



1'Info - Lettre of the CHARTER

The route of Cistercian abbeys in Europe



In this issue, you will find a report on our Study Days, held in June at Lérins Abbey on the theme

Cistercian hydraulics... today and tomorrow!

Charter Agenda

• 14 November 25, the next Charter Bulletin.

— 2026 —

• 21 and 22 April 26: 'Cistercian Knowledge' Days in Cîteaux - the programme and information pack will be sent out at the beginning of the year;

• 26 and 27 September 26: General Assembly at Eberbach Abbey (Germany).

Location of Charter members and links to their websites now available:
<https://cister.net>

In November, a new feature was added to the Charter's new website, which went live in September: the location of the association's members on a map of Europe. Details and corrections have also been made to this version.

This visualisation allows you to open the official website of each location, where available. Enjoy browsing!

Website address <https://cister.net>

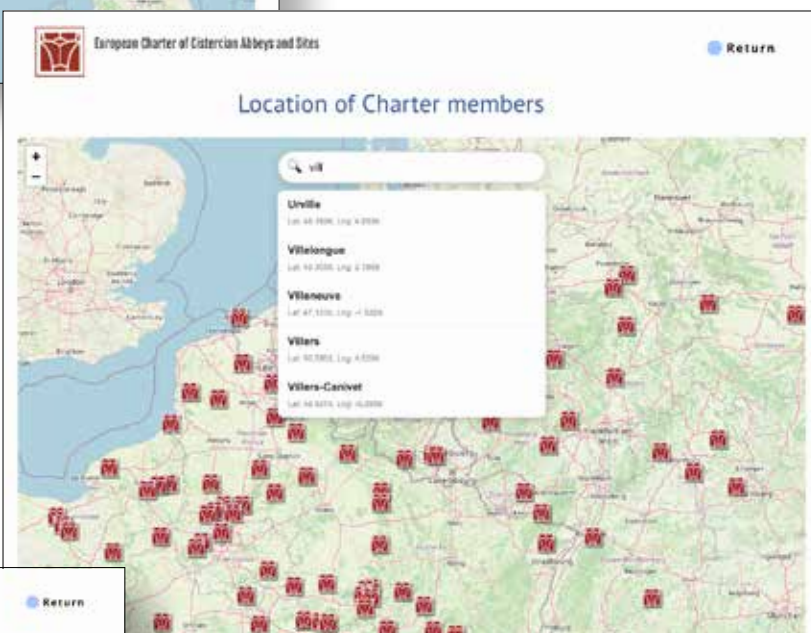


• Access to the map
- via the 'Home' page or
- via the 'The Association' page

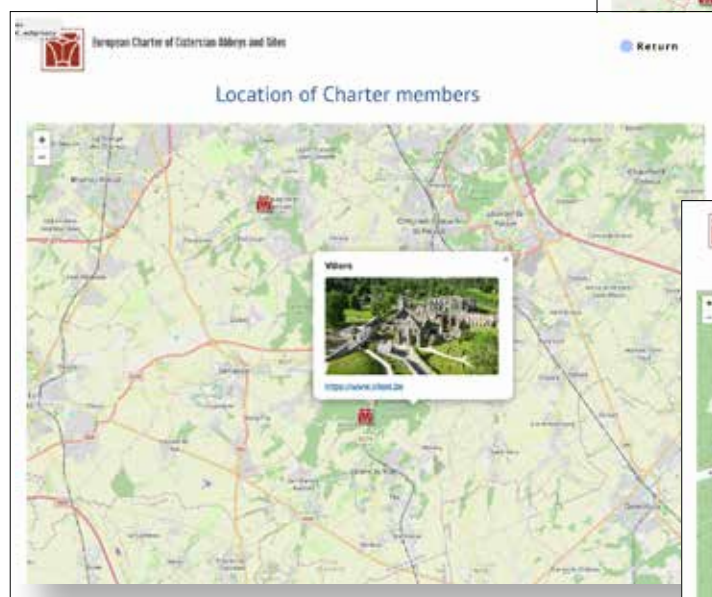


The map is displayed as shown here (on the left). It can be zoomed in or out, or moved around.

As soon as you start typing, a list of locations will appear. You can refine your search or click on the location you are looking for.



