when a river is doing well, the surrounding countryside is doing well too; and when the countryside is doing well, humans also do well. Humans actually benefit in two ways: they can enjoy a vitalized, more natural river landscape, and their drinking water is better. Higher quality in river water improves the quality of water in drinking-water wells fed by rivers. We cannot look at water's various facets separately because everything is interconnected. A falling raindrop reaches us, with or without pipes. So how we treat that drop of water is important. I feel it is our mission to enable that drop to do well because this is good for us too.

The Kinzig River in Schiltach

Historical maps are our best resource when we are working on new projects. They enable us to find out where water used to flow through a landscape. In a second step, I also hike up a mountain and take stock of the situation from above. This is usually all it takes to find out how the river would actually like to flow. Finally, I explore its upper reaches and observe the natural flow radiiuses of water in these parts of the river. I use these radiiuses as models for the design of flow lines in the river engineering project at hand.

This map from 1880 (Figure 12) shows us how water power has played a large role in Schiltach. We can make out several hydropower facilities along the Kinzig River: two mills, a canal that runs along the street, a large pond to store water and increase energy use, and the historic sawmill. It was common at that time to retain water after it was used, not releasing it back into the river but conducting it down a canal to generate energy again. The management of the Kinzig River's waters at that time was characterized by an extensive network of interconnecting waterways.

If we look at a modern map of the Kinzig (Figure 13), we can still find traces of past uses; we can see where the pond and the sawmill were once located. The river near Hansgrohe's main building has been completely straightened. Here it is easy to see that water does not want to flow straight, but would like to twist and make a turn. We can still identify its



A historical map of the Kinzig River in Schiltach from 1880 (above) and a map of the river today (Fig. 12 and 13).

original radiiuses and flow lines. At the point where the river wants to bend around, the straightened bank is at risk because this is precisely where the river would attack it during a flood. The installation of sickle-shaped bottom dams in this area is advisable as they would create a new low-water channel and speed up the flow of water a bit. Water wants to move, not remain still. New problems arise if water is stagnant for too long, which can happen in

deeper waters at vertical drops (deliberately built into rivers in the 20th century to benefit the fishing industry because deep waters are more favorable for fish). Today's rivers are becoming warmer due to climate change, and this has negative impact on all aquatic organisms, including fish. For this reason alone, we should make sure that water always moves in a structured way. I could imagine installing several additional flow structures in the Kinzig to enable it to create vortices and turbulences on its own again.

The Kinzig River probably used to contain much more sediment than it does now. Generally, most of today's waterways have been cleared of their sediment load, and this situation is often unintentionally aggravated by the construction of water retention facilities. The problem is that if a river does not carry enough sediment, it will try to eat away at its banks and the bed in search of new sediment. So to protect banks and improve water quality at the same time, we have to install rocks and place them strategically wherever there is not enough sediment.

Past changes to the Kinzig have greatly accelerated its flow rate because the large, wide bend where the river enters the town has been considerably shortened. This generates stronger drag forces in the riverbed and embankment areas, with more sediment building up in the inner bends. Indeed, the town's banks are no longer safe. Here we would try to reduce the speed at the outer bend by installing sickle-shaped bottom dams, guiding water to the center of the river and making it flow faster in the inner bend than in the outer bend. This completely reverses flow conditions near the river bottom. In large floods, overlapping flows with altered dynamics become noticeable – a corkscrew or longitudinal vortex is created. We can also see on the map that after its bend to the right, the river swings out a bit, but then wants to roll inward again. This swinging back and forth, before and after a river bend, is always present in natural waterways and is absolutely essential. But these movements mean that embankment areas directly before and after a bend in waterways are particularly vulnerable, even more so than the bank of the outer bend itself.

The Kinzig River had a lot more room in 1880. As there were only a few buildings near its banks, floods probably did not pose a problem at that time. Today the entire riverside is a densely built-up area, and completely new solutions must be found.

Learning from rivers

The upper reaches of the Ill River in the Austrian state of Tyrol (Figure 14) provide a good example of what we seek to accomplish with our sickle-shaped bottom dams. The river has found the way to its center, all on its own. Rivers in their natural state show us their original

flow patterns; all we have to do is identify and implement them. We must succeed in bringing rivers back home, in giving them the room they need in a way that complies with water's natural urges. Otherwise, water will reclaim its original territory.

As intelligent beings, it is up to us to invite water to bestow its riches upon us. We humans can also become aware of the same prosperity that plants sense as they grow along the banks of a river and turn into lush vegetation. I think of our river engineering methods as careful



Sickle-shaped bottom dams: free-flowing rivers naturally achieve what nature-based river engineering seeks to accomplish (Fig. 14).

medical procedures, of our water snails and pendulum ramps as acupuncture points in the landscape; they increase the potential of the watercourse and of the entire river landscape itself.

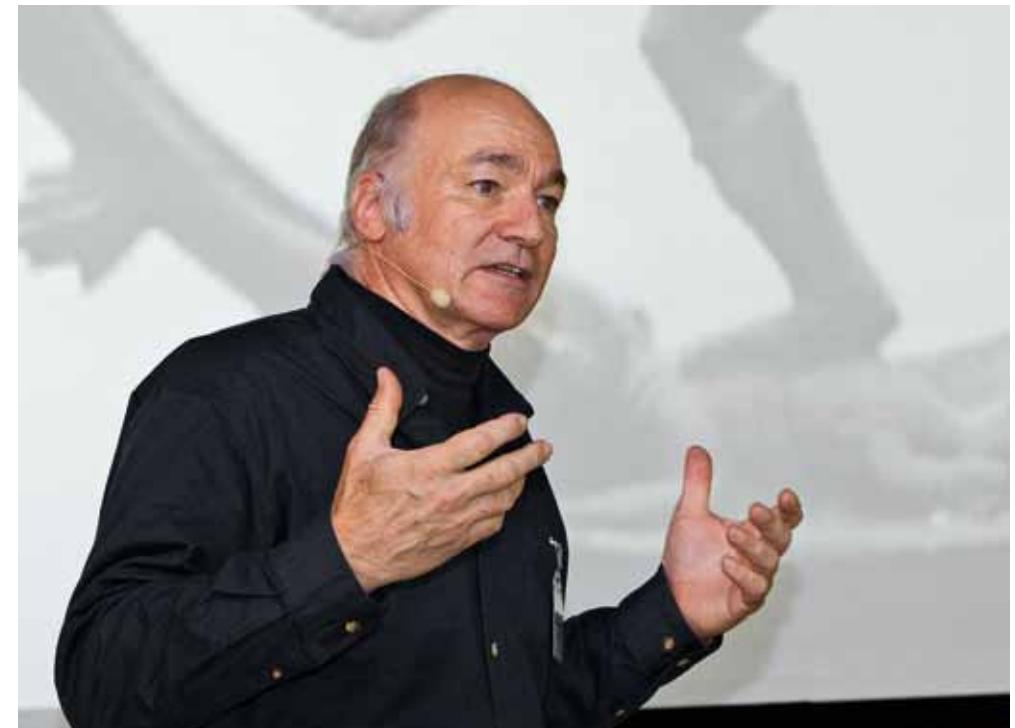
Sound Images of Water

ALEXANDER LAUTERWASSER

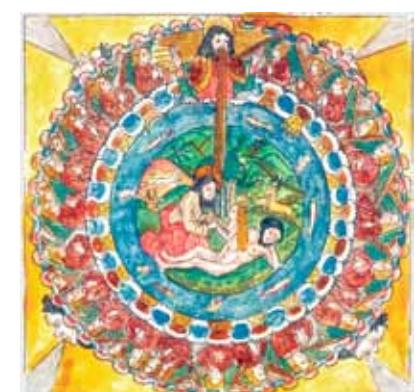
Alexander Lauterwasser's water sound images illustrate the extraordinary sensitivity of water to vibration. Even when set into intense motion, water will form highly symmetrical and complex standing waves if oscillations are in resonance. Wave patterns reveal shape-forming processes closely related to many natural growth systems such as the development of flower shapes.

In many ancient cultures, water played a central role in the process of creating the universe and our world. The medium of water was considered the intrinsic element of creation, but the formative force was also believed to have sprung from the world of sounds, of vibrations, and the music of spoken or sung words. I will briefly cite two examples from major cultural traditions. In ancient India, the magnificent concept of Shiva Nataraja depicted the entire cosmos as the dance of a god (Figure 1). The world could exist and continue to move forward only as long as this spiritual figure performed its dance, swaying and undulating in a rhythmic way. If Shiva stood still, or even stumbled, the whole world would instantly collapse. As we can see, Shiva holds a small drum in his upper right hand. According to the myth, the vibrations of this drum gave rise to the first waves on a world ocean that was initially as smooth as glass. The first shapes that ever existed were the result of the interplay and merging movements of these waves. Thus the wave was the original principle behind all forming processes.

All of Shiva Nataraja's movements are actually representations of fundamental vibration processes. His hands in front move up and down, while his left and right hands move back and forth. His leg movements represent two opposing motions: the foot treading the ground stands for the moment of densification, solidification, materialization, or the contraction of the heart muscle, a movement of the beating heart; the rising foot shows the counter-motion, the re-opening, the dilation, the softening, or the diastolic expansion of the heart. Everything in this figure is vibration, rhythm and music, and the world can emerge and evolve only from its movement. According to the myth, the hair that flows from Shiva's head is a symbol of cosmic primeval waters, of which our H₂O is probably just an echo.



The cosmos as the dance of the god Shiva Nataraja (Fig. 1).



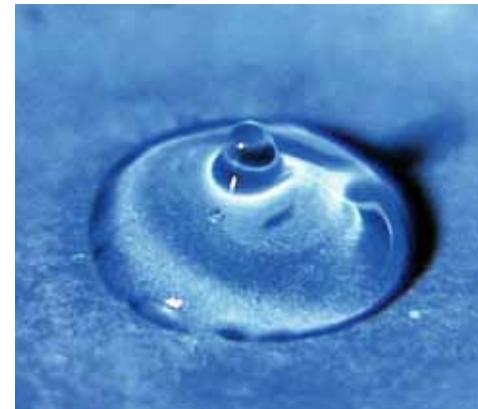
Light and sound are the primal forces that set the process of the world's creation in motion (Fig. 2).

When we look at a second cultural tradition, our western culture, we find in the biblical Book of Genesis the splendid image “And God said”. What is meant is not language in the modern sense, which refers to the mere communication of bits or units of information, but language as vibration. Whether what a speaker says is heard by the listener and has an effect depends largely on whether the words are of real, deeper meaning to the speaker or whether he or she is talking about something merely intellectual. From the mouth of the Creator resounds the world-forming word (Figure 2), symbolized at the same time by a beam of light – light and sound as the two primal forces that set the process of the world’s creation in motion and ultimately keep it going. In this sense, the whole universe is a resonating space. All matter is a resonating body, organized, structured and kept in tune by the primal vibrations which originally called it forth. The fundamental polarity between the material world in the center and the immaterial spiritual sphere around it can be clearly identified in the picture. Between the two poles is the Oceanus of the ancient Greeks, the earth-encircling river, the primeval waters.

Only water is able to mediate between the two poles of the world. Novalis, the early German Romanticist, spoke of water as “sensitive chaos”, thereby aptly characterizing its nature. Theodor Schwenk (1910-1986), the great water researcher from Herrischried, repeatedly emphasized the “impressionability” of water, its responsiveness, and the phenomenon that water responds to even the most subtle external influences with a great variety of inner flow movements. The well-known researcher in biophotonics, Fritz Albert Popp, once described water as the substance with the greatest and most universal resonance capacity of all. The essence of water is its extraordinary readiness to resonate, and life would not be possible without this phenomenon. For what else could the true essence of life be, and what meaning could it have, other than this ability to resonate within the unity of creation?

As a first example of water’s capacity to resonate, let us look at a single drop of water, vibrating on a plate moving up and down. The movements become visible only when they are slowed by the stroboscope; the human ear cannot hear the sounds that trigger the movements. The drop responds to the very first vibration with the elemental polar interplay between dome and hollow, convex and concave (Figure 3). This corresponds exactly to the two fundamental processes of formation from which all three-dimensional physical matter emerges.

A small air bubble soon appears in the center of the droplet. This indicates that besides the three-dimensional movement on the surface of the drop, the water inside is responding with other, additional flow movements. It took many attempts, but only after introducing tiny



The two fundamental forms of a drop are the dome and the hollow (Fig. 3).

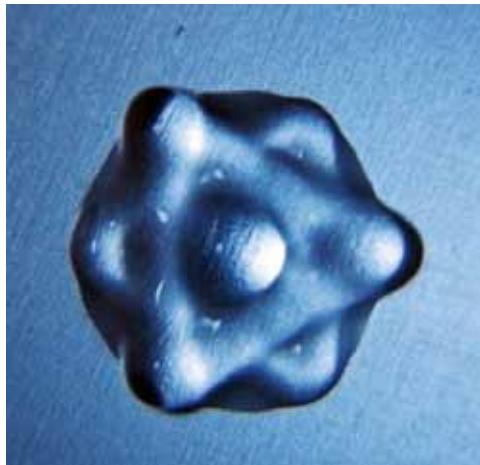


Particles make inner flow movements visible (Fig. 4).

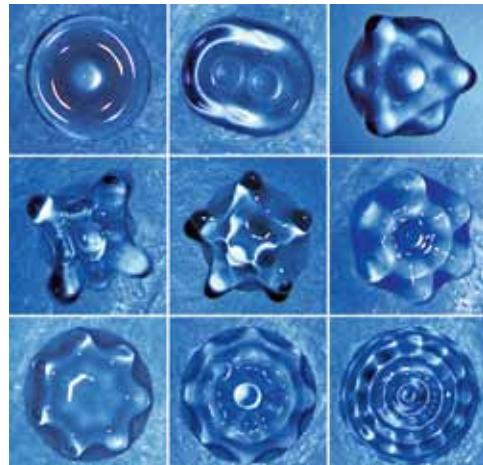
particles to the drop was it possible to show what actually happens inside. While the outside movement continues to alternate between concave and convex, complex vortical movements become visible within the drop, running in figure-eight-shaped curves along the edge and through the center (Figure 4). Thus, in a single drop, we see the outer three-dimensional movement of formation and the inner movement of current and flow.

If we look at the test arrangement from the side, we see the mechanical up and down motion of the plate. The movement of the droplet, however, is anything but static and rigid – it swings rhythmically. The poet Rainer Maria Rilke once said very aptly that water instilled something of its intrinsic nature into everything. This nature is characterized by the principle of rhythm. Water does not react passively, but actually responds – and there is a fundamental difference between the two. When listening to another person’s true response, we want to hear that person’s own words, not just a parroting of our own. This is exactly what water does – it does not react, it responds.

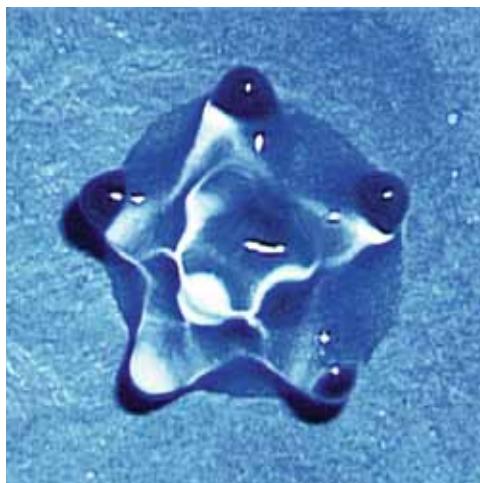
The most amazing phenomena appear when water is made to resonate fully at certain frequencies. Oscillating water can form regular geometric patterns and structures. Figure 5 shows a double triangle or hexagonal structure in which liquid water actually displays straight lines – qualities expected of this element only in its frozen state. The appearance of various whole numbers in the midst of these processes of oscillation touches on an ancient secret – the inner connection of the world of music and sounds to the world of mathematics (Figure 6). Here it is clear that numbers are far more than that to which they have degenerated in our consciousness today, as mere tools in the counting of quantities. In fact, numbers have an inner structural, qualitative strength, experienced as something tangible in these vibrating droplets.



Double triangle with straight lines (Fig. 5).



Whole numbers connect sound and mathematics (Fig. 6).



Five-pointed drop in phase-shifted oscillation (Fig. 7).



A five-pointed drop seen from a side angle (Fig. 8).



Lengthened drops are reminiscent of organic growth patterns (Fig. 9).



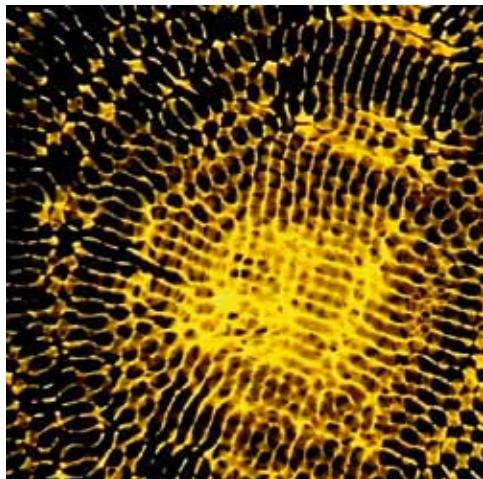
The same drop seen from a side angle (Fig. 10).

Figure 7 shows a five-pointed drop whose tip is sometimes at the top, sometimes at the bottom, since oscillations are phase-shifted. The shape oscillates into its polar counter-shape and back again. If we look at the same five-pointed droplet from the side (Figure 8), we see the mechanical up and down movement of the plate while the drop itself exhibits a beautifully smooth and rhythmic swinging movement. A white dome rises in the center – but only at every second downward movement. The droplet responds rhythmically in a phase shift, an essential feature of all these phenomena. The observed oscillation can go on for several minutes, but if the heat of the lamp causes the water to evaporate, the droplet's vibrations change, they lose their step, and resonance is lost. The oscillation frequency of the plate, which has just elicited the complex five-pointed drop, no longer has the same creative effect and everything falls apart.

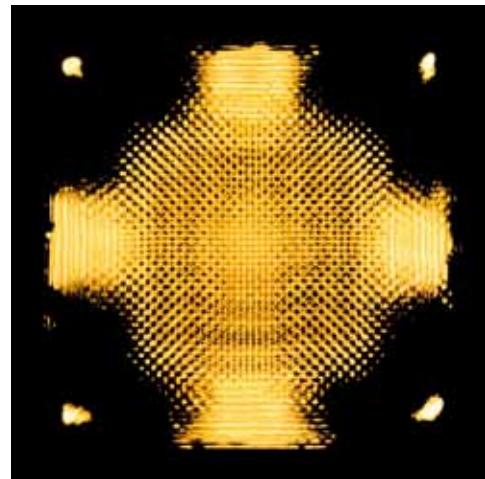
In this way, vibrating drops again and again turn into fantastic and wonderful shapes, but they cannot be produced in the modern sense of the word creation, and they cannot be induced through force. Homo faber, the deliberate designer and technically creative human being, always a controversial figure because of his often hostile actions, is powerless here. These vibration images are gifts. We cannot wish to control water, because water is like a living organism.

One day the wonderful phenomenon in Figure 9 appeared – a drop that suddenly drew itself out lengthwise. As unusual as this seems at first glance, it illustrates a very familiar principle of design in the organic world – starting with the growth of plants and the rhythmic alternations displayed in node and internode length growth. But among invertebrates in particular, this principle is reflected in the segmented structure of earthworms and insects, and it even occurs in embryonic stages of vertebrates. Embryologists are especially astonished by this sequence because they recognize in it primordial design principles familiar to them from studying the early development of living organisms. If anything disturbs this stable oscillating shape, the entire drop goes awry. It becomes unsettled and invariably seeks to return to its characteristic shape. If we look at the same drop through a second camera from a side angle (Figure 10), we clearly see that the droplet exhibits a beautifully distinct, fluidly shaped wave. It is not until we view the film sequence that we actually perceive the stability of the vibration in this drop.

A central concept in modern science is that of the oscillating field. In the sequence shown in Figure 11, countless waves travel through and mutually penetrate each other – a phenomenon that is absolutely impossible in the world of objects. No two objects can be in the same place in space at the same time. Objects always occupy their own space. Two cars meeting at



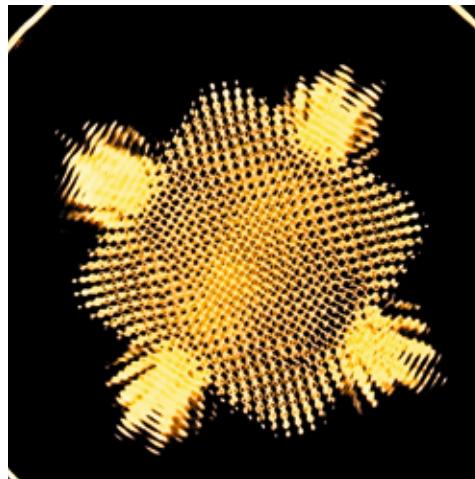
An oscillating field with countless waves flowing through each other (Fig. 11).