If the Charter has a photo of the location, it will be displayed in the thumbnail.
If the Charter has a 'WEB' link for the location, it will also be displayed in the thumbnail. By clicking on the link, you will open the home page of the location found in a new window of your browser.



Note: this map is open source and depends on updates, particularly from the States.



Zooming in can give you an idea of the layout of the locations.



CHARTRE EUROPÉENNE DES ABBAYES ET SITES CISTERCIENS — EUROPÄISCHE CHARTA DER ZISTERZIENSERABTEIEN -UND STÄTTEN — CARTA EUROPEA DE ABADÍAS Y SITIOS CISTERCIENSES — CARTA EUROPEIA DE ABADIAS E SÍTIOS CISTERCIENSES — EUROPEJSKA KARTA OPACTW I MIEJSC CYSTERSKICH — CHARTER VAN CISTERCIENZERABDIJEN EN — SITES — CARTA EUROPEA DELLE ABBAZIE E DEI SITI CISTERCENSI — EUROPEAN CHARTER OF CISTERCIAN ABBEYS AND SITES — EUROPÆISK CHARTER FOR CISTERCIENSERNES FLOSTRE OG STEDER — EUROPEISKA FÖRBUND FÖR CISTERCIENSISKA KLOSTER OCH KLOSTERPLATSER — EVROPSKÁ CHARTA CISTERCIÁCKÝCH OPATSTVÍ A DALŠÍCH SÍDEL -



Cistercian hydraulics... ... today and tomorrow!

Study Days of the Charter (Lérins – 11 & 12 June 2025)

- **Présentation**
Michel DUBUISSON, Secretary of the Charter
- **Opening speech**
François LAUNAY, The President of the Charter
- **Assessment of climate change on hydrological functions at the regional level**
Marnik VANCLOOSTER, engineer (University of Leuven)
- **Almost no water in the garden: the Valsaintes experience**
Jean-Yves MEIGNEN, Nurseryman (Valsaintes Abbey)
- **Water resources in France in 2050**
Eric SAUQUET, engineer (INRAE)
- **The evolution of water demand and its future management in France**
Marielle MONTGINOUL, economist (IRSTEA)
- **Living with water at Lérins Abbey, yesterday, today and tomorrow**
Dom Vladimir GAUDRAT, Abbot of Lérins
- **Architectural heritage put to the test by water**
Renzo WIEDER, Architect (Architecture et Héritage)
- **Water, between nature and creation: a source of inspiration for contemporary artists**
Sarah GUILAIN (François Schneider Foundation)
- **Hydraulics between ancient networks and contemporary issues**
Benoît ROUZEAU, historian and archaeologist (University of Picardy)
- **Round table: «What about my abbey tomorrow?...», by Benoît ROUZEAU**

The latest Charter Study Days, held at Lérins Abbey on 11 and 12 June, once again gave members the opportunity to benefit from the contributions of leading specialists and to discuss a topic that is more relevant than ever: «Cistercian hydraulics... ... today and tomorrow!».

The following pages contain a brief summary of these conferences. In some cases, this is the full text of the presentations, in others a detailed summary, and in others a simple overview, with the accompanying slides providing a more comprehensive presentation of the subject.

The order of presentations has been retained in order to reflect the dynamics of the proceedings (including each speaker's introduction to their presentation) up to the final round table discussion.

It goes without saying that the speakers are not responsible for the summaries of their presentations provided here. We would like to thank each of them for agreeing to send us their presentation materials, which we have used to compile this syllabus. We hope you enjoy reading it.

L'équipe organisatrice



For the little stream that flows through the meadows is diverted into certain channels to soak the dry land and make the withered grasses green again; then, when everything is sufficiently irrigated, it gathers itself together and, returning to its bed, resumes its normal course with impetuosity.

Conrad d'Eberbach, The Great Exordium of Cîteaux (early 13th).

Présentation

Michel DUBUISSON

Secretary of the Charter



The first «Study Days» of the Charter took place in Lérins in 2023. The dual theme chosen for these first meetings was 'Cistercian heritage: climate and environment'. It seems that, beyond all the subjects that concern the members of the Charter, these two themes encompass them all, as they affect the places, spaces and buildings of our priceless European cultural heritage.

However, as the subject is vast, inexhaustible and highly topical, the participants and organisers quickly realised the need to explore certain aspects in greater depth. A more specific theme became obvious for the following days: the question of water.

This is a theme that has been extensively studied from a historical perspective...

Attentive visitors are often amazed by the extent of the millponds and river diversions, the degree of energy control of the currents, and the scale of the dykes, ponds, and drinking water distribution systems developed around certain abbeys by the disciples of Saint Bernard.

The subject of monastic hydraulics has continued to intrigue historians of technology over recent decades, as archaeological knowledge of these networks has deepened. The Royaumont symposium on Monastic Hydraulics, Environments, Networks and Uses, organised in 1992, marked an important milestone in this historiography. In its wake, numerous regional studies on Cistercian hydraulics have emerged over the decades¹. This topic is attracting more researchers than ever, as shown by a recent collective work, which features no fewer than 24 contributions from France, UK, Belgium, Germany, Spain and Portugal.

1. B. Rouzeau and A. Grégois: *Les cisterciens et l'eau. Hommage à Paul Benoit, Cîteaux, Commentarii cistercienses*, 2020, Bd. 71, Fasz. 1-4, 504 S.

... but less so from a contemporary perspective!

Paradoxically, contemporary water management in Cistercian sites has been less widely discussed, as if, with the departure of the monks during the Revolution, the monastic chapter came to a close and the issue of water became a closed case... if not a resolved one.

However, the upheaval in our living environments caused by climate change is reigniting concerns: repeated summer droughts in regions previously considered temperate, melting glaciers, rising sea levels, drying soils and, conversely, an increase in the number and scale of often destructive floods. Current events abound with examples of how the issue of water, whether in excess or in short supply, is already a challenge for the owners and managers of Cistercian sites.

What is more, beyond the specific needs set out in the Rule of St. Benedict, water use and the resulting hydraulic developments have changed and diversified: irrigation, flood prevention, energy sources, leisure activities, green spaces, fish farming. This raises a corollary question: that of water quality in more or less polluted environments.

Insights, exchanges, debates

As with the first «Study Days», the principle was once again that participants should benefit from the insights of leading specialists in the subjects covered: scientists, architects, field workers and historians (INRAE, Water Agencies, CEREGE, etc.).

Another benefit of these study days was that they gave members the opportunity to discuss with each other and with the speakers what they can do at their own level to address the issue. Change is here and adaptation is essential, whether by drawing on past experience and/or by inventing new solutions.

Brother Marie, prior of the community, welcomed the participants on behalf of Father Abbot Dom Vladimir, then gave a brief presentation of the community of Lérins and, more broadly, of its Cistercian congregation of the Immaculate Conception.

The President of the Charter, François Launay, then gave the following opening speech.

Opening speech

François LAUNAY

The President of the Charter



Ladies and gentlemen, Dear friends,

On behalf of the Charter, I would like to express our gratitude to the Cistercian community of Lérins and its abbot, Dom Vladimir, for welcoming us here in such favourable conditions.

I would also like to thank the scientists, architects, field workers and historians who agreed to come and speak at our study days. Finally, I would like to thank Michel Dubuisson for this rich programme, and Alain and Marie-Luce Aubry for organising and hosting the event.

So, welcome to all...

For this session, the theme of water was chosen because it has a particular impact on our locations, spaces and buildings; because the current climate change is affecting a cycle that we tended to believe was immutable.

This H₂O molecule, which is abundant on the planet, is synonymous with biological life. And since time immemorial in human memory, water has been associated with the idea of territories, because rivers and oceans structure them and thus contribute to shaping cultures.

Over time, controlling water has meant creating the conditions for human survival by domesticating the environment. The history of our abbeys is a fine illustration of this...

However, in seeking to gain complete control over the living world, mankind is faced with new challenges: the boomerang effect of choices, whether deliberate or not, poorly or inadequately assessed, choices that turn against life itself.

This is the case with carbon, which is so essential to life but which, when combined with oxygen, generates carbon dioxide CO₂. For more than half a century, this molecule has been identified as one of the key factors in the increase of the greenhouse effect in the upper atmosphere, and therefore in the risk of climate change.