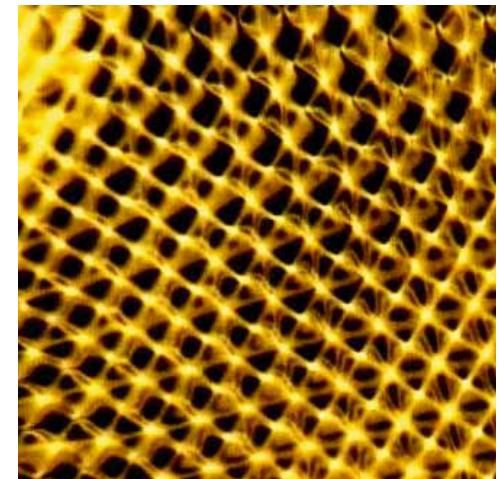
A dynamic oscillation can resemble a fixed lattice (Fig. 12).

the same point at an intersection collide and become deformed, changing the way in which they occupy space – the momentum of motion drops to zero and they come to a standstill. This is the implacable order of the world of solid objects.

But as Theodor Schwenk never tired of pointing out, water is subject to completely different laws. Here, various movements and waves can overlap and penetrate each other at the very same point. This is precisely the condition needed to evoke the complex processes of shaping that we have just observed. It is all fluid and it is all in motion, but the more the droplet settles into resonance, the more it oscillates as a unified and coherent whole, and a more static order is established overall. Quantum physicists confirm that precisely this image of static order in a dynamically oscillating whole is how modern quantum physics envisages the formation of matter. Even nuclear physicist Werner Heisenberg pointed out that we could not expect to find “the final particle” or “the last thing” at the heart of the universe: “The atom is not a thing.” Physicist Hans-Peter Dürr expressed this concept in other words: “Matter is not made of matter.” Rather, the modern view of the world is that essentially everything is a process, a vibration, a motion. But this movement does not develop chaotically; on the contrary, a new order and stability emerge from these vibrations – coherent oscillations – which in our world, we experience as solid matter. The image sequence in Figure 12 shows this very clearly. A dynamic variation suddenly goes into a state that resembles a fixed lattice. But in reality, it is fluid subjected to polydirectional movement, vibrating so precisely that a new order can emerge. Even tiny changes in frequency can instantly cause the order to break down, the water returning to its original fluid flow structure.



Expanding and contracting vibrations resembling a heart beat (Fig. 13).



Order breaks down in the absence of movement or rhythm (Fig. 14).

The image sequence in Figure 13 illustrates this breakdown in an exemplary way. On the outer edge there is a rhythmic alternation, similar to inhalation and exhalation or to a beating heart. Since this vibratory movement is in resonance, the static form of a vibrating square field can emerge from the whole. It was this sequence which first gave me a sense of what the ancient Indians could have meant by the image of the dancing god Shiva Nataraja. Order is created only through the process of vibration. If movement falls out of step (Figure 14), if Shiva loses his sense of rhythm, so to speak, all order breaks down. Once the vibration process returns to a completely coherent state, the fixed lattice, the order stands out clearly again. These observations teach us that we must revise our entire understanding of the world. Our world view is still based on 19th-century physics, with slow, static matter as the starting point. In reality, there is no static matter at the heart of the world – the primary element is movement.

The geometric arrangements we observe are a result of uniformly oscillating fields called standing waves. Unlike the chaotic waves set in motion in our soup plates or wine glasses when we shake a table, these waves move up and down in the same place. Sometimes the water’s surface moves in strictly geometric divisions during our experiments. In Figure 15, for example, we see three wave peaks and three wave troughs between them. Amazingly, some forms also emerge which are reminiscent of natural organic shapes such as flower petal arrangements (Figure 16), which exhibit great resemblance to oscillatory patterns. This is not to say that a blossom might develop from a single vibration. Even Johann Wolfgang von Goethe admonished us long ago: “Consider the What, but consider the How even more.” These patterns evidently display an internal correlation: basic principles of oscillation

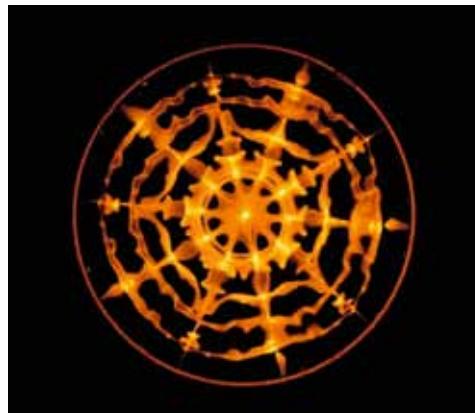


Vibrating water drops can take on strictly geometric forms, as well as natural organic patterns (Fig. 15 and 16).

patterns correspond to basic principles of organic design processes. Morphogenesis – how forms are created in nature, how life emerges, and where these forms come from – has been a field of great interest for biologists in the past 20 to 30 years. Today, they still engage in controversial debates on these key questions, but convincing answers have yet to be found.

Other illustrative forms of water in motion are presented here. Figure 17 shows a ten-pointed, or double five-pointed structure, with the ten points representing five wave peaks and five wave troughs between them. The images show a five-pointed star with the tip pointing upward, corresponding to five wave troughs, and another five-pointed star exactly in between with the tip pointing downward, corresponding to five wave peaks. The number five plays a very central role in nature; for example, Figure 18 shows a sea urchin shell with a beautiful surface pattern and ornamentation in two colors. The easily identifiable pentagonal design accurately reflects the essence of this oscillation pattern.

As a final example of the structural closeness of vibration patterns and flower petal arrangements, Figure 19 shows a wax plant (*Hoya carnosa*) reflecting this polar principle of formation with astonishing consistency and precision. Again, it is a pentagon with the tip pointing downwards, and a small five-pointed star in the middle with its tips set so that they point to the troughs of the outer pentagon. The composition of the flower does not deviate even by a tenth of a degree from the ideal shape. Does this not justify asking why? Why do flowers look like this? The natural sciences are slowly beginning to deal with this question again. We have seen flower shapes in the organic world; we have seen physical forms of vibration, and even vibration patterns that remind us of the artistry of the magnificent stained glass windows in Chartres Cathedral (Figure 20). Perhaps we can say that ultimately all creative processes, whether they are physical, organic or anthropogenic, draw from the world's one and only primeval formative source.



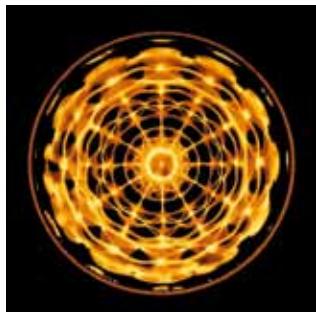
This double five-pointed vibration pattern corresponds to a sea urchin shell (Fig. 17 and 18).



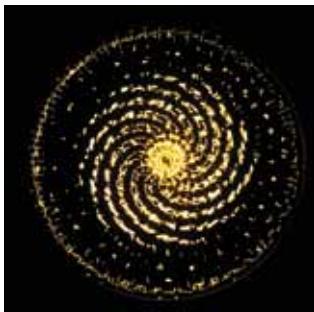
Flower shapes can be found in the vibration patterns of water drops and even in the stained glass windows of Chartres Cathedral (Fig. 19 and 20).

The phenomenon of the standing wave can best be seen in the film sequence. It shows a complex structure in which everything vibrates and quivers; the water is in absolute motion. Not a single molecule in the dish stands still, and yet a static order emerges, in this case a totally stable twelve-part structure (Figure 21). We see that the substance is in a state of total movement, but when resonance settles in, something new emerges. We often associate inaction with inertia, inaction with immobility. But there is another kind of stillness within where the most intense dynamics prevail, a pure process, which in turn can give rise to another new order. The vibrating, dynamic twelve-part structure in Figure 21 illustrates this *moving stillness* particularly well.

Finally, we should take a closer look at perhaps the most important process phenomenon in our universe – the spiral. I have dedicated 20 years to this work, conducting hundreds of experiments, but the phenomenon of the spiral has appeared only twice. Water has taught me what a phenomenon really is. Phenomenon in the literal Greek sense of the word means “that which appears or is seen”, as opposed to what is willfully and deliberately created, made or forced to come about. One cannot *make* a phenomenon. For me, each of the two occasions on which a spiral made its appearance was a gift, and I therefore observed, filmed and



Moving stillness in a twelve-part structure (Fig. 21).



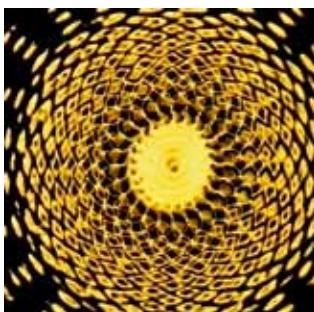
A rare phenomenon: a fully developed spiral (Fig. 22).



Complex and uniform – flow movement in a wavy pattern (Fig. 23).



A snail's organic archetype (Fig. 24).



Spirals moving in opposite directions... (Fig. 25)



...are also visible in pine cones (Fig. 26).

photographed them in great detail. All other attempts to intentionally elicit a spiral were miserable failures.

This phenomenon in particular is both highly complex and unstable, and it is simply not possible to control all the factors governing resonance that make it possible for a spiral to appear.

The spiral can be regarded as the most universal and important formation to be found in the world, from the most distant spiral nebulae in the universe to the innermost part of each cell in the body. A look at global weather patterns shows us the significance of the spiral and its systems. When the frigid air of the polar regions meets the warm air of the tropics, nature attempts to conciliate these differences in a dialogue between the extremes. On weather maps we can see how these extremes balance out through spiral systems in the atmosphere, in the form of high-pressure and low-pressure areas. Low-pressure areas rotate counter-clockwise from the outside to the inside, while high-pressure areas rotate clockwise from inside to outside. It seems that in nature, the spiral is the quintessential force behind integration and harmonization. In our experiments too, a prerequisite for the formation of a spiral is that

two contrary movements simultaneously take place, and then also start to pulsate. On very rare occasions, a fully developed spiral then begins to form (Figure 22).

Countless attempts to repeat this have been unsuccessful; it is too difficult to control all the factors affecting the water. It is never possible to determine exactly which other factors besides the artificial conditions of the experiment affect water and make it respond in a certain way. Therefore, one must carefully vary frequency and amplitude until the various influences gradually become balanced. With some luck, the experiment is eventually successful and the entire surface of the water displays a uniform formation, and a complex image of flow movement appears in a wavy pattern (Figure 23).

Spirals, with their integrative processes, appear not only on a large scale in the atmosphere but also in a smaller format, for example, in a snail's organic archetype (Figure 24). Interestingly, the process of hearing also takes place in spiral motion; the ear, with its snail-shaped cochlea enabling the integration of the outer and inner worlds, is one of the most important sensory organs.

The waves of the double spiral reflect a phenomenon observed in nature; many highly developed flowering plants, such as those of the daisy family (Asteraceae), show exactly the same double formation structure of a counter-clockwise and clockwise spiral. Meanwhile, research carried out mostly by Schuberger shows that forces and energies move in a spiral from outside to inside, as well as in a counter-spiral from the center outwards.

These images prompt further thinking and open up truly amazing horizons. Flowers are probably far more complex than described in botany textbooks today. Very little is known about integration processes taking place during the development of flower blossoms. In the image in Figure 25, the pattern of two spirals moving in opposite directions is again easily identifiable. The same structural principle can be discovered and admired in every pine cone, where we also see two spirals moving in opposite directions. The number of structural elements arranged in clockwise or in counter-clockwise directions – meaning the arrangement of seeds in cones – is never the same. However, the ratio of these numbers is anything but accidental. If we divide the number of elements arranged in one direction by the number of elements arranged in the other – in this case 8 by 13 – we arrive at a value very close to the golden ratio of 0.618... (Figure 26).

Nature observers and researchers discovered the principle of the golden ratio centuries ago in natural phenomena, but for a long time the idea was banned from botany textbooks as

unscientific. Later the golden ratio entered botanical teaching again. It plays a central role when it comes to understanding the highly complex formation systems found inside the circular head of a sunflower, for example (Figure 27), where the numbers of florets arranged in clockwise or counter-clockwise fashion are different, usually 55 and 89. If we divide the first number by the second, we again arrive at the numerical value of the golden ratio.

Meanwhile, it has been proven that the two spirals meet in the middle in high order, which means they always meet at the same angle. If the angle is changed in a computer simulation by only half a degree, the highly ordered structural pattern of a sunflower completely falls apart. In turn, the critical angle of 137.5 degrees, found in the structural pattern of every sunflower,



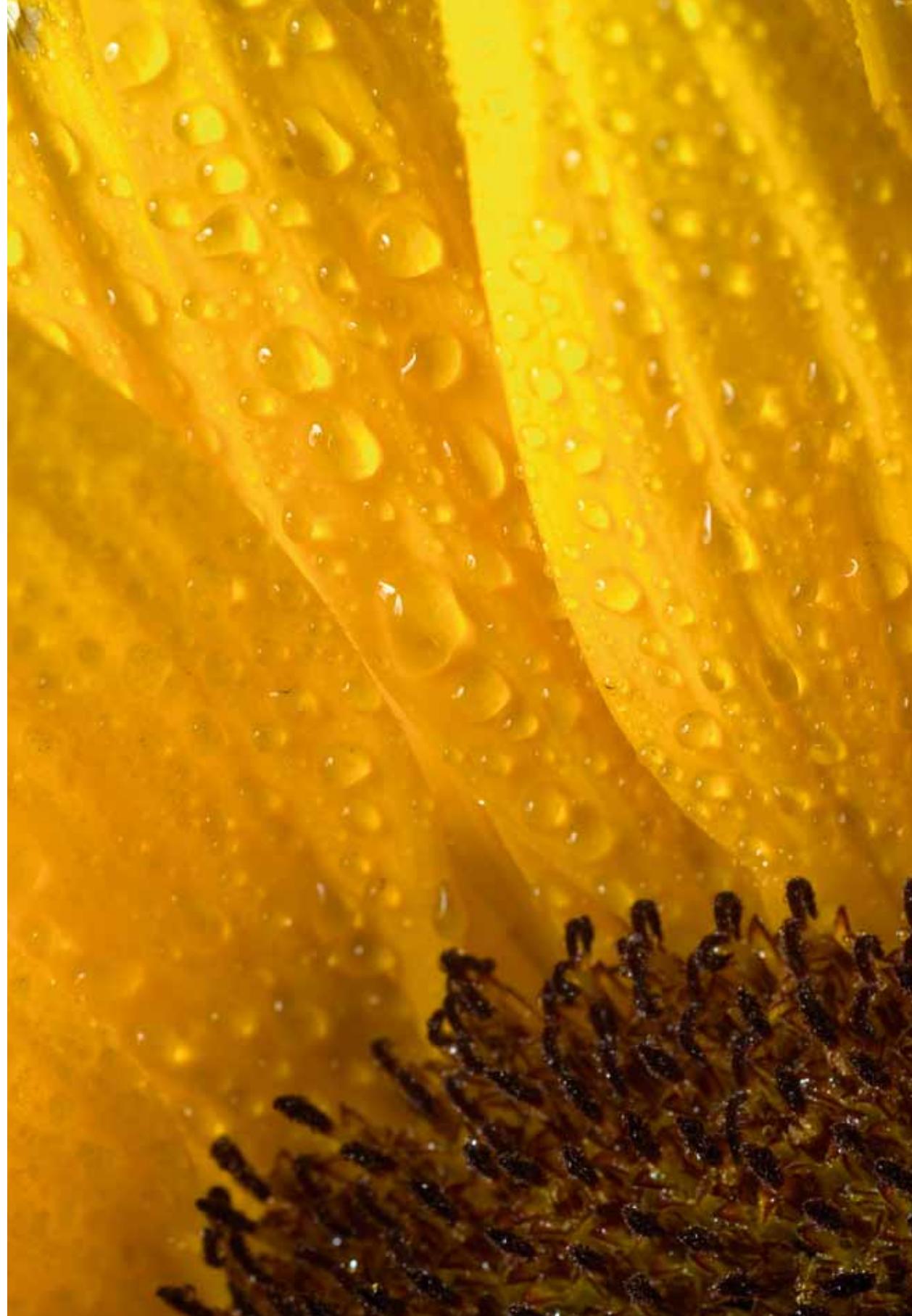
Opposite spirals meet at the exact angle of the golden ratio (Fig. 27).



The golden ratio in spiral dimensions (Graphic representation according to Richter/Dullin) (Fig. 28).

corresponds exactly to the proportions of the golden ratio when it is transposed into angular dimensions (Figure 28 is a graphic representation according to Richter/Dullin).

For me, working with the phenomenon of the spiral has been one of the most impressive experiences of my research. I think the spiral, echoed in the motion of an eddy, is both the most important form in nature's shape-forming processes and the most determining movement in water's deepest interior.











CHAPTER 2

Experience

Water can belong to a reality completely different from that which we generally experience in our everyday lives. ARD radio correspondent in Tel Aviv, Sebastian Engelbrecht, Swiss development aid consultant Pierre Walther and extreme swimmer Ernst Bromeis provided us with valuable insights into the many ways water can touch people's lives. They described how their experiences with water scarcity, water pollution and hour-long swims had changed their perceptions of water and transformed their personal attitudes towards it.

Total Immersion

ERNST BROMEIS

Ernst Bromeis calls himself a water ambassador, others call him an extreme swimmer, and yet others see him as a trail blazer. He is committed to swimming – in unusual places, across great distances, and under the most difficult conditions. His goal is to make us aware of the life-sustaining value of water and our responsibility towards it.

Total immersion is more than submergence. If you immerse yourself in water, you enter a new world and at the same time see the world from which you came from a different perspective. I am greatly motivated to be close to water or to move across its surface in a boat or kayak, or on a surfboard. But more than that, I really wish to fully immerse myself in it. I need this immersion to rediscover the world over and over again. Once, after I had swum through all the lakes of the canton of Grisons, I suddenly saw my native canton in a completely different light. While swimming across the largest lakes in Switzerland, I saw another Switzerland. Now I can say that I know Switzerland from the water.

What does it mean to me to be in touch with water? What does one experience during long-distance swimming? When I talk about my own experience, I cannot keep head, hands and heart separate – body and soul become a single entity. It is about will power, about motivation, but also about how close pain is to joy.

The largest lake in Central Switzerland is Lake Lucerne. It plays an important historical role in Switzerland because of William Tell and the pact of confederation sworn on the nearby Rütli meadow centuries ago. Lake Lucerne was the last leg of the Blue Wonder, my swim across the largest Swiss lakes during the summer of 2010. I swam through the largest lake of each canton; in Central Switzerland this was Lake Lucerne. It was also the longest stretch of my journey, and I had saved it for last to keep focused to the end, ready for the real mental challenge. This last leg took me from the town of Brunnen in the canton of Uri, where I started out at half past five in the morning, to the famous Chapel Bridge in Lucerne 26 kilometers away. These were the last 26 of altogether 300 kilometers swum within a month. Some people may believe I am privileged because I can swim at dawn – what could be more romantic? In reality, it was anything but romantic. After all those hours and kilometers in the water my whole body ached – shoulders, neck, back, and head, not least because of the mental stress – but more about that later.



Again and again, I experience extreme situations while swimming. They are emotional, physical and psychological – black and white experiences that give me the feeling that everything blurs and dissolves in the water. Then there is only yes or no, black or white, something I experienced while crossing Lake Sils, a large lake in the Upper Engadine valley, when the temperature of the water was probably only 12 degrees Celsius.

The story of the Blue Wonder project did not begin with Swiss lakes, but over a cup of coffee. I drink coffee without sugar, and one day I noticed that the wrapping on a cube of sugar had a map of Switzerland printed on it. At the bottom right corner was the canton of Grisons in the middle of the Alps. Sipping my coffee, it crossed my mind that it would be virtually impossible for the Grisons, an alpine canton, not to have lakes as well as mountains. Perhaps its lakes would not be very large, but water, the blue wonder, would most certainly be abundant in this alpine canton. My later research in government offices quickly made me realize how much we alpine inhabitants do in fact owe to our water. There would be no life in the Alps without it.

But when I started planning my first water project in the Grisons, many people reacted with incomprehension. Now you're doing a water project in the middle of the Alps? That's like

doing a sand project in the Sahara. There is so much water in the Alps; water abounds here. In the meantime though, I had discovered how crucial water was for my home canton, which economically is completely dependent on it. Firstly on hydropower – without hydroelectric power, the economy of the Grisons would be in a bad way. Then, the bottled water industry is also immensely important. And not least, whether one likes it or not, skiers in the three months before Christmas have the privilege of skiing on artificial snow which, mind you, is of drinking water quality.

Water in abundance is the key factor for all these activities. How do we manage this precious gift, this water in our mountains? After all, we have not actively contributed to living here at this source of water; it is simply our good fortune. But this privilege brings with it responsibility. What we do in the Alps has consequences further downstream. This is why ethics played a role in the Blue Wonder project. Perhaps my swimming is extreme, but my message is neither extreme nor militant. I turn off the tap while I brush my teeth, even though I know this will not help the millions of children in the world who do not have access to clean drinking water. This is about the deliberate and careful use of water in a globalized world, an ethical approach, a matter of respect. Anyone who knows how many people around the world do not have clean drinking water turns off the tap out of a sense of brotherhood, even while brushing their teeth.