But fossil fuel promoters have done everything in their power to turn a blind eye and dismiss whistleblowers as

hysterical prophets of doom. And here we are today. In recent years, we have seen concrete evidence of how much the Earth's thermal dynamics have been destabilised and how many unknowns there are.

Water is the primary vector for transporting all this surplus energy.

A few degrees above the average global temperature cause changes in both the air and the oceans.

And we realise that these changes in water circulation manifest themselves alternately in greater scarcity or greater abundance. And we realise the rise in the volume of the oceans and the melting of the glaciers. And we realise the worsening of climatic events that were already considered extreme. We are also taking stock of the growing scale of climatic phenomena that will have the most damaging effects on populations, living organisms and infrastructure, on our lifestyles and on the organisation of our societies. These effects are already underway and seem to be only a prelude to very serious consequences within one or two generations.

Ultimately, too little or too much water is impacting our lives and the entire living world, whether animal or plant.

Significant efforts have been made by nations to curb global warming, but they started late, and recently, the international context has proved unfavourable to coordinated action by all stakeholders, even tending to divert our attention away from these issues.

It is in this complex context, and as owners or managers of abbeys, that we are meeting in Lérins to try to address and anticipate the crucial issues facing the Cistercian built heritage that each of us is responsible for.

It should be remembered that the vast majority of the 2,300 Cistercian abbeys were established in uninhabited areas, often located in valley bottoms known to be unhealthy and damp. These places had no shortage of water, but the monks' settlement necessarily required considerable hydraulic engineering work.

It should also be noted that maintaining these communities over centuries meant constantly facing the challenge of controlling the water through ongoing maintenance, reconstruction and adaptation work.

Capturing, draining and channelling water, storing it in basins, reservoirs or ponds, using it for forestry – a source of income – using it as a source of energy for mills, tanneries and forges, maintaining plantations and vegetable gardens, watering domestic animals, washing vegetables, clothes and floors, ensuring the functioning of washbasins and the hygiene of latrines; digging and maintaining wells capable of providing clean water for drinking, bread and

cooking. And, of course, mixing mortar for construction. Such were the many uses of water in an abbey. The water passing through the abbey had to be regulated.

But the centuries passed and this golden age faded away. And over time, this heritage changed.

Rivers may have been partially diverted. Pipes or drains upstream may have been damaged, altering the flow of water around the perimeter or under buildings. Underground aqueducts may have collapsed downstream, contributing to damp rising in buildings, etc.

It is understandable that since those distant times, the succession of new owners linked to the division of land within or on the outskirts of large estates, voluntary or involuntary transformations, looting and wars have had an impact on water flow.

Nowadays, the hydraulic situations of these places vary greatly depending on their particular history, location and purpose.

But whatever the situation, the issue of water in an abbey directly affects the stability of the soil and therefore the buildings. The alternation between water shortages and surpluses linked to variations in rainfall naturally concerns site managers, particularly in regions with clay, sandy clay or limestone soils.

As an aside, let us add to these issues those of water quality. We know how much the excessive use of artificial inputs in agriculture affects biodiversity and therefore human health. Not to mention industrial and urban pollution. Water contamination lurks around every corner when these inputs circulate and accumulate in the body; but let us close this parenthesis...

With climate events occurring one after another, many owners or managers of Cistercian sites have now moved beyond questioning the causes.

They are, of course, wondering what they can do on their own scale to deal with it, while knowing that they will have to engage in dialogue with landowners on the outskirts, which is far from easy. They are wondering about new costs to come, and those whose economic model relies heavily on visitor numbers are concerned about an already unpromising global economic situation.

These are some of the contextual factors that we felt it was important to mention at the start of our conference.

As we can see, but unsurprisingly, there are some very serious issues to be addressed. And that is precisely the purpose of these two days in Lérins.

This shows how much we value your input.

Assessment of climate change on hydrological functions at the regional level

Marnik VANCLOOSTER – Engineer (University of Leuven)

Mr Vanclooster is a professor and researcher at the Faculty of Bioengineering at the University of Leuven and President of the Earth and Life Institute in the science and technology sector. The institute brings together 400 scientists, and one of its five departments focuses on climate change.

He completed a PhD in agricultural hydrology and unsaturated-phase hydrology.