“Ernst,” many people said to me in 2008, “the world is not waiting for you and your Blue Wonder.” I wondered myself who might be interested in supporting my water project and making it financially possible. But surprisingly, it soon became apparent that others had indeed been waiting for me. Whether they were environmental organizations, electric utilities or the tourist industry, they all found a common message in the Blue Wonder project: if I think that something is beautiful, then I appreciate it and cherish it too. The same applies to people – when you love someone, you treat that person differently. I based my Blue Wonder project on this message. I wanted to tell of the beauty of water and my love of this element. What made the project exceptional was that I wanted, because I live in the mountains, to swim above the timberline, near permafrost, where no one had swum before and otherwise only climbers venture.

You can see me on the bottom right of Figure 1. This is after swimming two kilometers in a dam lake 2,500 meters above sea level. The friendly employee at the power plant had said, “Ernesto, sono quattro gradi!” and that is extremely cold, even in Italian.



“Ernesto, sono quattro gradi!” At the Albigna Dam, 2,500 meters above sea level, Graubünden, Switzerland (Fig. 1).

Anyone who goes into water at this temperature, four degrees, three degrees, two degrees Celsius, gets right back out again. That is a completely natural, vital and healthy reaction. But if you have set your mind to swimming in water this cold and not endangering your life as you do so, you have to train yourself to become resistant to the cold. Despite all the training and a neoprene suit, you must be willing to accept pain. Reporters and TV crews were always disappointed when I did not elegantly dive in. When entering this icy element you have to proceed very slowly, repeatedly stopping to wait and then continuing, until you are literally up to your neck in water. Then you must persevere for another two, three, four minutes until the pain slowly subsides. It actually does and you lose all sensation in your hands, feet, arms and legs, and you look and think, oh, that's my hand. You lose any connection to your own hand because you no longer feel it. I can only continue if I merge with the water. I must be completely absorbed by the cold and become part of the element. If that happens, if I am in the water with a state of respect for it, then I can start to swim.

First I swim 200 or 300 meters with my head above water and then comes the critical moment when I submerge my head too. The pain returns, and you can swim like this for awhile. But your hands and your head soon start suffering from poor circulation. Poor circulation means that there is a lack of oxygen, and a lack of oxygen causes strange thoughts to arise and you drift away mentally. High-altitude climbers are familiar with this state of



Should I or shouldn't I? It takes tremendous will power to go into the icy water, even when in a neoprene suit (Fig. 2).

mind. I know that death is not immediate; it is a gradual process. I must admit being fascinated by sensing and exploring the ensuing hypothermia.

My head, heart and hands are equally involved during such a swim. My head is the will. I stood at this half-frozen lake (Figure 2) for a long time, wondering whether I should go in or not. Water penetrates the neoprene and reaches the skin, since I do not wear a dry suit. When confronted with water, we humans do not stand a chance – water is always more powerful. We can only submit to the water. Ice is another form of water, a different state of matter. So first I walked across the ice, and then I was able to swim. This was at 2,500 meters above sea level, at the height of summer in the Alps – a transcendental experience.

The largest lakes in the Grisons are in the Upper Engadine, including Lake Sils (Figure 3), a good four kilometers in length. I have swum across all the lakes in the Upper Engadine valley, about 12 kilometers altogether. There are about 200 mountain lakes in my canton, and the challenge was to swim through all of them. Physicians and professional divers warned me that I would get too tired during the week-long journey, would be too exhausted to cross the big, cold lakes of the Engadine. It was clear it would be a challenge to take a route no one else had ever taken – to swim where no one else had swum before. But I decided to take the chance. And along the way, I was rewarded with unique and impressive views of the



Lake Sils in the Upper Engadine valley – a place of inspiration for painters and poets – rewarded me with magnificent views (Fig. 3).

alpine landscape surrounding the lake I was swimming in alone. These are gifts, experiences that have touched me deeply.

During the two months of summer in 2008, I swam across all 200 mountain lakes in the Grisons. Although the course itself was only 45 kilometers long, it was the mental challenge, the fear of the cold, which would often keep me awake at night. It took me enormous effort to go back into the cold water several times each day. Besides that, I had to ascend a total of 80,000 meters just to get to the lakes. Most lakes in the Alps are not accessible by rail or road, so you have to get to them on your own. To reach these lakes, I had to walk or cycle, and in the end I had ascended a total of 80,000 meters. Cyclists in the Tour de France ascend 35,000 meters within three weeks, so I did twice that amount – but not as fast, I should point out.

On one typical day for instance, I began early in the morning at 1,800 meters altitude. Higher above there were 12 lakes I had to swim across; this meant swimming all day and then cycling back down in the evening – a twelve-hour day. Hikers were wearing winter jackets and could hardly believe that anyone would want to take a swim. That was understandable. Once in the water, I was in complete solitude; there was no accompanying boat, nothing. This was wonderful, but you have to be at peace with yourself, otherwise I would not have dared do it. The photographer would not have come to my rescue; he would not have had a chance.



Day after day of long distance swimming in cold water is not only a physical challenge, but a mental one too (Fig. 4).



Feeling happy and fulfilled after reaching my goal at Lake Geneva (Fig. 5).

On another leg, the overall course covered 60 kilometers at 3,000 meters in 12 hours. It had snowed the night before (Figure 4). Snow does not make swimming more pleasant, and no one was calling out: "Bravo, Ernst!" I stood all alone on the shore. This required intense inner motivation – you do not do this for money. I started out at seven in the morning, biked high up to swim, swim again, biked some more, then gave an interview. On this day, TV interviewers were there, and the first question was, "Mr. Bromeis, are you a nutcase?" I said no and continued on my way. The second interview started with "Mr. Bromeis, are you a nutcase?" Here I was no longer so sure, but again I continued on

my way. At twenty past five in the evening, when I had already been biking and swimming for ten hours, I wrote a blog post for the media, then continued on the bike. At seven in the evening, the last lake lay before me, only 2.5 kilometers long, but now I was very tired, mostly because cold is highly stressful for your energy balance as it takes a lot of calories to maintain body heat. Again a TV interviewer asked, "Mr. Bromeis, are you a nutcase?" This time I did not want to say no. "Yes, I am probably am! But let me swim now." In Lago di Poschiavo I had a critical experience. The boat with the TV crew had already gone ahead towards Miralago, and I had about a kilometer left to swim alone. Suddenly I had cramps. If you get cramps and are inexperienced, it is easy to panic and the situation becomes dangerous. What kept me going across the lake that day was that I possessed the knowledge and mental strength to tell myself that cramps go away and that people do not die of them. It was painful, but after swimming for half an hour I got there and everything was okay. These experiences increase my desire to expose myself to such extreme situations. When I got out of the water on the shore of Lago di Poschiavo, I had the feeling that my surroundings were mystical.

After that summer in the lakes of the Grisons, I was faced with the question of whether I wanted to rejoin society or continue my life as a water ambassador. I quickly realized that I had to continue, simply because water also flows on and on. Thus the story of the Grisons was followed by the story of Switzerland in 2010.

As I mentioned earlier, I had decided to swim across the largest lake in each of Switzerland's 26 cantons. Figure 5 shows me at Lake Geneva. If we trace the Swiss-French border through the lake, it is about 90 kilometers long, almost three times the width of the English Channel. After all, Lake Geneva is one of the largest freshwater lakes in Western Europe (the largest is Lake Ladoga north of St. Petersburg). But even in Switzerland there are other large lakes such as Lake Neuchâtel, Lake Lucerne, Lake Zurich, Lake Walen, Lake Constance, and others. My plan foresaw a long journey across the lakes of Switzerland. If I wanted to accomplish this, it meant swimming a distance of 300 kilometers. Some cantons have small lakes, in one of them the largest is just 400 meters across. This lake does not qualify as an extreme sport experience since almost anyone can get from one side to the other.

But my journey through Switzerland was not about world records; the big challenge was continuity. Even the largest lake has an opposite shore although there is a long stretch of water to cover before reaching it. Every body of water is finite. Figure 8 shows Lake Geneva at six in the morning. If you swim out from Nyon at one end, you have a straight 20 kilometers ahead of you. There is a wonderful fountain in Geneva, the Jet d'Eau, visible from Nyon.

I swam and swam and swam, and had the feeling the Jet d'Eau would never get any closer. I must admit that this almost drove me mad – the endless swimming, the long distance to cover across water.

You need to feel some kind of enjoyment to hold up, otherwise you could not do it. Happiness and despair are very close together. When I finally reached the fountain in Geneva, I was euphoric and could have embraced the whole world. At the same time though, I knew the journey would continue on Lake Neuchâtel the next day. That was an enormous mental challenge – I had just swum across a huge lake, and would swim across the next one the following day. But that was exactly what it was all about for me. Society does not need us to achieve spectacular records, to climb a mountain as quickly as possible, or to run 100 meters as fast as we can. What moves a society forward is continuity. Staying disciplined and focused for a long time is a great achievement. That is what we need: sustainability. World records are not sustainable.

There is great loneliness in the water (Figure 6). You can see civilization in the background; the boat with the photographer is in front. But even though civilization and other human beings were very close by, I felt like the loneliest person in the world. When you have been on a journey through water for so long, hours and hours a day, for weeks on end, something changes inside. In our world, inundated with stimuli, it is very difficult to look through water



There is great loneliness in water: swimming for hours on end in Lake Constance with no end in sight (Fig. 6).

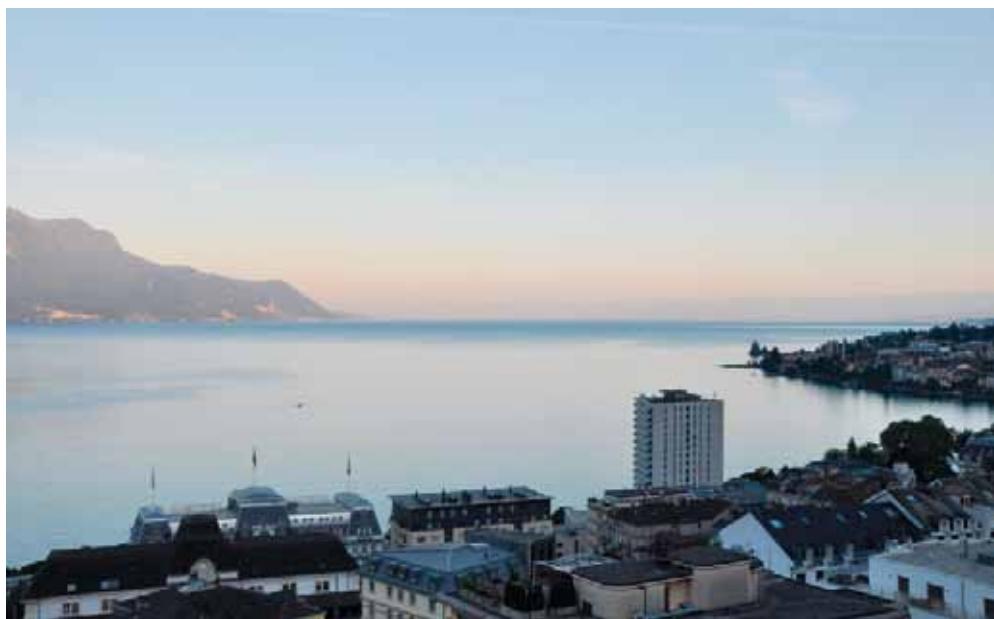


Disoriented, but not lost: fog makes it difficult for swimmers to know where they are (Fig. 7).

for such a long time. There is no variety when you swim in Swiss lakes; there are no colorful corals, no reefs, no fish. All you see are your own hands and otherwise it is grey or bluish-grey or greenish-blue. Enduring this solitude, this lack of stimuli, proved to be a major challenge during the project. I also experienced fear and despair. Once, in a lake covered with mist, I lost my way. I did not know where I was, where I was going, where the shore was. But somehow I found my way back to solid ground.

A thought that occurred to me during the long stretch across Lake Geneva became especially important to me. In Figure 8, you see the accompanying boat at the start early in the morning; I am not visible. Geneva is somewhere far off in the hazy background. When you are mountain climbing, the next hold is in sight, you move forward hold by hold, the world is in focus. But when you are swimming, there is no hold – you cannot grip water. Swimmers talk about it though: having a grip, feeling the water. But there is the hypothetical danger that all that water will dissolve you, even mentally, that you will lose yourself, be somehow diluted and completely absorbed by the water. It was extremely difficult for me to stay focused in this situation. For us humans, with our limited head size and brain capacity, water's vastness is beyond comprehension. Perhaps this is the problem and the reason why we behave as we do

in this world – we simply cannot grasp its dimensions. Why should we conserve water, why should we use resources sustainably when the world seems to have an endless supply of them? We do not have a gene that informs us to set limits. We have to learn to do this, just as we learn other things. That requires training, education, and persuasion.



Nyon at six in the morning. My goal is 20 kilometers away, hidden in the early morning mist (Fig. 8).

So swimming was only one aspect of my journey across Switzerland. An exhibition in a container traveled with me and was set up at all the stations along the way, the Blue Wonder container. Its primary message is that water is finite. The exhibition has been staged in many places – the Gotthard Pass, which is the watershed between the North Sea and the Mediterranean, the Montreux Jazz Festival, the Olympic Museum in Lausanne, and Lake Constance. When children are having a wonderful day on the water and then plunge into the waterscape in this container – that is education. If we want something to really change on this planet, if we are to recognize our limits in spite of an apparent abundance of resources, it will be only with the help of education.

But my mission did not end with my swim through the lakes of Switzerland; I have a triad in mind, a trilogy. For this triad to be complete, the first two parts, the source (the alpine waters of the Grisons) and the lake (the big lakes, the moats of Switzerland's rocky castle), still need

to be connected by a third element – the river. The river connects the source with the lake, and the source with the sea. The third part of the trilogy will follow in 2012 with Europe's river highway, the Rhine. The Rhine plays a central role in history – think of Blücher's army – but also in culture and mythology (the Lorelei, Wagner's Rheingold). It is of paramount economic importance – as a waterway, as a source of cooling water for power plants, as water for industrial use, as drinking water for major cities. It is one of Europe's main arteries, emptying into the sea near Rotterdam, the world's second largest port. The Rhine is also a habitat for fish and an ecological network. That is why the way we handle this abundance is so important. Does the Rhine actually signify that water is plentiful or have we already lost sight of and exceeded its limits? These are the crucial questions I will pose in 2012.

Figure 9 shows the source of the Rhine high up in the Alps of the Grisons. Its estuary is in the port metropolis of Rotterdam (Figure 10). My great goal for 2012 is to swim from the archaic landscape of the High Alps down to civilization. I am planning to swim nearly 1,200 kilometers during the month of May. The Rhine is 1,230 geographical kilometers long, but only about 1,180 to 1,190 kilometers can actually be swum – the water at the head of the Rhine in the Alps is not deep enough. So I will walk and wade in the stream or riverbed for the first 30 or 40 kilometers. The water will not be able to carry me until I am close to Ilanz. Real swimming will still not be possible, and I will need a helmet because of the rapids here. This will be a fairly extreme way of making my way down the river. Regular swimming will begin in Lake Constance. In Basel, I will begin to encounter international shipping – which incidentally has the right of way – and farther downstream, locks, and I will swim past large cities. The challenge in the lower reaches and the estuary will be to work with the forces of nature. High and low tides reign here, and getting to Rotterdam or Hook of Holland will depend on the right time of day. I intend to swim until I taste the salt of the sea on my tongue.

I want to close by talking about a very large, very alarming figure. Some 884 million people, more than ten times the population of Germany, did not have access to clean drinking water in 2011. The lack of water is a serious threat to their survival, an extreme challenge they must face day after day. That is why we are all under the obligation to recognize that the finite nature of water makes it a limited resource, and that we must act accordingly. My contribution is to generate ethical values, to create ethical added value, as opposed to monetary value.



Lake Toma is the source of the Rhine in the Alps of the Grisons and starting point of the 2012 Blue Wonder project (Fig. 9).



From Lake Toma to Rotterdam in 30 days: The 2012 Blue Wonder is a tremendous challenge (Fig. 10).

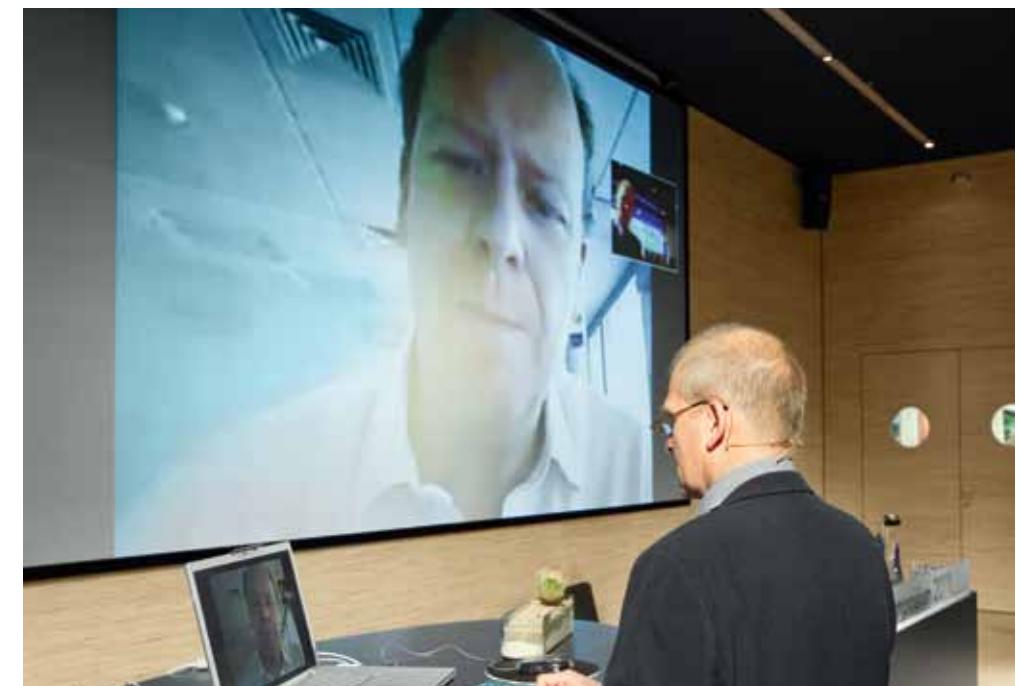
Water in the Middle East: A Political Issue and a Symbol of Divine Grace

SEBASTIAN ENGELBRECHT

In 2010, Dr. Sebastian Engelbrecht submitted to the competition for the Hansgrohe Award for Journalists a 30-minute radio feature story entitled "*The Land Where Wells Spring Forth: The Political Reasons for the Water Crisis in Israel and Palestine.*" The jury was impressed and awarded his story an honorary mention. Before Klaus Lanz spoke to Dr. Engelbrecht live via Skype from the symposium, the audience heard a short updated summary of the original story describing what is happening with water in the Middle East.

The Feature

Something will have to change in Israel and Palestine. Ten million people live here and that number is steadily growing. The population draws its water from underground aquifers and from the Sea of Galilee, the largest source of fresh water in Galilee, but water levels in



Skype conference call with Dr. Engelbrecht

the sea are more than five meters below normal. The Jordan River, which flows through the Sea of Galilee, has been reduced to a mere trickle. Clemens Messerschmid, an independent hydrogeologist, reports from the Palestinian town of Ramallah on the state of the biblical river:

VOICE OF MESSERSCHMID: “That used to be a river. Now it’s no longer anything. All that’s left of the lower Jordan is brownish brine. (...) You wouldn’t even want to stick your toe into it, it’s so dirty, it’s full of salt and sewage.”

The water crisis makes itself felt among Palestinians at an existential level. Often nothing comes out when they turn on their faucets. At most, this has been no more than a moral problem for Israelis. They have plenty of water available to them, everywhere and at all times, and it is up to individuals to decide whether they want to conserve water or not. Average Israeli per capita water consumption is 260 liters per day, while Palestinian per capita consumption is only 60 to 70 liters per day.

International human rights organizations have long drawn attention to this injustice, so why is there this discrepancy? Let’s ask Issa Romani’in, a Palestinian farmer and the mayor of al-Auja, a town of 5,000 inhabitants to the north of Jericho in the Jordan Valley. Issa Romani’in receives his guests in the town hall of al-Auja. Anyone who would like to wash their hands after the long drive from Tel Aviv is out of luck because there is no running water in the building. Once a week only, for a couple of hours, does water run through the pipes. The mayor explains why.

VOICE OF ROMANI’IN: “Awal waqtil ...”

Romani’in explains that the al-Auja spring, which supplies the town with water, is currently dry. There are two reasons for this – the drought and the fact that nearby Israeli wells take their water from this spring. The Israelis do not allow the inhabitants of al-Auja to drill their own wells, says Romani’in, which is why there is no water. Only occasionally do the Israeli waterworks, controlling resources even here in the Palestinian West Bank, let water flow through the town’s pipes. But just a few hundred meters away we see neat rows of green plants, the dates, bananas and vegetables grown by Israelis who live in the settlement of Yitav.