His current interests and research focus on

- the interaction between agriculture and water resources, especially in southern countries, as well as the issue of water quality
- integrated water resource management with civil society actors.

He has also studied, among others, the Thau basin

The issue of water is now a major global challenge, from an environmental, economic, social and geopolitical point of view. While there is no shortage of water on a global scale, its geographical and temporal distribution is extremely uneven, particularly in terms of available freshwater per capita. It is estimated that a human being needs 1,800 m³ of fresh water per year (for direct or indirect use, to produce the goods and services consumed) to meet their basic and economic needs, but many regions of the world are far from reaching this threshold.

Climate change is exacerbating this pressure, with very concrete impacts at the regional level. Changes in precipitation patterns, rising temperatures and an increase in extreme events (droughts, floods) are already being observed, seriously disrupting the water cycle. For example, in the Thau basin in France, projections for 2070 predict a 10-15% decrease in rainfall, accompanied by a 2-4°C rise in temperatures. This type of scenario risks profoundly altering the balance of ecosystems and the human activities that depend on them.

The issue of water has several complementary dimen-



sions. Blue water, which we see in rivers and lakes or drink, is the most visible, but it represents only a fraction of the entire hydrological cycle. Green water, which is absorbed by plants and then evaporated or transpired, remains undervalued, even though it plays a fundamental role in ecosystems and agriculture. Grey water, which comes from domestic or industrial wastewater, poses growing challenges in terms of management, treatment and reuse. Furthermore, the distinction between fresh water and salt water highlights the physical limits of our ability to exploit certain sources, particularly given the high energy costs of desalination. Finally, virtual water – the water used to produce goods and services, often imported or exported around the world – highlights the invisible interdependencies between territories.

Water is also a key resource for the economy, although it has long been underestimated by decision-makers. It is essential for agriculture, industry, energy production and many other human activities. When this resource becomes scarce or uncertain, the economic repercussions can be considerable, particularly in regions where governance and infrastructure systems are fragile. The link between water and social, and even political, stability then becomes clear.

But beyond its utilitarian dimension, water also carries cultural and spiritual values. In many religions, it symbolises purification, life and connection with the sacred. This intangible dimension reinforces the importance of considering water not only as a resource, but also as a common good to be protected collectively.

UN Secretary-General António Guterres has repeatedly emphasised that water is at the heart of the Sustainable Development Goals for 2030 and beyond. Every 15 years, the United Nations reassesses the progress made, but the

challenges remain immense.

Current models, although useful, remain subject to numerous uncertainties, particularly due to future climate variability, consumption dynamics and upcoming political choices.

In light of this, there is an urgent need to reverse our way of thinking about the economy, society and the planet. Water can no longer be considered simply as an economic input or an adjustment variable: it is a pillar of life and sustainable development. Only then will we be able to develop water management policies that are resilient, equitable and sustainable.

The presentation given by Prof. Vanclooster is available at the following address: <https://cister.net/pdf/vanclooster.pdf>

Prof. Vanclooster also informed us that a video of a previous lecture on a related topic is available online at the following address: <https://www.youtube.com/watch?v=5iEEenVJNbfc&t=25s>

At the end of the conference, Prof Marnik Vanclooster (University of Leuven, Earth and Life Institute), who gave the introductory lecture, published this post (translated):

«Climate change requires appropriate water management to protect historic sites and cultural heritage. As a citizen of Bruges, I attach great importance to historic buildings and cultural heritage. And yes, climate change and water-related impacts are affecting these precious sites.

“This week, I had the opportunity to participate in a scientific seminar on the small island of Lérins, organised – perhaps appropriately, given my name – by the monastic community of the Lérins monastery. Organised by the Charter of Cistercian Abbeys and Sites, an association of owners and managers of historical cultural heritage sites across Europe and beyond, the seminar provided an opportunity to discuss how site owners and managers are integrating climate change into their operational strategies.

The topic is particularly relevant as many of these sites

are located in remote valleys and are increasingly exposed to the risks of drought and flooding.

We had the opportunity to hear from historians and architects who explained how ancient communities adapted their sites to difficult flood conditions. We also explored how current managers are designing drought-resistant gardens and parks. In the case of Lérins, for example, sea level rise projections add new constraints to future water management strategies for the island.