Israeli water policies are indeed intentional, and the numbers speak for themselves. Clemens Messerschmid, the independent German hydrogeologist, knows that Israel pumps 2,100 million cubic meters out of the region’s water reservoirs every year. The Palestinians in the West Bank pump 190 million cubic meters from the ground, less than one-tenth that

amount. In the land between the Mediterranean and Jordan there is enough water for everyone. Israel should stop pumping 60 percent of the water supply into agriculture accounting for only 2 percent of the country’s economic output. Israel should conserve water. And in Messerschmid’s opinion, Israel should give Palestinians what they are entitled to – their fair share of the region’s common water resources.



Survival in Israel and Palestine is only possible with artificial water supplies.

VOICE OF MESSERSCHMID: “All they need to do is drill new wells. The water is there. The only thing that stands in the way – and it’s not a technical problem, not a climatic problem – what stands in the way is Israel’s policy on issuing well permits.”

The talk

Klaus Lanz: Good morning, Mr. Engelbrecht.

Sebastian Engelbrecht: Good morning to all of you in Schiltach.

Klaus Lanz: Today we want to talk about the politics of water in Israel and Palestine. The conflict between Israel and Palestine has gone back to the top of the agenda ever since Palestin-

ian President Abbas submitted a request to the UN for the recognition of a Palestinian state. Media reports usually deal with land distribution – who gets what areas, where will the border barrier be built? But what about water? What role do water resources in the region play in negotiations between Israel and Palestinians?

Sebastian Engelbrecht: That is a very justified question. Essentially, the conflict in the Middle East revolves around three key issues: the borders between Israel and Palestine, the future status of Jerusalem, and the future of Palestinian refugees. For a long time, the issue of water was not on the table. But during the most recent attempts in the past two or three years to resume negotiations, the Palestinians have put water on the agenda as another key item – persistently and whenever core issues are supposed to be listed. One of the biggest difficulties to overcome before new talks can even begin is that the parties have to agree on which issues they will discuss. It remains to be seen whether the Middle East Quartet's most recent negotiation initiative will yield results, and whether both parties will really sit down together to engage in talks.

Allow me to illustrate the water situation here in Israel with a statistic recently published by the Israeli human rights organization B'Tselem. Approximately 10,000 Israeli settlers currently live in the southern part of the Jordan Valley, which lies in the West Bank. These Israeli settlers on Palestinian territory use about 45 million cubic meters of water per year. That is one-third of the total water available to the 2.5 million Palestinians living in the West Bank. In my 2010 radio story, I interviewed a Palestinian from Bethlehem who told me, "We only have running water on an hourly basis." Everywhere in the West Bank I hear people say that running water is available only sporadically. People make do by collecting tap water in cisterns and other receptacles. I recently did a story on Palestine's only brewery in Taybeh. It makes outstanding beer and of course needs water to do this. Even this brewery has to rely on water collected in containers whenever tap water is available.

We can see the inequality of conditions for Israelis and Palestinians reflected in another very sad development. Many Palestinians, especially the poor who live in rural areas, are Bedouins. In the West Bank, they maintain ancient cisterns, some of them dating back to the Ottoman Empire before 1918. In recent months, we have repeatedly heard news of the Israeli army blowing up these ancient cisterns on the grounds that they are illegal. But these cisterns are vital for the survival of many poor Bedouin herders who need them to water their sheep and goats. By declaring the cisterns illegal and destroying them, the Israeli army takes away from these people their only means of existence.



The Jordan: border river, key political issue and contested water resource.

Let me give you another statistic. Average Israeli per capita water consumption is 260 liters a day, while Palestinian per capita consumption is only about 60 to 70 liters a day. These figures speak for themselves. Why is there such a difference? Israel has built modern deep wells, very deep wells that pull water from the large groundwater aquifers below the coastal plain and the mountain range. These underground water reservoirs supply Israel with plenty of water. Palestinians, however, are prohibited by Israeli military orders from drilling new wells on their lands, which means they can rely only on very shallow wells, springs and surface water reservoirs. No new wells have been drilled since 1967, when Israel began its occupation of the West Bank. So as far as water is concerned, the structural inequality is aggravated by these Israeli deep wells that draw water off from Palestinian sources and wells.

This is all despite the fact that Israel and Palestine are located in a region with an abundance of water – unlike their neighbors to the north and south – and it is also the reason why the area is so fertile. Jerusalem gets 556 millimeters of rainfall per year. Compare that to Berlin where rainfall is actually a couple of millimeters less – Berlin gets 550 millimeters. There is a

mountain range here where clouds coming from the west, from the eastern Mediterranean, release rain, especially in winter. That's why average rainfall is rather abundant and why water reserves in the region are plentiful. So water supply is actually quite comfortable, especially because of the modern deep wells, but water is not fairly distributed.

Let's take a look at the Dead Sea. The Jordan, the only river flowing into it, has become a meager trickle, with hardly any water flowing into the Dead Sea because most of it is drawn off before it gets there. The upper Jordan flows through the Sea of Galilee, used as a reservoir for Israel's water supply, so that practically no fresh water reaches the Dead Sea from the north. This has caused the coastline of the Dead Sea to recede by as much as a kilometer over the past 20 years. These days, if you take the coastal road along the Dead Sea, you won't see its waters anymore. It would have been right at your feet 20 years ago.

The worst situation is in the Gaza Strip, the poorhouse of the region. Most of its underground freshwater reserves are polluted by wastewater because there are no water treatment plants, and wastewater collects in lagoons and seeps into the ground. The level of groundwater has also dropped drastically due to over-pumping, and what is worse, seawater from the coast can seep into emptied underground water reservoirs and make them salty. This means that the people living in the Gaza Strip have to resort to natural springs with high salinity for their water supply. When you turn on the faucet in Gaza – and I know this from personal



View of the Jordan Valley from Israel.

experience – brackish water, saltwater is what you get. There are small desalination plants, but for drinking and cooking people have to make do with expensive bottled water. The Gaza Strip in particular is in urgent need of help from Israel. And Israel could help – if there were cooperation. But Israel refuses because of the Islamist Hamas government. Israel could cooperate by allowing the Gaza Strip to share its water supply. This wouldn't be a problem because Israel is right now building huge seawater desalination plants, and expects to meet 100 percent of its own water needs by 2015. These projects are underway in response to occasional water shortages when the amount of rainfall in winter is low. In spite of having abundant water reserves, Israel is preparing for the future by building desalination plants to create a large water surplus. But letting the Gaza Strip participate is still just a distant dream.

Klaus Lanz: Mr. Engelbrecht, this is a very dramatic portrayal of the situation. Now I'd like to move our talk to an entirely different area. As you know, this year here at the Schiltach symposium the focus of our attention is the very personal connection people have to water. In this context, I would like to ask you to tell us about your everyday life in Israel. How was it for you when you first went there as a student? Does a European experience water in new ways in an arid region? Is it possible to ignore the fact that water is scarce, or does it affect you personally?

Sebastian Engelbrecht: People in Israel and Palestine have other problems than we do in Europe. For decades they have been used to wars, to security problems that threaten their existence. That is why the question of water, even if Palestinians repeatedly attempt to make it a key issue, remains a minor issue. This is understandable. When I am in a situation in which I fear for my life, worry about whether and how I can survive – and that is something people here have been confronted with in past decades again and again – it is natural for me to be less concerned about my daily water supply as long as it is at least more or less there, even if it does taste strongly of chlorine. But differences don't end at the water faucet. In the spring, following the winter rains, the countryside is beautifully green, even in desert areas. As the sun gets stronger again, the desert is covered in a green shimmer and colorful flowers, a wonderful sight. But then the sun gets really hot and by the end of April this beautiful green desert starts to wither and turn yellow and brown. There is practically no rain from April to October, and it feels threatening when there is absolutely no rain.

The saddest sight of all is the Sea of Galilee. The situation here has deteriorated distressingly in the last ten years, because in addition to the deep wells I mentioned before, the Sea of Galilee is the region's most important freshwater reservoir and meets about one-third of

Israel's water needs. In these parts, the Sea of Galilee stands for fresh water. Twenty years ago, anyone coming into the small port town of En Gev on the lake's eastern shore could see fishing boats in the small harbor from far away. Nowadays, if you want to reach the fishing boats, you have to walk down six, seven, eight, nine, ten meters of steps. There's something very depressing about that, for tourists of course, but especially for the people who live there. It's obvious to fishermen on the Sea of Galilee that water consumption in this country is much too high and that its reserves are being overstretched.

I can see similar things here in Tel Aviv from where I speak. My office is near an urban highway that runs along the Ayalon River. The part of the river that flows through Tel Aviv has a cement riverbed, and this cement channel is dry for about six, seven, eight months of the year. It always makes me happy when in winter at least, there is some water in the river again. The other river in Tel Aviv is the Yarkon. Although there is water in it and it flows into the sea, it's still a sad sight because it's quite dirty. When you're in a boat on the river, you really don't want to fall in.

Klaus Lanz: In your radio story you said that water in Israel is not only a resource, but also a symbol of divine grace. What was it you wanted to express?

Sebastian Engelbrecht: I think that describes how most people feel in this country. When the first rains come, usually in October, children in Palestine and Israel run out into the street and cheer enthusiastically. On the Israeli side you hear "geshem, geshem", a Hebrew word for rain. There's tremendous euphoria, great happiness in the country as soon as the rains come, difficult to imagine in Germany where it drizzles so much of the time. Rain here has something romantic about it, something magical, something cathartic, something liberating. For religious people, whether they are Jewish, Muslim or Christian, it also has a religious dimension. Rain is a symbol of the grace of God, and people are grateful for it. Whenever there is no rain for a longer time, amazing things happen. In 2010, when everyone was still waiting for rain at the beginning of December and there were terrible forest fires due to the drought, an interfaith prayer was held – right in the middle of the West Bank. Jewish settlers prayed together with Palestinian Muslims and Christians. People who usually detest each other and reject any kind of cooperation gathered together in an interfaith prayer for rain. It speaks volumes when people who are sworn enemies gather together in their plea for water, in common admission that only God can help and bring rain.

I can summarize this in a sentence from an acquaintance from Bethlehem, whom I interviewed for my water story. He is an enlightened contemporary, an engineer, a Christian.



Water levels in the Sea of Galilee, Israel's most important water reservoir, continue to drop due to excessive withdrawal of water.

In an email to me after the first rain he spontaneously wrote, "Almighty God has bestowed water upon us." That shows how strong everyone's emotional bond is to water here, when it comes like salvation after a long drought.

Klaus Lanz: Almighty God bestows water upon us – that is indeed a remarkable statement. Here in Germany we don't always use water carefully either or set a good example. Is there anything you have gathered from your experience in the Middle East that you could share with us so we can learn to do things better?

Sebastian Engelbrecht: Given the situation here, my first idea is to respond to this question from a political perspective. There's no doubt that we Germans first and foremost have a responsibility towards Israel, that our solidarity with Israel is something that must remain untouched. This is a priority, and must not be questioned. But I think it should also be possible, as friends and maybe even the best of friends, to expect Israel to be able to deal with the truth. That's why I wish German politicians would occasionally voice criticism towards Israel. I think criticism is needed and beneficial, especially in light of the country's unfair water policies. The blatant injustice of water distribution today cannot continue. This is an

issue that must be tackled now, even if the state of Palestine doesn't exist yet. One day it will exist, and the management of water must be prepared for that day too. In my view, German society and German politicians should keep pointing out to the Israeli government that there is structural injustice regarding water under the Israeli occupation of Palestine, and this must be remedied unconditionally.

I would also like to answer your question from a more personal point of view. I am grateful for every drop of water – and become more and more so the longer I live here. My life in this country, where water has such existential importance, has taught me to no longer take water for granted. Now I see it increasingly as a divine gift.

Klaus Lanz: Mr. Engelbrecht, it was fascinating talking to you and it is fascinating technology that has allowed us to join you directly in your office in Tel Aviv. I wish you a good day and thank you very much for this interview. Good bye, Mr. Engelbrecht.

A Success Story: Latrines for Bangladesh

PIERRE WALTHER

In Europe we take it for granted that there is always water in our rivers, that landscapes are green all year round, and that an unlimited amount of perfectly clean water will flow from the faucet at all times. But daily water supply is much more precarious in poorer countries. Pierre Walther, who for many years has worked as an expert in Asia, Latin America and Africa, uses Bangladesh as an example to show how social marketing can play a role in solving problems.



There are 884 million people worldwide who still do not have access to safe drinking water (2008). Nevertheless, great progress has been made in past decades. More than 1.8 billion people – 1.1 billion in cities and 723 million in rural areas – gained access to clean drinking water between 1990 and 2008. But the sanitation situation is much worse. Some 2.6 billion people currently lack latrines or toilets, and no fewer than 1.1 billion people still relieve themselves in the open. Taking Bangladesh as an example, I would like to explain just what this means and how progress can be achieved. In the years between 1990 and 1997, I was privileged to witness the beginnings of a true hygiene revolution sparked by UNICEF with the help of the Danish and Swiss governments.



Village in Bangladesh in the 1980s: the pond was used for washing, bathing and drinking, but also for hanging latrines (Fig. 1).

Every village in Bangladesh has its own pond. Even as late as 1990, this water (Figure 1) was used for a variety of purposes, for cooking, washing, bathing and drinking. At the same time, most of the villagers defecated in hanging latrines that discharged straight into the ponds. This caused bacteria to spread unchecked, resulting in serious bacterial contamination of the environment.

In 1985, more than 90 percent of the approximately 100 million inhabitants of Bangladesh at that time still defecated in the open because they had no access to latrines. The alarming number of children who died each year from diarrheal diseases gives us an idea of how much the lack of latrines can affect public health. Studies published by the World Bank showed that people suffered from some form of diarrhea on average every four days. This also diminished their ability to work and significantly contributed to their undernourishment.

The government sold standardized latrines

Since western-style toilets require expensive sewage systems and wastewater treatment plants, they will remain prohibitive for decades to come in rural areas of Bangladesh. Therefore the government focused on the development of simple latrines, produced and distributed by a countrywide network of state production centers. The government decided to manufacture a simple standardized latrine throughout the country and sell it to the rural population for a subsidized price. There were 1,000 such production centers in Bangladesh



No place for diversity and marketing: production of standardized latrines in Bangladesh in the 1980s (Fig. 2).



National health and hygiene awareness campaigns involved visiting every single household (Fig. 3).

(Figure 2) in 1991. Production was centrally planned and managed by the ministry in charge in the capital Dhaka.

But the program always had its problems. Year in and year out, the government had to acknowledge that production stagnated due to weak demand. The share of the population with access to latrines remained at a disappointing 27 percent, even though the program was heavily subsidized by more than 5 million dollars per year.

The 700,000 latrines sold by the government each year were hardly enough to keep pace with the growing population. Our calculations showed that this program would have needed 100 years to provide the entire rapidly growing population of the country with latrines. This was unacceptable. The prejudices of local experts claiming there was no demand for latrines in Bangladesh at the time were also unacceptable. They maintained that Bangladeshis were simply not willing to pay for latrines – a glaring mistake, as would soon become evident.

The adoption of social marketing

For a business-minded person, the idea of one standardized solution for an entire country is of course a nightmare. Yet initially the government wanted to keep expanding the extremely expensive subsidies, and even increase the number of production centers to 2,000.

By threatening to stop aid payments, the international community succeeded in 1992 in convincing the government to change its strategy. UNICEF decided to embrace social marketing starting in 1992. The goal was to raise awareness in the rural population of the importance of hygiene and latrines, and to persuade people to buy latrines – basic marketing in the conventional sense. The government latrine production program stayed in place, but on a much reduced scale.



Demonstration latrines were set up so that people could get an idea of how they worked (Fig. 4).

At the time, people in rural Bangladesh had no newspapers or radio, not to mention television. So campaign work had to be carried out in more than 10,000 villages; in some places every single household was visited (Figure 3). Religious and village leaders had to be won over for the project. Demonstration latrines were set up in every district (Figure 4) so that people could get an idea of how they worked. It was a massive undertaking and could only be accomplished with the help of non-governmental organizations. UNICEF put its entire range of communication options to work, from films to pictures on matchboxes. But on the whole, costs proved to be considerably lower (approximately 3.5 million dollars per year) than those of the old government latrine program.

The results of this campaign were amazing. There was a sharp increase in demand for latrines. Within only a few years, the share of the population that had access to a latrine grew to 55 percent. Our studies showed that thousands of craftspeople responded to this new demand by producing latrines and actively marketing them (Figure 5). It soon became obvious that Bangladeshis were definitely willing to spend money on having their own latrines, and so aid recipients turned into customers. But the primary motivating factor for acquiring latrines was not to prevent diarrheal diseases. Women especially valued latrines because at least they provided some privacy and offered them and their children a certain amount of protection from harassment and assaults. Moreover, being the owner of a good latrine elevated men's social status. It was also a quantum leap as far as comfort was concerned. Having a latrine on their property meant that people no longer had to venture out into fields in the dark, regardless of weather.



Thousands of craftspeople began producing latrines and actively marketing them (Fig. 5).

The boom was made possible only through the involvement of craftspeople in the private sector. There were now ten different models to choose from instead of only one standard government latrine. Models ranged from a cheap build-it-yourself latrine priced at half a dollar, to a luxury model with two pits and an attractive enclosure for 20 dollars. As a customer, the head of the household could now choose the latrine most suited to the family's budget, its needs and personal taste, picking from a variety of models. More and more craftspeople invested in building latrines. There were already more than 4,000 sales outlets (Figure 6) by 1995, and the production of latrines became an important source of income. Interestingly, government production centers did not profit from the increase in demand. Small factories were so successful that they ousted the state-run factories from the market, even though these continued to receive state subsidies. Many state-run centers were unable to sell their products (Figure 7).



Building and selling basic latrines became an important source of income for craftspeople (Fig. 6).



It became increasingly difficult for the state-run centers to sell their stocks of standardized latrines (Fig. 7).

Sanitation for all

Additional awareness campaigns had to be carried out to achieve sustained success. The government therefore launched another Total Sanitation Campaign in 2003. The goal was to achieve nationwide sanitation. One village after another was mobilized; all inhabitants were expected to have their own private latrines. Defecating in the open was to be socially discouraged and the expectation was that it would completely disappear. Simple, catchy slogans were used, like in 1992. Campaigners at village meetings showed how much fecal matter from the village ended up in the open every year. In a typical village of some 500 inhabitants, each of whom excreted 800 grams of feces per day, this would add up to about 150 tons each



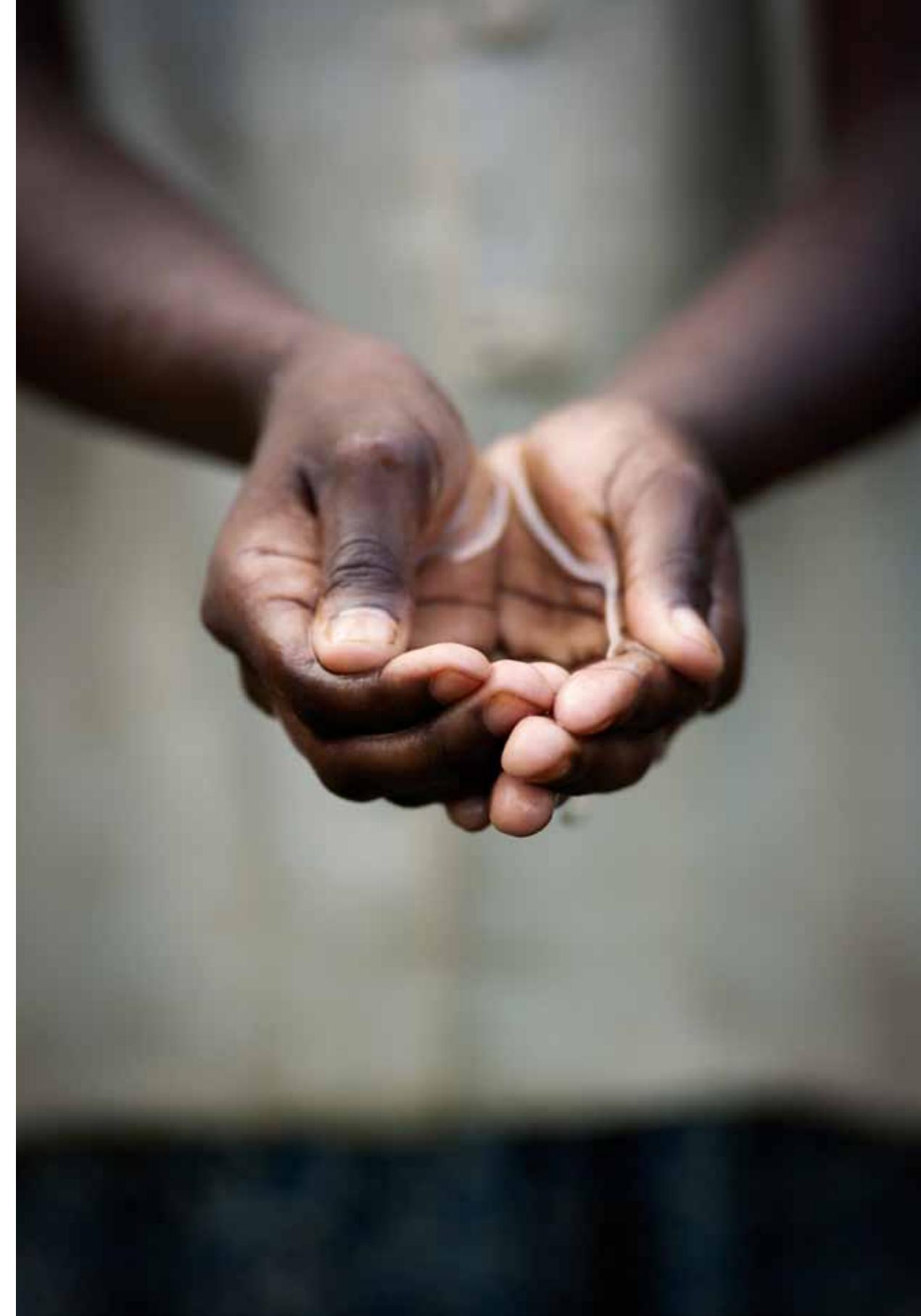
Separate latrines for boys and girls are becoming more and more common in schools in Bangladesh (Fig. 8).

year, or enough to fill 28 pickup trucks. Religious leaders talked about the spiritual consequences involved. According to local beliefs, contact with mere traces of feces results in the loss of personal spiritual purity.

Soon thousands of village communities declared themselves willing to make sure their villages were cleaned up. The social pressure at the village level to condemn defecating in the open – particularly because of children's well-being – substantially increased demand for latrines.

But even this campaign was not able to achieve, as had been hoped, the goal of ensuring that all of nearly 160 million Bangladeshis had access to private latrines by 2010. However, we can realistically expect this to be the case by 2013 – two years earlier than the time frame laid out in the United Nations Millennium Development Goals. In any case, demand for latrines is huge. At least 10,000, perhaps even 20,000, small and micro latrine manufacturers in Bangladesh currently produce between three to six million latrines each year.

This success is based on the tremendous dedication of countless people, on millions of village meetings, on personal conversations with individuals and on fundamental changes in the state's administrative system. But speaking from personal experience, I am absolutely convinced that the key factor was the initiative taken by small, private enterprises, business-minded craftspeople who discovered an opportunity for themselves and knew how to correctly read the needs of the country's population. The private sector thus became the driving force behind this development.











CHAPTER 3

Workshops

As in preceding years, the 2011 water symposium also included workshops in which participants could develop their own personal relationship to water. Museum educator Michael Bradke activated participants' sense of hearing to bring them closer to water, conceptual artist Markus Heinsdorff guided participants in the making of a short film, and water therapist Karin R'hila used rituals to give participants spiritual and emotional access to Schiltach's two rivers. Finally, Hansgrohe product manager Jan Heisterhagen invited participants to experience firsthand many different ways of enjoying water.

Listening to Water – Splash, Babble, Gurgle!

MICHAEL BRADKE

Michael Bradke has set himself the goal of awakening the interest of children and adults in making noises and sounds to encourage them to make music. His Mobile Music Museum in Düsseldorf boasts an enormous range of original instruments which he lends out or uses in hands-on activities or elaborate day-long seminars. His workshop at the Hansgrohe symposium focused on the acoustic qualities of water and their stimulating effect on people.

Musical instruments, sound objects, and tools for making noises are always interactive. People who make or play music, or simply produce a sound, experience a close interrelationship between themselves and these sounds as an expression of feeling. We make contact with our own sensuality and ability to perceive. Musical instruments and other sound machines or tools facilitate the interaction between hearing and fine motor skills as well as between the eye and the ear. This is enhanced by the bond created with fellow players and the audience. We can *resonate* as part of a larger whole and thereby physically and emotionally express ourselves.

Music is a culture of objects because it is strongly dependent on instruments and because they are what enable us to experience music. Anyone who generates sounds with water makes a lot of surprising discoveries because water, unlike traditional musical instruments, has a distinct life of its own. Water responds to even the smallest changes in outside conditions with new variations in sound, making it very difficult, if not impossible, to reproduce the very same tone a second time around. Listening to and working with water when the smallest nuances of tone and sound are important trains our often neglected sense of hearing and creates the awareness that water has a life of its own. We discover that water instruments can hardly be tuned and only an intense preoccupation with the nature of water will allow the confident repetition of an intended sound effect – and only after a great deal of practice.

Experimenting with water in sound-shaping installations always fascinates both children and adults. There are almost endless ways of setting water and mixtures of air and water into motion to make sounds: water drums, splash pianos, thud sticks, dive gongs, bottle gongs,



water organs, splash funnels, floating drums, bubble tubs, lotus flutes, underwater chimes, gurgle machines or plop tubes. Music experimenters keep discovering new and unexpected sound effects enhanced by the interaction – the symphony – of the various instruments of sound that make up the water orchestra.

We can also listen carefully to the voice of water in the natural world. How often do we close our eyes and become conscious of the patter of rain or the fine drops of a drizzle? Or of the many sounds of water flowing through the landscape – the murmur of a small meadow stream hidden deep between banks covered by bushes and grass, the rush of a weir, the pulse-like sloshing of an old wooden water wheel, the lapping of small waves on a riverbank, the gurgle of bankside eddies and swirls in deep and quietly flowing rivers, or the roar of a waterfall? During the workshop, we were able to hear some of these natural sounds coming from the Kinzig River right outside the door.

As the above paragraph clearly shows, the human language must be creative to describe this huge variety of sounds, so people have always made use of sound imitations called onomatopoeia. Although there are limits to the accuracy of expression, everyone recognizes *splash* as the sound for something small hitting water, and *splash* as the sound for something larger. Sounds are similarly echoed in the pitter and patter of smaller and larger feet, the plop of heavy and blunt objects dropping into water, the burbling of bubbles, the hissing and fizzing of sea foam, the patter of rain, the squeak of wet shoes, the gurgle of a drain. Nearly all descriptions



Experimenting with sounds in a studio and on the Kinzig River.

of bodies of water use sound words to imitate natural sounds or other acoustic phenomena as closely as possible. Through comic books, onomatopoeic words have entered the written language (pow, bang, whiz) – and from there become part of the language of young people.

With a little practice, using our very own resonance bodies, we too can imitate the sounds generated by moving water, provided we have a deep understanding of our own bodies and voices and learn to use them as musical instruments. But imitation is easier using tools that enable us to mimic the many phases of the water cycle. For instance, crumpled foil blankets can be made to sound like pattering rain, drain pipes let single drops fall, inverted water bottles stacked on top of each other gurgle like a real stream, hundreds of tiny beads in my ocean drum instrument sound like waves crashing on shore, and my thunder box sounds like a storm breaking loose.

At the close of the workshop, participants were so inspired by this orchestra of water that they joined in to perform a boisterous water symphony themselves.

The fascinating part of active engagement with sound, noise and music is not that it gives us conceptual insight, or leads to an increase in theoretical knowledge. For me, it is important to surprise people, whether young or old, and to get them moving. I am always happy when active music making helps people let go, encounter their deeper natures, and discover harmony. Once this happens, a person has the musical confidence to join other musicians and experience making sounds together. Because music, no matter how you make it, has the unique potential to transcend barriers – between individuals, between generations, and between nations.



Michael Bradke can create water sounds without water...



...and persuade water to talk.

Water Works

MARKUS HEINSDORFF

Installation artist Markus Heinsdorff from Munich agreed to hold a workshop to offer insight into the way he works. The end result would be a short film in which water would take center stage. The only technical aid used was a video camera. Everything else developed spontaneously by exploring the area around the Hansgrohe plant in Schiltach.

For many years, Markus Heinsdorff has dedicated himself to water and the sensual and aesthetic impressions it affords us. His interest in creating art with water developed very early in his professional career. He has produced a wide range of artwork, including installations, objects and photographs, and mixed media work. His deep involvement with water arises from knowing that water is one of the most pressing issues of our times – which is why he seeks to bring people into intense contact with water through his work.

And yet, Heinsdorff himself always finds something new in water: “If you look at water surfaces from a certain angle, you discover an array of fascinating light reflections that, depending on the position of the sun, gleam in a complex blend of colors and sometimes look like codes from another world.” In his photographs, Heinsdorff captures the endless shapes and colors generated by the movement of water and the reflection of light, their development and their perpetual state of change. The results often look like paintings, and reality and abstraction are almost indistinguishable – a fascinating phenomenon with different effects, depending on whether the water is fresh water or seawater, or from a river or a lake.



In the workshop, Heinsdorff made use of the versatility and diversity of these water reflections. The basic idea was to make a short film, a composition of image and sound, and then show it at the plenary of the symposium. In the process, workshop participants would perceive water from unfamiliar perspectives and reacquaint themselves with the element in an entirely new way. At the same time they would be involved as creative actors in the making of a piece of art.

The Kinzig in Schiltach is a small river in the Black Forest, rather unspectacular in its dimensions or even in its course. Yet under Markus Heinsdorff’s direction, participants discovered an amazing variety of scenic features and numerous possibilities for filming them. Within a stretch of barely 500 meters they found deep waters, glistening reflections, foaming swirls, tumbling rapids, a sandy river bed, algae, and much more. Everyone was invited to take turns filming, while the artist commented on his vision of the river: “Wherever I look, the pattern on the water’s surface is never the same: wind, current, refraction of light and depth are continually creating new imagery – the whole river is a patchwork.”

But Markus Heinsdorff would not be an installation artist if he limited himself only to the filming of a river. He is also creative, and his creations allow water to become a stage for conveying other messages. At the point where the Schiltach and Kinzig rivers meet and generate rather turbulent swirls and eddies, he released variously sized balls into the water, some lighter, some heavier – ping pong balls, foam rubber balls, footballs – and left them to the free play of forces. They made visible otherwise hidden countercurrents, undercurrents and vortices, and revealed the willful nature of water.

Markus Heinsdorff is not just interested in images, he also documents the sounds water makes. He collected pebbles in the Schiltach from the riverbed near the banks and placed them in glass bowls with water. While he swirled the bowls in his hands, he called participants’ attention to the swooshing and tinkling sounds the pebbles made in the water. Heinsdorff also talked about other harmonious water sounds such as those made in Chinese bronze vessels. He said that essentially every river has its own unique sound.

A final experiment showed how multifaceted water symbolism is. The artist asked participants to use wet sponges to write on dry asphalt the names we use for water: H₂O or aqua, for instance. On hot days, this kind of water writing evaporates quickly, showing how transient these appearances are. But this did not happen on this cool October day. So in the finished film, Markus Heinsdorff let the water writing process run backwards, and we saw the wet sponges absorb the wet characters from the asphalt, making them disappear after all. The workshop and the film that came out of it offered just a brief glimpse of Markus Heinsdorff’s unique way of working and thinking. For many years, he has worked intensely with the subject of water and its life-giving and destructive forces. “Wasser-Werke” (Water Works), exhibited in 2009 at the Kallmann Museum in Munich, gave the public an excellent opportunity to discover his work. Heinsdorff had salvaged from a river a tree trunk measuring 18 meters in length; this was placed in front of the museum. Its form was the outcome of the river water’s many years of work. To set a contrast, he presented smaller, blackened pieces of driftwood on a large light table, making them look like works of calligraphy.



Water has long played an important role in Markus Heinsdorff's work: "Sky Place", bamboo installation, Bali, 2002.

Since then he has worked together with several partners, among them the hydromechanics laboratory at the Technical University of Munich, where he created his installation "*Air Rings Underwater*". Dolphins at play have been observed to blow bubble rings similar to smoke rings. This gave Heinsdorff the idea to construct a bubble ring generator in the hydromechanics laboratory. A plastic replica of a huge fish mouth was built into the bottom of a transparent acrylic glass tube filled with water (2.4 meters high and 65 centimeters in diameter). The electronically controlled opening and closing of the fish mouth generates doughnut-shaped bubble rings, 30 centimeters in diameter and 5 centimeters high, that slowly rise to the surface where they practically explode. The rings also rotate inwardly and sparkle with multiple reflections, revealing a spectacle never seen before in this way.

Heinsdorff had already created an equally astonishing construction in 2000, "*Skyplace*", a large sculpture on the Indonesian island of Bali. In a flooded, artificial paddy, he managed to build an enormous bamboo airship on stilts, 30 meters in length and nearly 6 meters across. Visitors could walk on a footbridge inside the open, airy bamboo construction and see themselves reflected, along with the sky and parts of the airship, down in the water below them. When rice started to grow, the mirror turned into a green field, and once the rice harvest was over, the field turned back into a mirror – symbolically representing landing and flight, depending on whether there was a harvest or a flood. This experience roused Heinsdorff's interest in creating new forms and space with nature. As with the airship, the combination of water and air often plays an important role.



By observing the river, filming and transforming it, we can become more closely acquainted with water's intrinsic nature.



Playful art: preparing a scene for the short water film.

His sound installations are also inspired in many ways by water. In one of them he places large water-filled demijohns (glass balloons) on steel stands in a circle and connects them using a ring made of copper tubing. A partial vacuum causes water to steadily drip onto metal sound cans of different sizes placed in the center of buckets below. Sounds are created by water drops bouncing off the cans, which act as resonating bodies and generate high and low tones depending on their size. The sound of water falling on metal is reminiscent of church bells. Drops fall from a height of up to several meters and produce tones of astonishing intensity and volume.

Markus Heinsdorff was an international artist even before he created the "*Skyplace*" in Bali. For many years now he has been a visiting art professor at various universities in China and he designed the German-Chinese Pavilion made of bamboo for EXPO 2010 in Shanghai. He searches for ways to address the subject of water and nature through new and surprising perspectives, and is currently working on a project called "*Art and Research*", an exhibition of objects similar to the water bubble ring copied from dolphins. The exhibition will be launched in Germany and travel to different countries. Its scope will cover regional and global water issues, and it will be individually adapted to each country. The exhibition will also address current topics in local excursions, lectures and workshops. Heinsdorff is not interested in static art. He is interested in thought-provoking ideas, in awareness and in expressions of change – because change, after all, is inherent to the very nature of water.

Ways of Experiencing Water – a Shower Testing Workshop in the Hansgrohe Spray Lab

JAN HEISTERHAGEN

Although test drives are a must when buying a car, hardly anyone would think of asking to test showers in a bathroom retail store. But there are many good reasons for trying out a variety of showers. Jan Heisterhagen, Hansgrohe's product manager, made this vividly clear in his workshop.

In the only really wet workshop of the symposium, four different ways of experiencing showers were tested: showering with scented body care products; showering with newly developed spray modes; showering using water-saving and efficient spray technology; and showering with pleasure and ceremony. In the Hansgrohe ShowerWorld test center for customers, participants were able to experience firsthand the remarkable differences in the sensations caused by contact with water and their effect on physical well-being.



Far more than just hygiene: showers are invigorating for body and soul.

Almost anyone taking a shower is certain to use cleansing and skin care products such as soaps, lotions, shampoos, aromatic shower gels or body scrubs. But it is a completely different experience when these substances are added to the shower spray, a common practice in Japan and New Zealand, for example. The workshop experimented not only with familiar skin care products, but also with added fragrances and vitamin C, even with salt spray mists – comparable to sea spray.

Participants enjoyed the effect of the shower. They thought the added shower gel or shampoo was practical and comfortable, and some said that the spray mist shower in combination with these products gave them a feeling of deep cleansing since active cleansing substances stayed on the skin longer. The scent of the added fragrances was quite distinct and thought to be

pleasant. It was however interesting to note that nearly all participants said they would not make use of additives every day, but reserve this for special occasions.

Apparently many people taking a shower wish to have the feeling that the water brings them closer to nature. This was reflected in the workshop participants' fascination with the rain showerheads. The Rainmaker showers water from high above, which drums on the skin, a completely new experience for many. It recreated the sensation of a tropical downpour, and was unanimously praised for being especially pleasurable. The Raindance overhead shower and the softer, finer spray from the hand shower were also described as very pleasant.

A second way to experience water intensely is by using pulsating massage showerheads. Their high water pressure stimulates the skin, making it more sensitive so that each jet can be individually felt. These jets invigorate the muscles beneath the skin as the massage mode varies the pressure of the pulsating jets or causes the jets to rotate so the skin feels as if it were being massaged. Here in the workshop, participants experienced very different degrees of sensitivity to the massaging effect. What some felt to be pleasantly invigorating, others thought was too powerful and intense.

Water is a scarce and expensive commodity in many emerging countries and megacities. For years, it has been a central concern of Hansgrohe's to develop water-efficient faucets and overhead showers that deliver the sensation of good water pressure despite a low rate of flow. In overhead showers, the Crometta 85 Green has a maximum flow of 6 liters per minute and even the Raindance AIR 180 EcoSmart needs only 9 liters. But are products that are considered ecologically exemplary and useful also comfortable and practical enough for everyday use?

Participants' answers to this question were very pragmatic. Nearly all felt that a flow of 9 liters was enough for a proper shower, and some could not tell the difference from conventional showers. However, there were some participants who said that a flow of only 6 liters did test their willingness to save water, remarking that the shower had been less enjoyable because it had seemed there was not enough water. On the other hand, a handheld showerhead with a flow of 6 liters was considered acceptable, and many thought this was the best choice for anyone seriously interested in conserving water.

Participants repeatedly indicated that there was a difference between taking a "cleansing shower" and a "shower for pleasure", whereby they thought that the latter did call for at least 9 liters flow per minute. But it is safe to assume that this perception would shift significantly in areas of water scarcity. Wherever water is really scarce, even a 6-liter showerhead might be considered a luxury.



Only 9 liters per minute: showers can still be a real pleasure without wasting water.



The quest for the perfect shower spray: a research team at the Hansgrohe spray lab explores the many aspects of water.

A special area of research at Hansgrohe is to explore new ideas for shower environments that could make the way we experience water even more sensual. This can involve introducing sounds or music, or offering a variety of lighting options. Participants also tested the effect of sitting under a shower, for example, and of showering in rain simulated by the large rectangular Axor Starck ShowerHeaven overhead installation. They said that showering while sitting made the shower feel more like rain since water was falling from higher up. Overall the effect of the droplets was described as gentle and pleasant. This is presumably because the drops, on their long way down, have more time to assume the natural shape of raindrops. Here again, a strong interest in experiencing water naturally became apparent – another indication of the direction which developments in everyday bathroom use could take.

So it is not the cleansing function of water which comes to the fore, but rather the emotional experience of touching water, an element not only stimulating and invigorating, but also a link to the natural environment so increasingly distant from our urban lives. One of the key motivations behind Hansgrohe's research into the pleasures of showering is to contribute to the balance between humans and nature by creating an intense and yet efficient experience of water.

A Meditative Walk Along the Schiltach River

KARIN R'HILA

Development and healing for people and places – this is Karin R'hila's speciality. She sees herself in the tradition of a shaman, an urban shaman who supports change and transition, detects an imbalance, eliminates it and helps to create a new balance. In her workshop, she invited participants to join her in a meditative walk along the Schiltach River, a walk along, and with water that engaged all our senses.

As in ancient times, rituals today still function as mediators in transitional situations. They act as bridges between the worlds; they connect the outside and the inside, humans and their environment, individuals and communities, mankind and cosmos. Rituals touch the soul, which is what makes their effect so special. *My rituals for the now time* attempt to convey the beneficial effect of traditional rituals in a more modern form.

Before beginning a collective ritual, I often use words to integrate the intellect and the mind, to awaken each participant's inner child, and to bring individual creativity into play. This is the only way of getting everyone to join in and participate. I aim at creating experiences that are value-oriented and have a spiritual aspect, that give people a sense of purpose, awaken the senses and the soul, and make us connect to the larger whole. My actions may seem to be totally unspectacular, but they derive their energy from something that is really being experienced, or lived through, and the live, physical contact between people.

In any activity that involves nature, we can differentiate between two fundamental approaches. On the one hand, we can heal and renew the connection of humans to nature (in a tree, the earth, or water), thus strengthening our feelings of respect, consideration, consciousness and gratitude; on the other hand, we can activate and use the positive effect that water itself (or the tree, or the earth) has on humans.

In both cases, the combination of all factors leads to the actual effect and power of the actions, clearly felt by those present as positive energy and creating a counterpoint to our ever-increasing contact with virtual worlds. This is important because virtual experiences confuse us and weaken the trust we put in our own senses. Therefore, one of the fundamental goals of my *rituals for the now time* is to sharpen and intensify the finer range of our sensory



perceptions – a faint breath of air, warm sunlight on our skin. People are almost always accessible through their intact senses, even in exceptional circumstances when they are in states of dementia, coma or actually dying.

In my rituals I put particular focus on individuals who live and work in urban surroundings. Excessive amounts of stimuli, too many options and too much information cause them to be overwhelmed, stressed, and often close to a state of exhaustion or burnout. These people rarely have the time and the space needed to quickly and easily recharge their sources of inner strength.

I am convinced that we all carry within us ancestral knowledge of the healing properties of water and that this knowledge just needs to be activated. The human body is composed of more than 70 percent water, and we have made use of water since time immemorial. Besides its practical uses for cleansing and other purposes, we have always valued water because of its regenerating qualities for body, mind and spirit. This is why we still take trips today to the seaside, stroll along rivers, and visit springs and fountains.