I also discovered the updated long-term projections for climate and water consumption in France, presented by Eric Sauquet from INRAE. As part of the Explore2 project, future water consumption was assessed according to three possible scenarios: one following current political trends, another incorporating moderately adapted public policies on climate, and the third envisaging radical changes in societal behaviour and public policies in response to climate change.

The study brought together experts in climatology, hydrology and political science to produce quantitative information.

The encouraging message from this study is that radical changes – towards a low-carbon society – can still significantly reduce the impact of climate change on future water consumption.

This, I believe, is still a message of hope.”



Almost no water in the garden: the Valsaintes experience

Jean-Yves MEIGNEN – Nurseryman (Valsaintes Abbey)



Our colleague Jean-Yves Meignen is Chairman/Director of SAS Le Jardin de l'Abbaye de Valsaintes, co-owner of this abbey with Mr Jean-Louis Moine. A nurseryman who has been working in Valsaintes for 30 years, he made a remarkable presentation at the last General Assembly of the Charter. The organising committee would like to thank him for agreeing to participate in our conference and share his practical experience on the subject of «Almost no water in the garden».

The entire history of the garden he created revolves around the issue of water. He has already given numerous lectures on this subject and is also a gardening columnist for *France Bleu Drôme-Ardèche* and *Rustica* magazine.

The Abbey of Valsaintes, a daughter of the Cistercian Abbey of Silvacane, is a place marked by a rich past. Like many religious sites, Valsaintes was sold to private owners during the Revolution.

Little by little, plots of land were bought back, giving rise to the current project. Originally, there was no question of creating a garden. The site was isolated, consisting of dry stone terraces, low walls and clay soil poor in humus. The initial objective was more about seeking solitude than enhancing the landscape. However, today the site welcomes nearly 12,000 visitors a year!

A nurseryman by profession, Mr Meignen was quickly confronted with a key problem: water. We are in the dry region of Provence. Not only does it rain rarely, but sometimes it doesn't rain at all.

Thirty years ago, the only water reserve on the site was an 80 m³ cistern located in the centre of the buildings, with

no trace of any ancient wells or water collection systems. Needless to say, this capacity was completely insufficient to supply a nursery. It was therefore necessary to create a 500 m³ surface storage basin. Drilling attempts were made as early as 1998, but the results were disappointing: a low flow rate of 1 m³ per day, with moisture detected in the rock at a depth of 20 metres. A grant enabled drilling to continue down to 40 metres in sandy sandstone, but without much success. At 80 metres, there was still no water. Since 1998, the flow rate has remained insignificant, barely 1 m³ per day.

The initial plan was to start with the rose, which was not the easiest option in this context. From 2003 onwards, the drought intensified. There was less and less rain and increasingly long dry periods. For example, this year there has been only 5 mm of rain since winter.

The result: a piping system was installed, but there was no water to circulate through it. The economic model was no longer viable, despite the knock-on effect of interest in the abbey and the garden. The initial project focused on the rose garden collapsed. A choice had to be made: abandon the nursery, which had become unviable, and move towards a dry garden model, better suited to local climatic conditions.

This dry garden was launched 13 years ago, covering 1 hectare (out of the 2 hectares of the property), and is only now beginning to attract attention. More than 200 species have been planted there, without watering. Today, the garden has more than 400 species, with the capacity to accommodate up to 1,000.

The plants that thrive there are all adapted to hot and dry conditions: reduced foliage, sometimes hairy or grey to reflect light, carpet or ball shapes, a strategy of losing leaves in summer (rather than winter), diffusion of protective essences, and double rooting to seek water deep underground.

A prime example is a 300-year-old oak tree growing in a rocky crevice, its roots deeply anchored. A small almond tree even sprouted on its own on a rock, remaining 20 cm tall for years before growing without watering in a 100% natural environment.

This logic goes against the common belief that young plants must be watered. Here, the plants settle in slowly but surely, as long as they are given time.

Horticulture has changed profoundly in 40 years, and many nursery growers in the South are questioning their practices. The dry garden at Valsaintes demonstrates that it is possible to create ornamental Mediterranean vegetation that is attractive, resilient and requires little water.