Another reason why people feel drawn to water is perhaps because our bodies are reminded of the comfort and sense of security we had in the womb where we began our lives surrounded by this liquid element. In any case, we know that water makes us feel good. Water is powerful, it provides us with relief and serenity, and it is also a source of inspiration. The fact that we all carry this primal feeling within us makes it very easy to make use of this natural source of energy. Sometimes all it takes to remember is a short pause and a moment of reflection.



People always feel drawn to water, both alone and together with others.

Water offers us a variety of possibilities. We can gaze out over water, sink into a state of peaceful meditation, go to the source, let go of the old, and explore the new. In combination with nature, it rapidly and lastingly strengthens our energy potential. My goal for this workshop was to combine the walk along the river, an act of remembrance, with instructions for a small *emergency intervention* measure which can be called up and used anywhere at any time, and that provides immediate help when we feel overcome by weakness and fatigue. For this reason I abstained from using any accessories in the workshop. We did not even take with us on our river walk such practical things as protective rainwear or meditation cushions. The walk took place in October, but we purposely risked being surprised by rain, allowing for the possibility of physically experiencing the element of water. The only aid we had was a singing bowl which I used to signal the beginning and end of each phase of meditation. What follows is a description of our walk along the Schiltach, derived essentially from my spoken instructions.

"I come as it were with empty hands because what I've brought you is already here – in abundance.

We will meet with the real subject of this workshop – water – in all its power and beauty. Recently an *ÜBER LEBENSKUNST* festival was held in Berlin. One of the ideas of the festival was to concentrate on essentials. Today I'd like to celebrate a mini-*ÜBER LEBENSKUNST* festival with you. Together we will address some issues that are quite prevalent in today's media, but we will look at them in a different way – growing social exhaustion, change and



Release and inner peace intensify how we experience this walk along the river.

renewal, growth and the knowledgeable society, the conservation of natural resources, and safety nets.

You may reconnect to the ancient knowledge you carry deep within you. In case of a crisis situation or a state of exhaustion, from now on you will know that there is a resource available to you, one that doesn't cost anything and requires no appointment. Room for deceleration, which deep down, you have always known existed, but which was suppressed to enable you to survive in our urban culture.

To rediscover this resource, you will need all your senses and your body to a certain extent – but you won't need to think very much. I'd like to ask you to leave most of your intellectual faculties here in this room. Assuming an almost childlike disposition and openness would be helpful to really experience water on this walk of heightened awareness and phases of meditation along the Schiltach River."

I spoke the words below very quietly and more and more slowly. This helped participants enter into a light trance, achieve a state of peace and serenity, and connect to their inner powers of perception.

*"We will
go
arrive
let go
experience
feel
cleanse
reach for our inner source
welcome inspiration
experience together
retain positive memories –
either way – you are welcome."*

Gathering together in a circle

The walk began with becoming consciously aware of what was happening at the moment. "I'd like to ask all participants to gather in circle. Now open your eyes and your other senses to explore the group. Perhaps you can already feel some of the power created by a circle of like-minded people. Become more and more aware of yourself and your body.

Tell yourself: I am standing here and relaxing – I am feeling more and more relaxed. I am ready for something new, I feel the ground under my feet, I am myself and at the same time part of a group of like-minded people. I look around at the others in the circle, become aware of each individual person and of myself, come closer and closer to myself. I am now here – I am now – I am – I.

Now, breathing deeply, please repeat the last sentence three times. You can say it out loud, quietly or repeat it to yourself in complete silence.

When you feel ready to start, direct your consciousness to your feet. They are still standing on the ground that supports you – and they are becoming more and more willing to start moving."

Conscious walking

Our walk to the bridge and then to the next place to pause was a walking meditation.

"Focus your entire awareness on walking – on each step. Be aware of every single movement your body makes. Feel the surface of the ground under your moving feet: gravel, asphalt, soil, soft grass. From now on, please walk in silence so that you can concentrate on your senses even more.

Enjoy the silence you are experiencing. As soon as you reach the bridge, the silence will enable you to listen intensely to the sound of your feet on the wooden planks and the power

behind every step you take. Use your inner powers of perception to observe every aspect of the forward rolling movement of your feet. Now decide to cross the bridge silently. This will allow you to benefit even more from the silence and enjoy the contemplation accompanying it."

Contemplation and release

The first place to pause, right after crossing the bridge, is meant to give you the opportunity to leave unnecessary and distracting thoughts behind.

"Look for a comfortable spot at the end of the bridge from where you can look out over the river. Perhaps you prefer to lean on the railing. Feel the pleasant and regular flow of the water. Gather any stray thoughts that might still be in your head and imagine that you let them flow out into the river through your half-closed eyes, making you feel light, lighter and pleasantly empty.

Now concentrate entirely on the river. Contemplate the water flowing by. *Contemplate* means to gaze at the river through half-closed eyes as opposed to looking at something in an attentive and focused way. Now imagine that you are letting the last of your thoughts go, every last wisp flowing through the window of your eyes, emptying your head even more. Everything that ever existed or that will ever exist flows out through this opening and into the water. The water willingly carries everything away in its flow.

Now do the same with your body. Simply let anything that bothers you flow out. Rigidity, tension, discomfort, perhaps even pain, flow into the water, they are all just washed away, more and more, as much as the moment allows. You feel comfortably empty, cleansed and relaxed, this feeling intensifies – and you are ready to absorb something new and totally different."

Until now we had been walking along the Kinzig River. But our real goal was the Schiltach River, which gave the town its name. A walk along this river was important to give participants at the symposium a stronger feeling for the place. Many at the symposium simply would not have taken the time, or were not in the habit of exploring and coming into contact with the water of the place they were in, even though the symposium would last for two days.

Together

In Germany today, people who live alone make up more than 40 percent of urban households. Loneliness und work-related stress are increasingly responsible for mental and physical health problems and often result in burnout. This is why I greatly value shared social experiences as a source of energy and I include small things in many of my actions that contribute to this – as I did in this workshop.

When we climbed down a rather steep slope to the river, we did not do it alone, but together. Everyone lent a helping hand and help was readily accepted. This activated the child within us. Afterwards we once again gathered and stood in a circle.

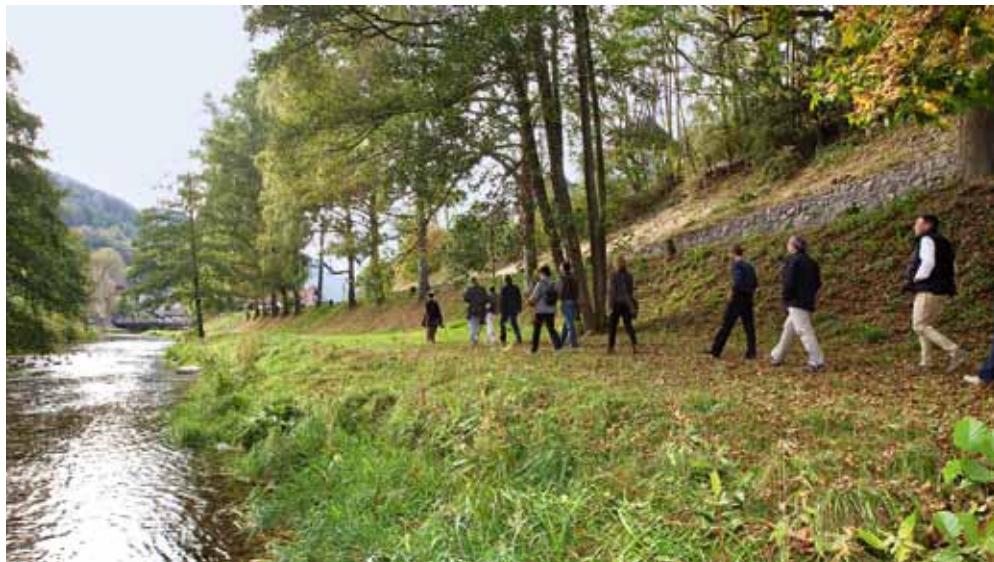
"Look around the circle, concentrate on the face of each person in your group. Did you experience their help? If you did, in what way did they help you? How did you feel? Were you able to accept the help offered? Was it easier for you to offer help, or to accept help from someone else?"

If this reminds you of a company outing or field trip, you are absolutely right. But what company really takes the time and effort to create shared social experiences that help people connect with each other?

Source of inner strength

I knew from previous walks that there was a fountain in the town square called the Kropfbrunnen, which translates to *goiter spring*. On my earlier visits, I had become acquainted with the exceptional quality of its water. The people of Schiltach have always valued the fountain's palatable and healing spring waters. We were all the more surprised to find there was now a sign at the fountain reading: "This water has not been approved for drinking." I myself felt it was still safe to drink from this spring, but I also felt it was important to leave it up to the participants to decide for themselves whether they wanted to drink from it or not.

"Ask your inner wisdom, your intuition, and your instincts. Is it alright for me to drink this water? Regardless of how you reply to this question, the answer will be true and correct – for you very personally. You will realize – perhaps with joy – that this inner wisdom, this personal source of unmanipulated truth is always available to you, here and now, and on any other occasion."



Meditating on the banks of the river: feeling the flow, the passing of time and the course of life...

You can turn to it whenever you like, for anything you like. You probably already do so quite often – more or less intuitively. If the answer is no, please pay attention to this and do not drink from the fountain. You can still take part in all our other actions. If the answer is yes, step up to the fountain, one at a time, and scoop up some water with your hand, and using all your senses, every single part of your body, concentrate on drinking the water in your hand. Now please prepare to listen to your inner self. Allow your very own *power word* to rise up within you – courage, confidence, power, determination, hope. Be completely open and trusting – the first answer you become conscious of is the truth, even if your mind tells you otherwise. When you continue on your way, imagine you are holding this personal power or magic word in your right hand; if you are left-handed, hold it in your left hand."

When everyone had finished, I filled a jug I had brought along with water. When we had first started on our walk, the group had noticed that the stream around the Hansgrohe building had gone dry. We therefore planned to conclude our walk by emptying a jug of spring water into it.

A thundering millwheel as a source of energy

A key feature of my walking meditation ritual is that it can be adapted to include distinctive local features. In Schiltach, I was able to incorporate the hydropower which is of central importance to the town. To do this I took the group to the millwheel of the former Schüttesäge saw which is several meters high and which used to power a sawmill. Its powerful rotating movement and thunderous roar turned the exhilarating, activating and liberating power of water into a very special kind of sensory experience and helped us release inner energy.

"You now have the opportunity to charge your power word from the fountain with as much strength and energy from the source as you wish. One at a time, please walk up as close to the millwheel as you feel comfortable doing. Then, very consciously turn and face your body towards the source of strength at the millwheel. If you allow me to, I will be standing next to you the entire time and will give you balance by resting my hand against your back.

In your imagination, transfer the power word you discovered at the fountain from your hand to the area around your solar plexus, a hand's breadth above your naval. This is where your inner core is, the place of self-empowerment and dynamic action in your body. You can also imagine that there is a rotating wheel here, a rotating disc. This energy disc stands for your solar plexus chakra, one of the seven centers of energy in our bodies.

Now, with every breadth you take, transfer as much of the powerful energy from the thundering millwheel to your chakra, as much as you like and that is good for you. Your body will let you know when to stop. Trust your body. As soon as you feel you have absorbed enough, nod briefly so that I can use words to help you close your chakra again to a level that is right for you.



For once water takes center stage: paying our respects to water, the element of life.



Once you have finished, allow the next participant to take your place, but do not go back the way you came. Go up the steps you see over there.”

This process took quite some time and required patience because of the size of the group. However, the participants showed great interest in this experience and had no problem in waiting their turn.

The circle as a symbol for community

This powerful event called for a quiet ending. A gathering, contemplation and another shared social experience therefore rounded off our walk. The group made its way to a place on the upper part of the Schiltach where the river's living water jumps over rocks.

“This last part of our walk will lead us to our final place to pause. On the way you will come across a small piece of wood, a branch or a twig. You will know it is yours as soon as you see it. Pick it up and take it with you. Once you reach the last stage of our walk, place your piece of wood on the ground with those found by the others so that all the pieces of wood together build a circle. I would like to ask you to then join the other participants in standing in a circle surrounding the one we made with the found wood.”

When we reached the upper Schiltach, we looked back at the various stages of our walk.

“Now close your eyes and review what you experienced today. How you gathered in a circle in front of the Hansgrohe building, your silent walk, the first time you caught sight of the water, contemplation, recollection and release at the bridge, the inner cleansing that followed,

your willingness to continue, how we helped each other down the banks of the Kinzig, how we experienced the supporting and helping hands held out to us by other participants, our resting place at the steps leading down to the Schiltach River. Like children, we listened to the water tell us its fairy tale, we discovered that a fountain is a source of power and a place of intuition, we experienced the inner surfacing of our very own *power word*, the millwheel that charged our solar plexus chakra with energy – and now here – your piece of wood lies in a circle, an individual and yet equal part of the larger whole.

Perhaps you would like to take another look around you at the participants standing together in this circle, and see with whom you have spent the past 90 minutes. Try to concentrate on how you feel at this moment.

Perhaps you have already understood that you can experience this without quantifying it or passing judgment. If you like, you can promise yourself to remember this walk along the Schiltach and your very personal experience of it. This will give you the opportunity to later refer to one or several of its energizing elements and make use of them in your everyday life.”





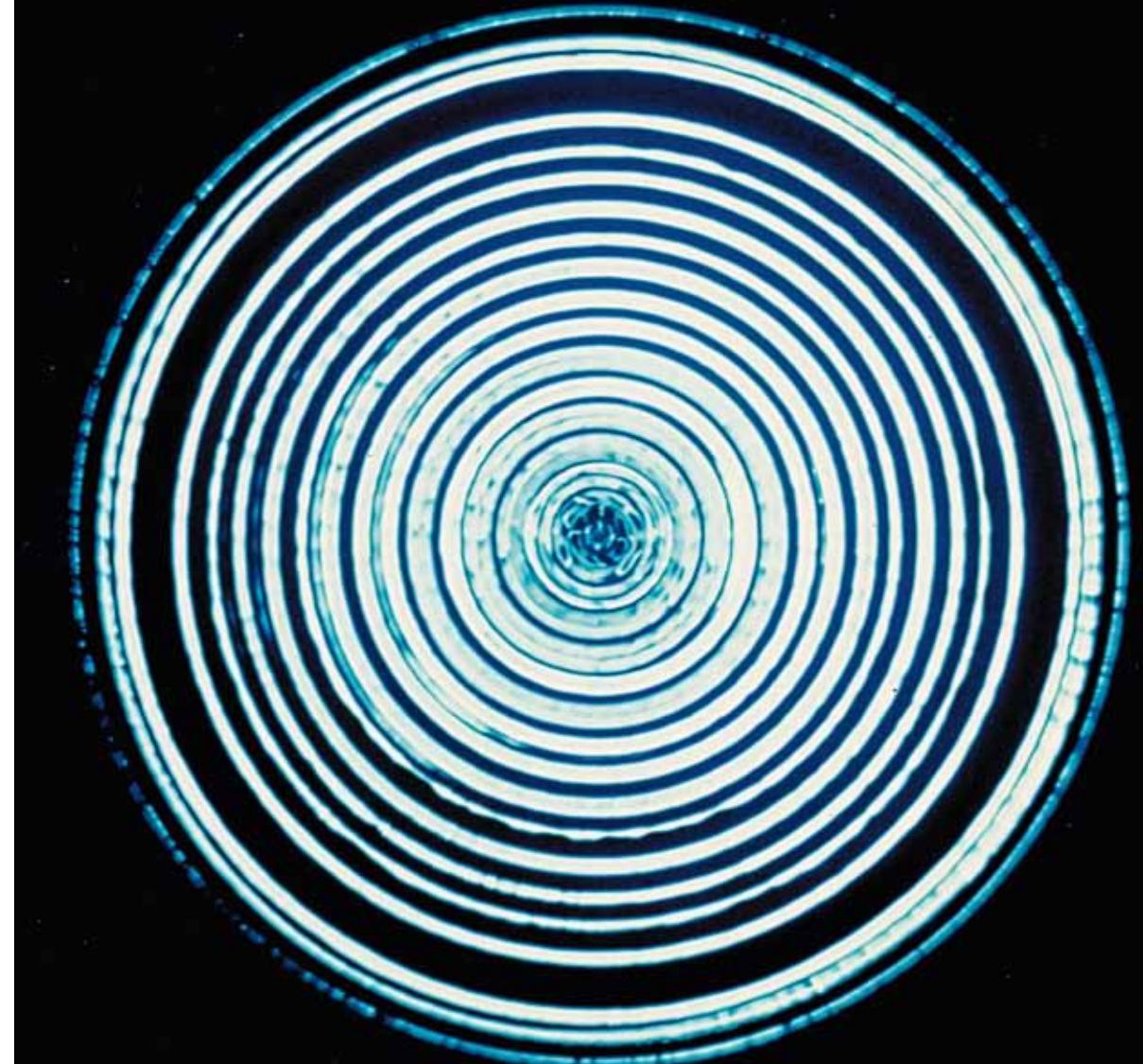
Karin R'hila leads the participants back to the auditorium; the event has given them a sense of inner strength and tranquility.

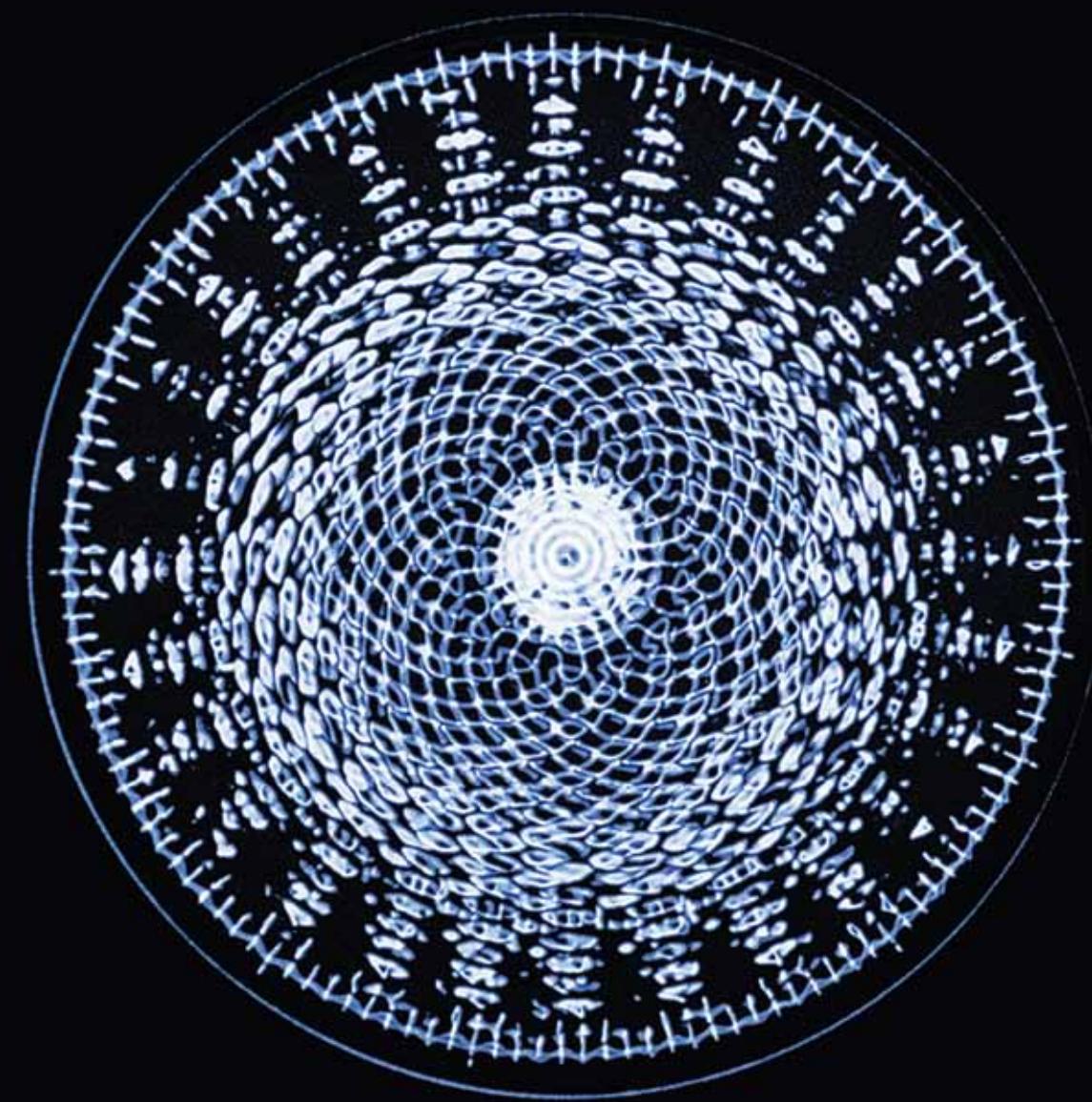
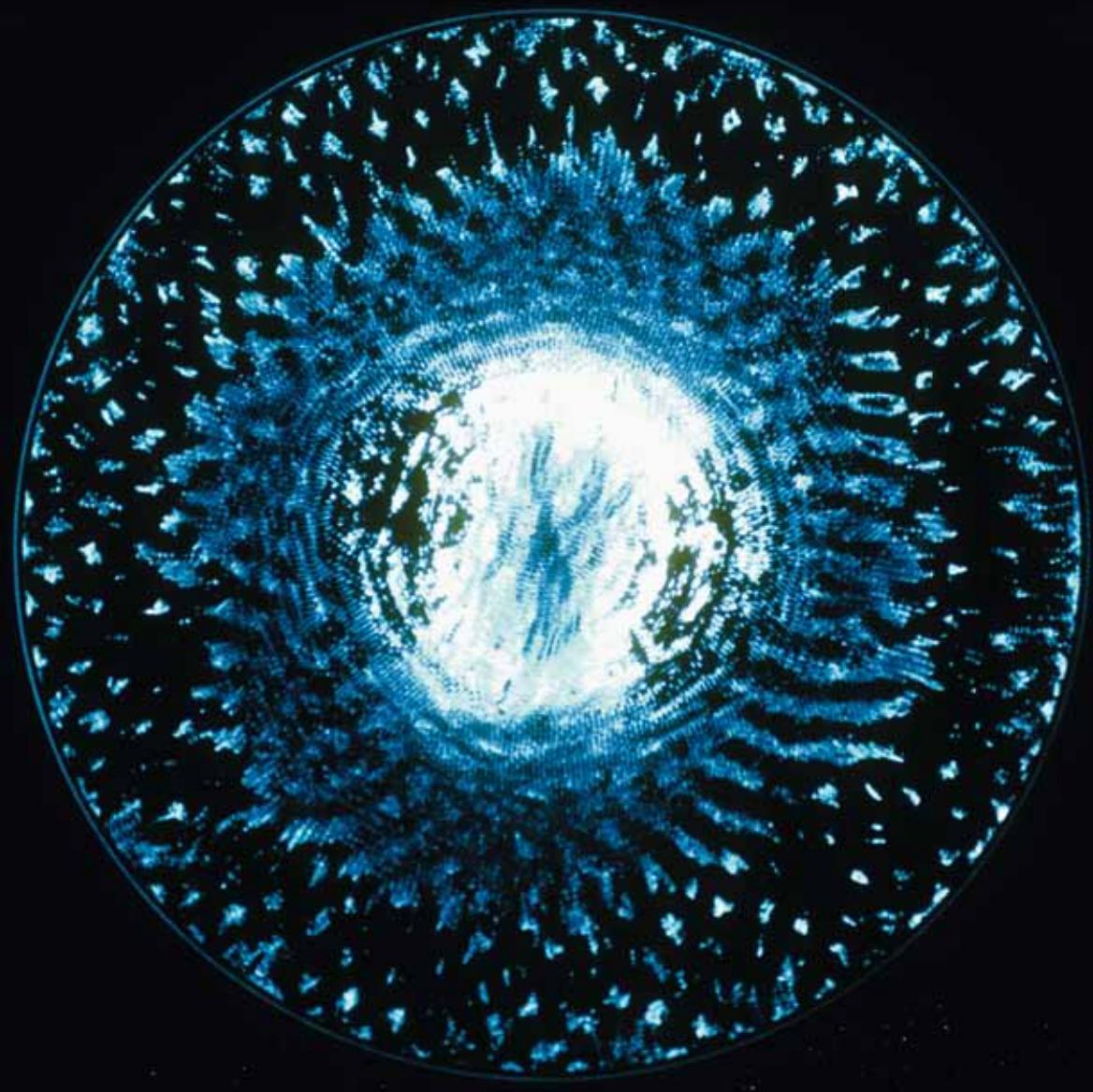
Epilogue