From the outset, Mr Meignen also chose to plant densely. It is a winning strategy: the plants touch each other, cover

each other, protect the soil from heat and limit evaporation. Dead leaves create natural mulch, a phenomenon that is still relatively new in the history of gardens. The soil stays cool and weeds are kept at bay.

A Belgian company did attempt to develop natural herbicides, but without success. Here, we have reached a point where weeding is almost unnecessary.

Six years ago, another project was launched: the creation of a vegetable garden – with no historical pretensions – in a shallow, south-facing area where temperatures can reach 45°C in summer. Thanks to mulching and composting techniques, using garden waste, the soil was quickly enriched. What would have taken centuries naturally was accelerated. Planting hops quickly created shade, encouraging other species to grow.

The project took shape to the point where a new building had to be constructed (to the right of the church), with water collected from the roof (20 m³) and the neighbouring restaurant. A large above-ground 80 m³ (4 m high, 12 m wide) tank, assembled from sheet metal and plastic sheeting and secured with 2,500 bolts, is used to water the garden. Despite this additional capacity, 50 m³ per week are needed for the vegetable garden, which empties the entire site's reserves in 12 weeks. For the past three winters, rainfall has been above average, but if it falls again, we will have to revert to a system without irrigation.

If the rainfall norm drops to 500 mm per year, we will enter a truly desert climate.

Water remains a precious and uncertain resource. A nearby wetland is another potential source. This is where a former gardener used to cultivate a vegetable garden, 500 m from the abbey.

Finally, it should be remembered that the Alpes-de-Haute-Provence region was largely reforested in the 19th century, after having been completely deforested – partly, it is said, due to exploitation by monks.

Today, the Gardens of Valsaintes Abbey do not sell a grandiose historical monument – we only have a church – but a living, modest and resilient project. Despite 12,000 visitors a year and 15 employees, the garden remains the poor relation of the site: it barely covers the cost of two gardeners. And yet it is a model of sober, adapted gardening with a promising future.

The presentation material for JY Meignen's talk is available at the following address: <https://cister.net/pdf/meignen.pdf> - Mr Meignen also provided this link to a video of a related conference given in November 2024 (see 1:37): <https://www.youtube.com/watch?v=YxqQa2Di2hk>

Water resources in France in 2050

Eric SAUQUET – Engineer (INRAE)



During the first study days in 2023 on the theme of «Cistercian heritage: climate and environment», two topics already concerned the theme of water, and we had already had the opportunity to welcome Eric Sauquet, Director of Research in Hydrology, Project Manager in the AQUA department at INRAE, who gave a presentation on «French rivers facing the challenge of climate change». His research focuses on the impact of global change (including climate change) on the hydrological regime and issues of adaptation in water management practices.

When we contacted him again in January this year to tell him that we wanted to devote two whole days to the topic of water, Eric Sauquet immediately mentioned a study that had just been published on water use in 2050 (as part of France Stratégie), in which he had participated. The study focused on low water levels, conflicts of use, water resources, etc.

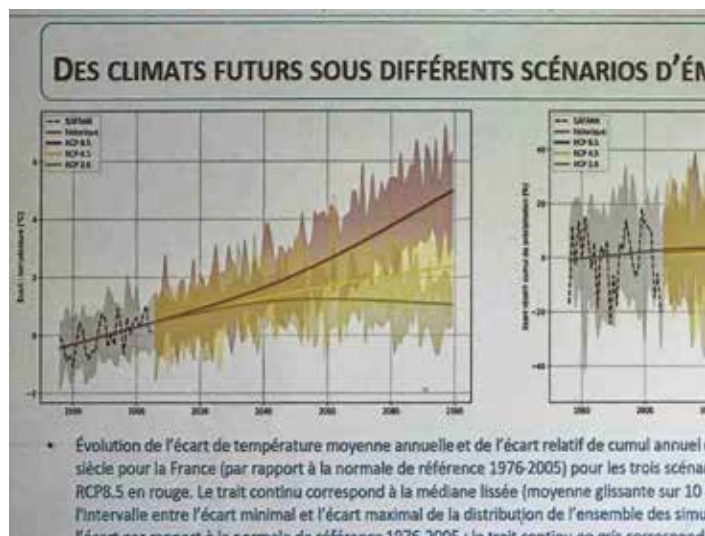
The topic was therefore obvious: «Water resources in France by 2050».