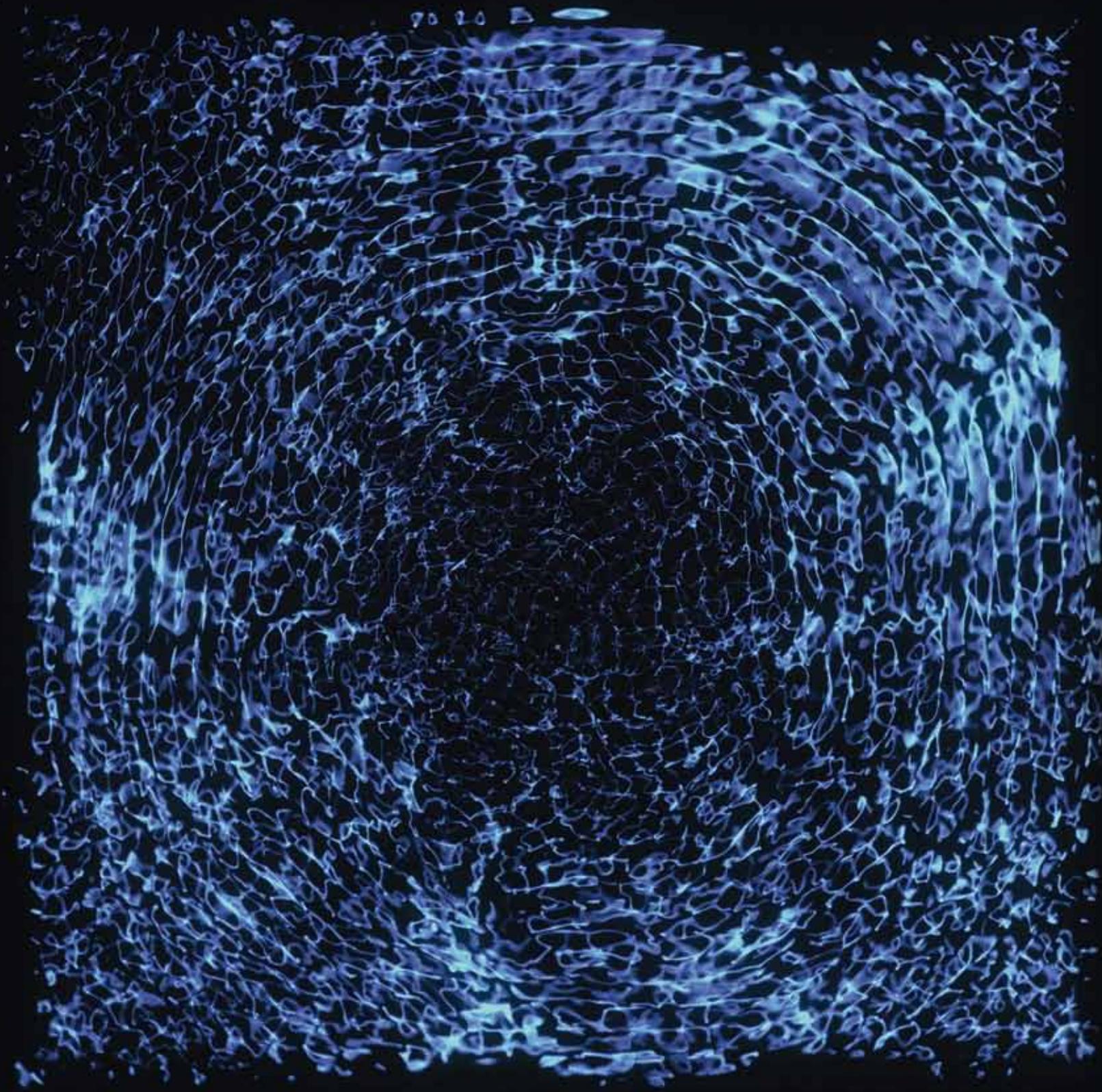
Recently in the weekly newspaper *Die Zeit*, I came across a fascinating idea formulated by Daniel Kahneman, a Princeton psychologist, behavioral scientist and Nobel laureate. According to Kahneman, people tend to overrate material things and attach too little value to their experiences. In contrast to dealing with inanimate objects, what we experience when we do things in a group, like hiking and other sports, offers us the opportunity to feel human – and this is an experience that can be repeated again and again. Perhaps this tells us that, for us as members of a modern industrial society, it is not so much the things we acquire in our lives as consumers that make us feel truly alive and happy, but rather our experiences. This is what my work is about, to create situations that make it possible for people to have this kind of experience – as we did on our walk along the banks of the Schiltach River.

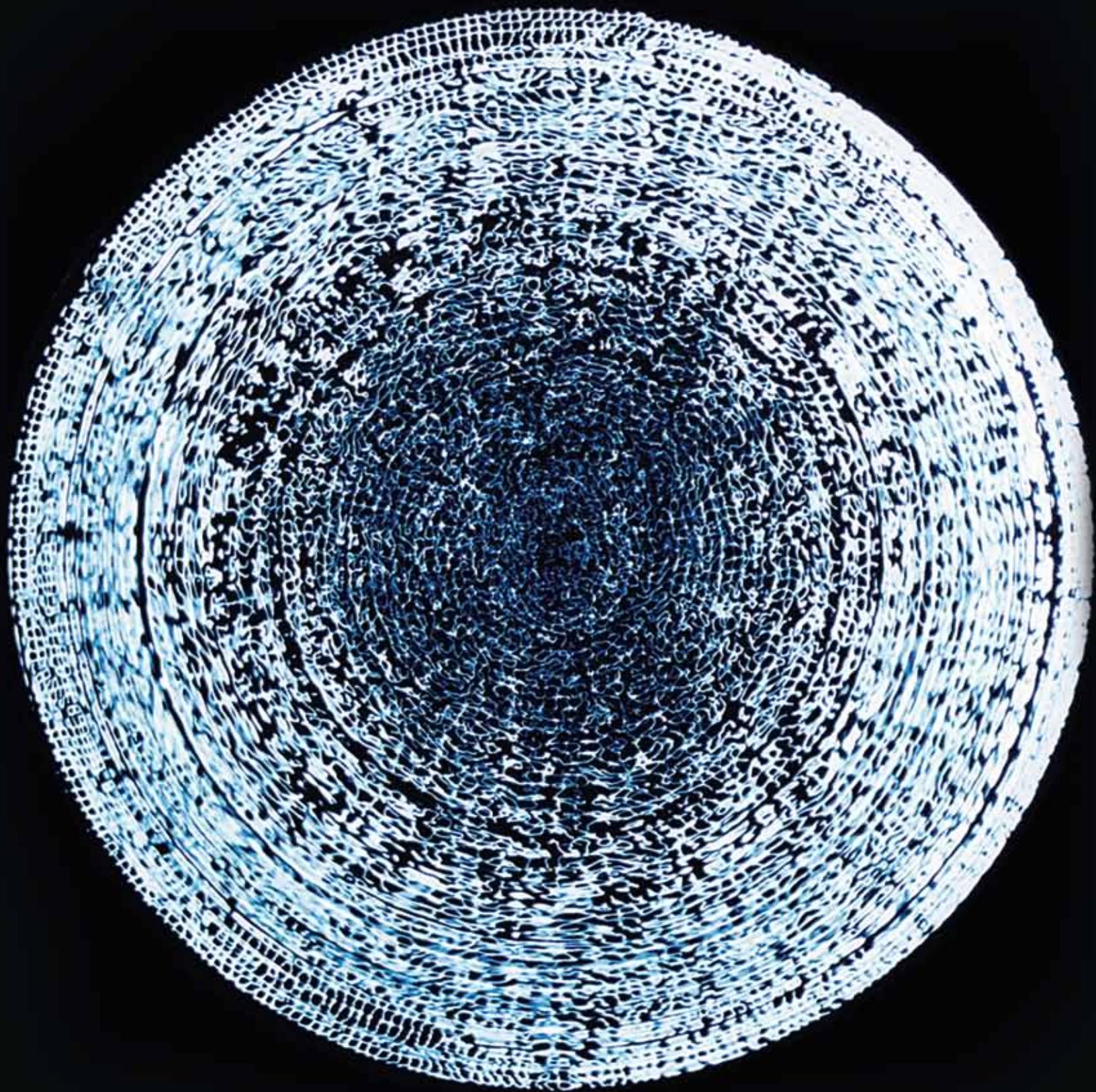
Water can heal and invigorate people, but it also absorbs vibrations from its surroundings. The close-ups of water sound images by Alexander Lauterwasser on the following pages make this strikingly clear (see page 74).

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CHAPTER 4

Perception

In what ways does water affect people? Turkish architect and spa designer Ahmet Igdirligil, and Philippe Grohe, head of the Hansgrohe Axor brand, discussed this question together with Klaus Lanz. In his talk on the significance of spas for wounded, disabled and traumatized war veterans, Dieter Alfter, director of the museum at Bad Pyrmont Castle, described how people, especially in extreme situations, put great hopes in the curative effects of water. The symposium concluded with a water concert conceived by Helge Burggrabe and Alexander Lauterwasser, in which musical vibrations caused water to perform, giving the audience a fascinating look at the versatility of this vital element of life.

Water – Refreshment for Mind, Body and Soul

AHMET İĞDIRLIGİL & PHILIPPE GROHE

Ahmet İğdiriligil is an architect in Bodrum, Turkey. For more than 20 years he has studied the culture and history of oriental baths. He is an international hamam (Turkish bath) and spa designer and planner, as well as a leading authority on the subject. Philippe Grohe is head of Axor, the design brand of Hansgrohe Societas Europaea (SE). He shares Ahmet İğdiriligil's fascination with hamams, and is looking into how traditional elements and experiences could enrich western bath culture. They joined Klaus Lanz to talk about the history of bathing culture and the effect water has on people.

Klaus Lanz: Mr. İğdiriligil, how does water affect people? What happens when we are touched by water?

Ahmet İğdiriligil: Our contact with water occurs in many different ways. Even in the ancient world, every culture had its own bathing tradition. One example is the hamam, where you mix your own water in a bowl and then pour it over yourself using a smaller bowl. In other words, you yourself are responsible for the flow of water, not a shower or a faucet. This gives the experience a special quality. You feel the warmth of the water rather than the power of the water, which is what you are more likely to feel under the shower.

Philippe Grohe: It has more of a human touch, action and reaction, a touch that is different every time.

Ahmet İğdiriligil: Even if you remove the showerhead and let water flow directly over your body, there is still a difference. In the case of the bowl, there is a beginning and an end, while the shower, in contrast, flows and flows and flows. And finally, contact with water always has a deeper meaning because water plays a role in religious rituals in almost every culture – in baptisms, ritual cleansings and initiation rituals.

Philippe Grohe: Ahmet İğdiriligil is from Turkey, where the emotional aspect of water has not faded away as it has in the western world. It is becoming increasingly important for us to



Moderator Dr. Klaus Lanz (right) talking to spa architect Ahmed İğdiriligil (center) and Philippe Grohe.

experience water's emotional side more consciously. In this part of the world, we have spent more than 100 years focusing on water's functional quality. On average we shower for about four minutes, although we really need only 30 seconds to wash ourselves. Deep down we all know that water is good for us.

Klaus Lanz: When I visited a hamam, it was the very special background sounds that particularly impressed me. Being in water at body temperature, we experience the kind of comfort and well-being that brings back memories of the time before birth.

Ahmet İğdiriligil: The dome shape is what gives hamams their unique acoustics. The dome is hemispheric, a specially proportioned bowl turned upside down, so that the room seems quite high. The interior is usually made completely of marble, which reflects sounds and increases their intensity. It also amplifies the sound of running water which flows continuously, filling washbasins and small basins. The overall impression is that of a resounding flow of water; drops do not sound like drops, but more like long echoes, like long tones. The temperature is lower than in a sauna, 36 to 40 degrees at the most; the humidity is moderate and not as high as in a steam bath; and the warm water in the basins is very pleasant. It's easy to spend several hours there. A psychologist once told me that a child experiences similar surroundings in its mother's womb: the right warmth and humidity, muted sounds, soothing bubbling. I am sure that in these baths, we subconsciously relive feelings of security and obliviousness from our pre-birth experience. I suppose we could call this fuzzy warm feeling



The oriental hamam: a relaxing and peaceful place where we can be alone with ourselves or together with others.

our ur-emotion. From personal experience, I can confirm it is extremely relaxing for body and soul.

Philippe Grohe: The muted light and peaceful atmosphere of a hamam put a certain distance between us and everything else, giving us a feeling of detachment. This positive isolation helps us find ourselves and elicits strong emotions. We can experience these emotions together with others, or we can indulge in them all by ourselves under the wide dome, in this large surrogate womb.

Ahmet Igdirligil: That shows how important architecture is for the hamam. It is only when there is complete architectural harmony, when water, space and soft light are integrated into the design, that this impression is created. In fact, the room itself is extremely important for the overall experience because people spend just a short amount of time actually washing themselves. Otherwise they sit and chat, or lie back and relax. Baths have served a social purpose for more than 2,000 years. People take time for each other and for themselves. In the past, people were especially keen on going to a hamam when caravans came into town because they hoped to find out more about the faraway places the merchants had come from. The bathhouse was also the most important place for women to communicate because it was only there that they could move about freely and be on their own. Even the sultan made regular appearances at a hamam to show himself to his people.

Philippe Grohe: Time plays a very central role. We sometimes ask ourselves whether we should take a bath or just a quick shower. The difference lies in the way we make emotional contact with the element of water. Let me tell you about the time I went to a hamam with Ahmet. We wanted to go through a traditional hamam ceremony from beginning to end, and he had even promised to give me a massage. We had agreed to meet at a certain time, but I got there a bit earlier to give myself a chance to get a feeling for the place





Warm water, serenity and leisure time are all part of the hamam experience.

before meeting Ahmet. But Ahmet had arrived long before and was lying on a hot stone slab. I didn't know whether he was asleep or not, and so I decided I would simply lie down next to him. We just lay there for 20 minutes. That was a wonderful way to start off our visit, to consciously experience time and celebrate the experience. We in the enlightened west need to realize that there are cultures where this has been developed and cultivated for hundreds of years. And that we Europeans today are only beginning to rediscover this relationship to water and to ourselves.

Klaus Lanz: That's true. In Europe we haven't had this kind of intimate relationship with water for centuries. As recently as the 1950s and 1960s, taking a bath or shower in often unheated bathrooms in apartment buildings was basically for the sake of hygiene. But now we are rediscovering the enjoyable and stimulating aspects of bathing. Bathrooms today are far more comfortable, warmer and very importantly, bigger than they were fifty years ago. Where is this heading? Will we keep moving towards the concept of a contemplative bath? Will we spend more time in our bathrooms in the future? What could bathrooms be like in twenty, fifty or a hundred years?

Philippe Grohe: I don't think there will be one single type of bathroom; but many different types. Of course technology will continue to develop – we work hard at this at Hansgrohe. I think for instance that people who live in the country don't need the same kind of bathroom



as people who live in the city. There are personal preferences too. Some people want their bathrooms to be an intimate retreat, while others want to share the experience of bathing with a partner, children or friends.

Ahmet İğdirligil: Public baths were the most important meeting place for centuries – for the Romans, the Greeks, in Muslim countries, in the entire Arab world. People often spent all day there. When it comes to water and warmth and relaxation, we usually think only of cleansing and hygiene, and we overlook the fact that public baths were places where people got together to communicate. Today of course, we use other media to communicate, especially television and the Internet. But in western countries I have seen people's attitudes towards baths and bathing shift over the past twenty, thirty years. It began with the sauna, and then a lot of new public bathing facilities appeared, so-called spas. These are very popular for social get-togethers and relaxation. People are starting to spend more time with water again. This is why when we think about the future we have to distinguish between the way people use water in their homes and the way they share the social experience offered in spas, bathhouses and hamams. These are two very different things.

Philippe Grohe: But what they share is that they are essential for re-establishing our inner balance in our everyday lives. We may visit a spa once a week or on the weekend, or when we are on vacation. So we also have to explore using water on a daily basis to relax at home in our bathrooms. Our lives have changed a lot in past decades. Life has become extremely

hectic, especially in cities, and we know that a growing number of people will live in cities in the future. It will become more and more important to counterbalance the hectic pace of everyday life and compensate for the loss of nature and natural living in these urban settings. If we look at developments over the past hundred years, we can see that we have rapidly distanced ourselves from nature. Water is an amazing medium and it can help us reconnect with nature and our bodies. I think bathrooms will play an ever larger role in this by enabling us to experience water so we can keep in touch with the natural world.

Klaus Lanz: Mr. İğdirligil, you were once told that taking photographs was not allowed when you wanted to take a picture of an architectural detail in a hamam. Here another aspect of water comes into play, water as a link to nature, but also to something higher, something that is above us.

Ahmet İğdirligil: That happened in Algeria. As part of an EU project, some fifty researchers – architects, sociologists, historians, and water scientists – were studying baths and bathing traditions in five Muslim countries. In this context, I wanted to take some photographs in a very small hamam in Algeria. I was particularly interested in niches, which I had never seen in baths in Turkey. While I was about to take some close-ups, a local colleague took me aside and explained why people could not go into these niches. He said that each hamam had its own spirits, and that the niches had been built for them. These spirits could not be disturbed because as long as they stayed in the niches they were appeased and left people alone. This story fascinated me. Although the building, a bathhouse, was purely functional, it was steeped in strong spiritual belief, expressed in the construction of niches for spirits. We can find this kind of connection between water and the spiritual world in other places too. Water spirits such as nymphs existed in several civilizations of antiquity. Even in the traditional Finnish sauna, the spirit of the vapor that rises from hot stones, the *löyly*, connects the earth and the sky, this world and the hereafter, the living and the dead. People who surround themselves with water and heat are also aware of this connection; an aspect of faith is always there too. Philippe and I have often discussed this point. I believe that today's functional act of washing lacks ritual. In old traditions, ritual acts were an inseparable part of every cleansing and bathing ceremony.

Klaus Lanz: So if we were to add something new to the purely functional bath, to simple hygiene – something we could perhaps call *hygiene plus*, what could the plus be? Would it be just a quantum of wellness or rather a first step towards a ritual? The elements that make up a ritual are always the same – its rhythm, the recurring bathing and resting times, the set sequence of events – all this gives us a feeling of security, serenity and well-being, and could

even give rise to religious feelings or beliefs. The question is whether bathing as we know it could also become more like oriental bathing traditions.

Ahmet İğdirligil: Rituals in connection with water are ancient cultural traditions that can be found in other places such as India or in the sweat lodges of Native Americans. Rituals develop and reinforce themselves over many generations, so you can't really create a ritual on the spur of the moment. But I do see some elements of this in modern spas that use special lighting, aromatherapies and crystals. So bathing could definitely develop in this direction because there seems to be a great need for mysticism, rituals and a spiritual dimension.

Philippe Grohe: I find it very difficult to draw a clear line between the functional and the emotional qualities of water. The line where emotion turns into mysticism varies greatly from individual to individual. What does seem clear to me is that rituals always have something to do with habit. Rituals allow us to celebrate our experience with water more intensely, but they also call on us to take the time to do so. And for me, in a world where time is becoming increasingly limited, this is a clear message. It will be more and more important for us to take this time when we deal with water. Anyone who feels the urge can also light a candle.

Ahmet İğdirligil: Allow me to add a personal comment here. In the past ten to twenty years, growing emphasis has been placed in the west on sustainable technology. It is important and right to recycle water and use the heat of the sun; this is where the future lies. Still, I believe that if we don't change our habits and our attitudes towards water, all of this will have a limited effect. We must start with ourselves.



Ahmed İğdirligil is both scholarly and emotional in his approach to the history and future of bathing culture.

Water and the Hope in Its Power to Heal

DIETER ALFTER

Dr Dieter Alfter is director of the museum in Bad Pyrmont's castle; the museum documents the history of the spa town through the centuries. He talked about a relatively unknown side of the spa's history – its role in caring for and rehabilitating war invalids. Through the ages, sick people were not alone in hoping to benefit from the healing powers of water; soldiers who suffered physical or psychological damage did so too.



Wassersymposium 2011

It was not only 19th century literary figures who perceived spas as *other* places, as healing other-worldly retreats for those seeking a respite from life in the everyday world. Johann Wolfgang von Goethe described Marienbad as an “outside world,” and Johanna Schopenhauer wrote from the Schlangenbad spa in Hesse that for her it felt as if “the rest of the world was not in the world.” Since the late 18th century, spas across Europe have been celebrated, advertised and cast in literature as places where natural springs can heal the body and restore the spirit.

The heyday of baths has been amply documented through research and in exhibitions. But one aspect has always failed to get much notice – that war invalids also arrived in spas by the thousands to physically and psychologically convalesce through the beneficial effects of mineral springs and the peaceful *other* atmosphere. Although historians seemed to long regard war as a disruptive factor in the history of spas, there is no lack of documentation on the wartime history of bath towns in collections held by their museums. Here we find numerous and significant records dating from times of war and occupation that have never been systematically classified, let alone evaluated for research purposes. It would in fact be extremely interesting to closely examine how wars, which inevitably cause people to suffer physical and psychological injury, stand in relationship to therapeutic and beautiful spa resorts even today.



Spas have always been a destination for those seeking better health, and a place where war invalids can convalesce.

healing of war wounds: “Auch heilet disß wasser, alle wunden so geschossen, gehauwen oder gestochen sind.” [This water heals all wounds that are shot, struck or stabbed.] We also know that during that period up to 10,000 people sought treatment at the same time, visiting the springs in Pyrmont’s valley, with some even undertaking the journey from as far away as Sweden, Spain and Portugal.

The 20th century brought a completely new dimension to war. During both world wars, hotels and guesthouses in many spas were converted into military hospitals, and sometimes even entire towns became hospital towns (Bad Nauheim, 1870 to 1871; Bad Schwalbach, 1914 to 1918; Bad Wildungen, 1939 to 1945; and Bad Kissingen and Bad Pyrmont, both from 1914 to 1918 and from 1939 to 1945). Often the German military leadership, and foreign occupation forces after the wars, turned spas into military headquarters – probably because their infrastructure was generally good, with numerous hotels and function rooms. During World War I, Bad Kreuznach was converted into the Imperial General Headquarters, and the North Sea resort of Norderney became a garrison fortification. After both wars, many spas continued to be of interest to the military as places where occupying forces could go for rest and relaxation (Norderney and Bad Wildungen after 1945). Some were expanded into military administrative centers (Bad Ems and Bad Schwalbach after 1918, and Bad Salzuflen and Bad Kissingen after 1945).

We know for a fact that starting long ago, water from some curative springs was used to treat typical war wounds such as broken bones, impact and puncture wounds, scarring, and amputations. About 2,500 years ago, the Greek physician Hippocrates described the treatment of gash and stab wounds which his patients had probably incurred during battle. From the first to the third century, the medicinal waters of Aquae Aureliae, today’s Baden-Baden in Germany, helped Roman troops recuperate from their battle wounds. From the lore of the New Zealand Maori people, we know that warriors went to certain hot springs after a battle to relieve their pain and calm down the spirit thrown out of balance by the fighting. Even the very first description of the healing powers of Bad Pyrmont’s main spring, the Wundergeläuf, dating from 1556, promised the



Providing opportunities to return to work: occupational training for war invalids at Bad Pyrmont.

of spas after both world wars which has received little attention – the old idea that in addition to its medicinal effects, even the atmosphere of a spa could be soothing, indeed healing.

Military hospital town Bad Pyrmont

World War I broke out in August 1914. As early as September, the first wounded soldiers began to arrive and were treated in Bathildis Hospital, St. Georgsvilla and Liboriushaus. The euphoria, unimaginable today, with which people in Germany and France jubilantly awaited the war, gave way in Bad Pyrmont after only six weeks to disillusionment and horror. A chronicle of the arrival of the first 16 wounded soldiers at St. Georgsvilla on 15 September 1914 reported that "...the sight of them immediately woke us up to the stark reality of this horrific war. They were still wearing the first emergency dressings, had not changed their clothes for weeks, or taken off their boots, had not even seen a bed." The number of wounded continued to rise, which is why the Bad Pyrmont Red Cross Foundation was founded in 1916 to enable them to have free spa treatment.

During World War II, Bad Pyrmont was completely reorganized and turned into a hospital town. After the war broke out, the authorities immediately took possession of spa hotels and guesthouses as reserve military hospitals for wounded German soldiers. By the spring of

In the post-war years, thousands of wounded, disabled and traumatized veterans poured into spa towns. New therapies and methods of treatment had to be found, especially for those who had suffered psychological trauma. Thousands of war veterans trembled uncontrollably, unable to deal with the horrors of World War I battlefields; they were a hitherto unknown and disturbing sight for civilians. Physicians began to realize at that time that this post-traumatic syndrome, previously unknown, had to be treated not as an organic or physical illness but as a mental disorder. But in the years after 1945, conventional medicine still had no satisfactory methods for dealing with the trauma caused by war, persecution or the Holocaust. So that at least something could be offered, concerts were given with *comforting music* for veterans, and in Bad Pyrmont a *silent meadow* was set aside for them. The installation of this space for retreat underlines a central function

1945, 400 nurses working in 84 houses were providing medical treatment to altogether 5,000 wounded troops and 4,000 sick persons and people who had been bombed out of their homes. Each hospital had a red cross on the roof to ward off possible bomb attacks.

Bad Pyrmont's reputation as a hospital town continued to be significant long after the end of the war. The turmoil of war had the effect of making the town one of the major treatment centers for wounded soldiers and amputees in Germany.

During the last weeks of World War II, in February 1945, the military hospital in Koszalin in West Pomerania [present-day Poland] and the Wehrmacht vocational school in Szczecin were moved to Bad Pyrmont because of the advancing Soviet army. Just a few weeks after the American army took over the resort town on 5 April 1945, teaching began again at the vocational school under the new name Bad Pyrmont Versehrtenfachschule [school for the disabled]. This rapid restart was urgently needed because 1,800 patients required help, many of them amputees, including 400 double amputees – and more of the wounded were arriving nearly every day.

Besides doctors, nurses and attendants, many other people were employed from the beginning in job counseling and occupational training. In the months following the war, the focus shifted more and more from medical treatment towards social services and job training. The central focus was to give victims of wartime injuries new courage to face life and open up opportunities for them to return to work. In 1947, British occupation authorities allowed job training to be provided at a state school for the disabled set up in Bad Pyrmont's castle.

Commercial and administrative training courses were held here, and there were workshops

for tailors, shoemakers, carpenters, basket makers, watchmakers, furriers, and beekeepers.



Rediscovering life in spite of mental and physical impairment: spas still offered some hope of recovery after the two world wars.

The aim was always to help those veterans unable to take up their old jobs because of the injuries they had sustained to begin a new life with the help of vocational training and job preparation.

Often it was not enough to provide them with new vocational skills – many men had to be convinced

that they were still useful members of society in spite of their disabilities. In Bad Pyrmont, many people who suffered severely from wartime injuries were made to feel that they were taken seriously, receiving the recognition they needed to feel confident enough to accept a new chance to live. The vocational school put together a comprehensive program to offer its students a new perspective; they lived in rooms in the castle and all meals were held in the castle's dining hall. They were able to complete vocational education in workshops, whereby in Bad Pyrmont the training of those who had lost both hands was given special attention. In April 1950, a first exhibition held at the castle featured works by amputees, most of whom had undergone training to be painters and graphic artists.

It is a little-known fact that even today the reality of war veterans is still a pressing issue in Germany. Physical injuries are no longer dominant, having been replaced by the psychological damage to soldiers involved in combat operations under extreme conditions. Of the 250,000 people who were on mission in Afghanistan, at least 1,200 suffer from post-traumatic stress disorder. And they are still looking for relief and healing at health resorts and spas, for example in Bad Pyrmont's psychosomatic clinic. In individual cases, it may be difficult to determine to what extent immersion in warm and healing water contributes to regaining health. But the otherness of spas so praised by Goethe, the atmosphere of warmth and protection, is certain to have the same healing effect on modern souls that it has had throughout the ages.



Pyrmont Castle, 1945: hotels, spa hotels and even castles were turned into military hospitals and training centers for war invalids.

Water Concert

The evening's program featured the interplay of music and water. Soprano Geraldine Zeller, cellist Olivia Jeremias, flutist Helge Burggrabe, and organist Claus Bantzer at the piano played compositions from several centuries which used water as their theme. Alexander Lauterwasser translated musical vibrations directly into water sound images and made them visible to the audience on large projections.

Hamburg composer and flutist Helge Burggrabe's major interest lies in making a connection between architecture, music and stillness. When he became more involved with water as part of his work, he developed a close working relationship with Alexander Lauterwasser and his world of water sound images. The world premiere of Burggrabe's oratorio *Stella Maris* was in Chartres Cathedral in 2006. In this production, the association of its main characters, Maria and Sophia with water, was expressed and visualized by accompanying projections of water sound images created by Alexander Lauterwasser.



A simultaneous experience: music and water sound images at the evening concert of the fourth Hansgrohe Water Symposium.

In Schiltach, Helge Burggrabe and his fellow musicians played a wide range of water compositions, while the sound waves generated by the music were transmitted directly to a bowl of water. Alexander Lauterwasser used lighting and color changes to make the water movements created by the music visible, and then projected them in real time to a large screen.



People in the audience were both listeners and spectators. They heard improvisations for flute, cello, piano and waterphone, operatic pieces, lieder of the 19th century, and original compositions by Helge Burggrabe – interspersed with short texts on the subject of water. They saw projections that were strikingly beautiful as water vibrated with the music or responded to it with wild effervescence. It showed how closely water and sound are connected to each other, and to what extent the moods of music can be transmitted and reflected in the aesthetics of the vibrations and resonance curves of water – harmony and disharmony were not just audible, they were visible too.

The program showed us that water has been a source of inspiration for many musicians, in particular 19th-century composers who frequently used water and its guises as a theme. Franz Schubert's "The Trout", "Frozen Tears" or "Torrent", Bedřich Smetana's "The Moldau", Frédéric Chopin's "Raindrop Prelude" or "The Swan" by Camille Saint-Saëns are all exceptionally moving and lovely pieces of music. Helge Burggrabe's original composition "Wasser! Marsch!", and improvisations for cello, piano, flute and waterphone, accompanied by soprano Geraldine Zeller, whose singing was interwoven with whale song, attested to how musicians today can still be inspired by water.

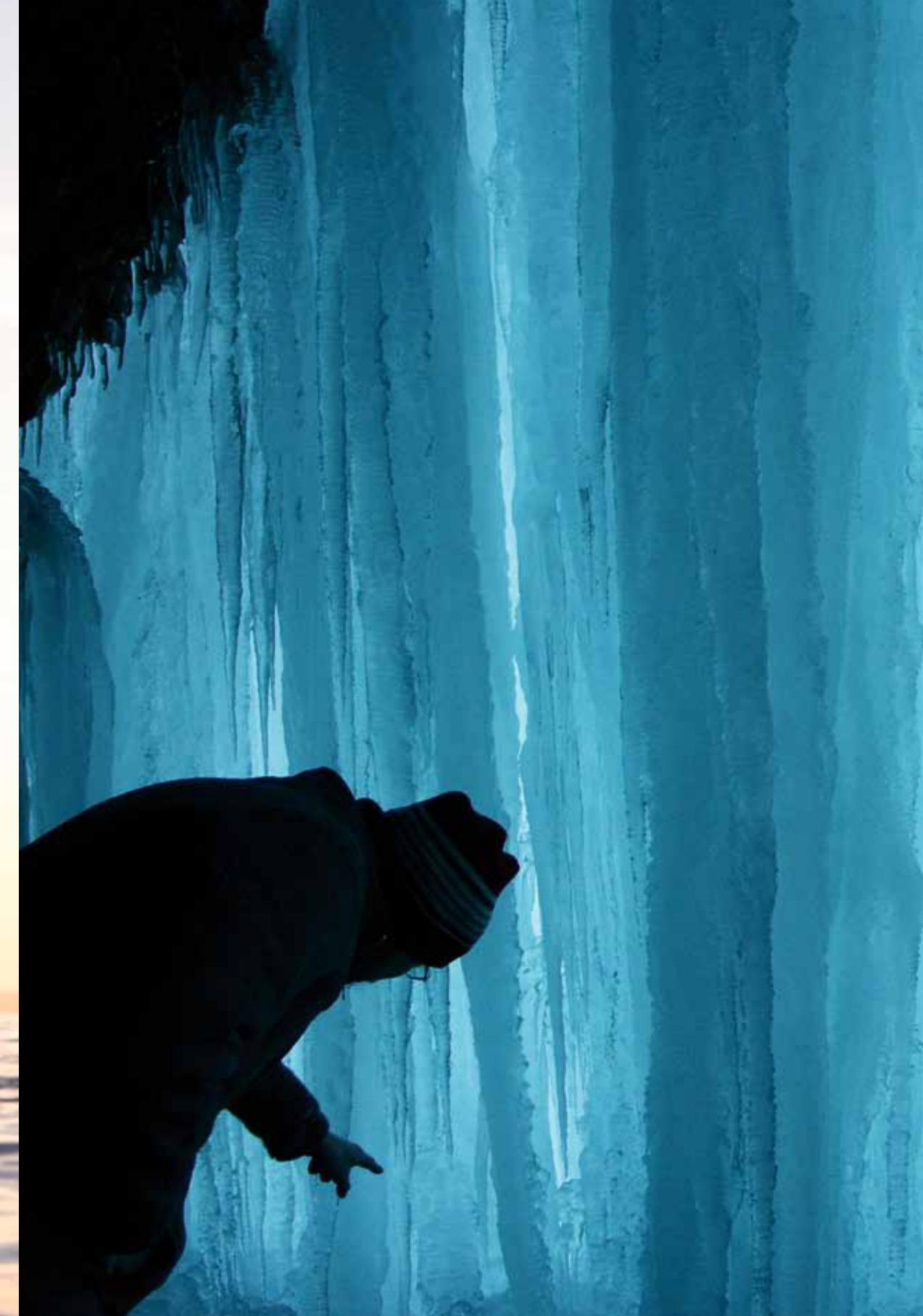
The audience was fascinated by the oscillations, forms of resonance and leaps performed by water in its role as musician. Water responded to music in such versatile, diverse and surprising ways that it opened up completely new realms of perception. Water's nearly simultaneous response to musical vibrations punctuated the listening experience, the individual reaction to the music. Acting as an intermediary, water made image and sound relate to each other in multifaceted ways, achieving an additional dimension of mystical intensity.

















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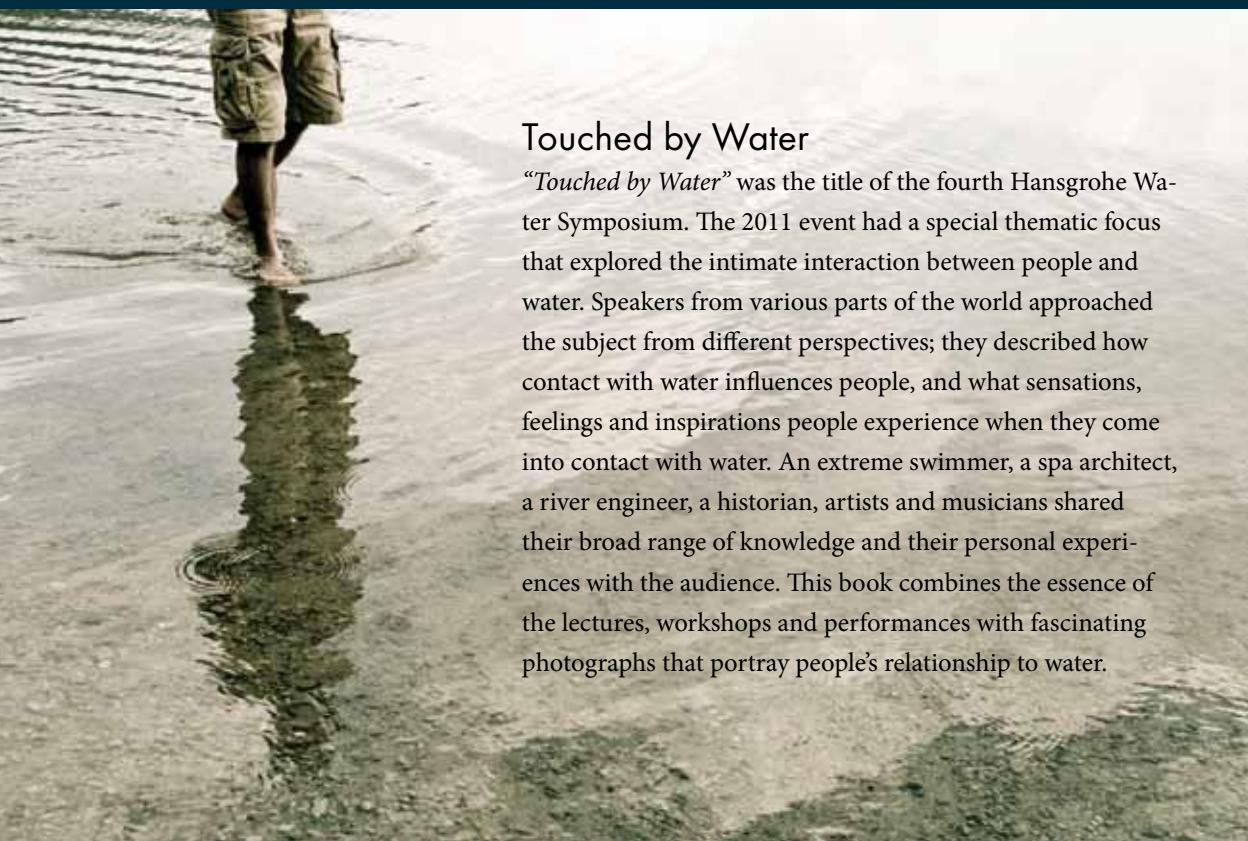
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Touched by Water

“Touched by Water” was the title of the fourth Hansgrohe Water Symposium. The 2011 event had a special thematic focus that explored the intimate interaction between people and water. Speakers from various parts of the world approached the subject from different perspectives; they described how contact with water influences people, and what sensations, feelings and inspirations people experience when they come into contact with water. An extreme swimmer, a spa architect, a river engineer, a historian, artists and musicians shared their broad range of knowledge and their personal experiences with the audience. This book combines the essence of the lectures, workshops and performances with fascinating photographs that portray people’s relationship to water.

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