Under the most unfavourable climate projections studied for the period 2020–2050, the scenarios show contrasting trends in water demand depending on the sector and the policies envisaged.

In a trend scenario – i.e. in the absence of major changes in usage or public policy – annual water demand would stagnate, with a slight increase of around +1%. On the other hand, scenarios incorporating proactive public policies show a decrease in demand: -24% in the «public policies» scenario and up to -47% in the «disruption» scenario. This decrease is mainly due to reduced water requirements for energy production, particularly in the Rhône Valley.

However, a major point of concern is agricultural irrigation. Under the combined effect of increased physiological needs of plants (linked to global warming) and the development of irrigation equipment, water demand for this sector is rising sharply: +102% in the trend scenario and +72% in the «public policies» scenario. Only the disruption scenario manages to contain this increase.

As a result, agriculture's share of water withdrawals continues to grow. This trend leads to increased concentration of water demand during the hottest months, precisely when the resource is naturally at its lowest in aquatic environments. This seasonal mismatch between water demand and availability poses a major challenge for sustainable resource management.



The presentation supporting E. Sauquet's speech is available at the following address:

<https://cister.net/pdf/sauquet.pdf>

The evolution of water demand and its future management in France

Marielle MONTGINOUL – Economist (IRSTEA)



During our discussion in January, Eric Sauquet also referred us to one of his colleagues at INRAE in Montpellier, Ms Marielle Montginoul, who agreed to expand on Eric's presentation from an economist's perspective.

As Director of Economic Research at the UMR G-Eau in Montpellier and Chair of the Scientific Council of the Rhône-Mediterranean Basin Committee, Marielle Montginoul has been working for many years on topics that are at the heart of current water issues, using a variety of research methods and techniques: the reuse of treated wastewater and its acceptability; groundwater management through quotas and allocation, markets and economic instruments; smart meters; water pricing structures and their water or social efficiency.

Her thesis in economics, completed in 1997, foreshadowed some of the wide variety of her future research areas. It was entitled: «An economic approach to irrigation water management: instruments, information and stakeholders». Marielle Montginoul conducts both research and

expert work in the field of water with a view to supporting public policy.

Historically, water consumption projections have sometimes led to oversized investments, as was the case in the 1970s in Nantes and Paris. These investments were based on expectations of strong growth in demand, which proved to be greatly overestimated.

A turning point came in 2003, with a sharp drop in water consumption. This decline, which has not yet been fully explained, seems to be linked to a combination of factors: environmental awareness, modernisation of sanitary facilities, improved network efficiency and, perhaps, broader societal changes.

Today, the issue of future water resource management is becoming critical, especially as demand is likely to exceed supply in many areas. The Water Plan, presented in March 2023, places this issue at the heart of national priorities, with a particular focus on two complementary approaches: sobriety and efficiency.

Sobriety is based on the voluntary reduction of consumption, while efficiency aims to make better use of every litre of water. The example of drip irrigation illustrates this duality well: although this technique allows for apparent water savings at the local level, it can, paradoxically, lead to intensification of agriculture, expansion of irrigated areas, or the adoption of crops with higher added value – all of which ultimately increase the use of resources, particularly surface water.

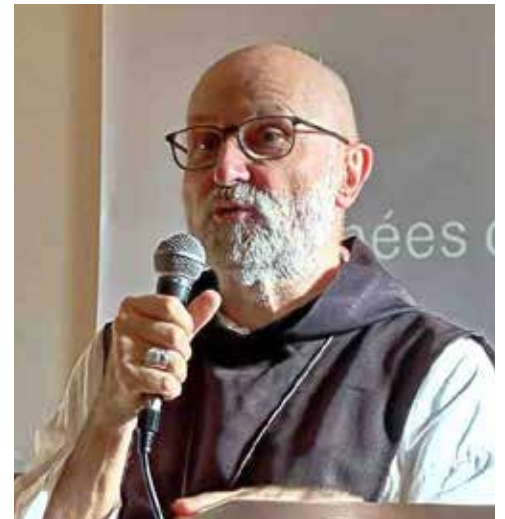
Ways to improve efficiency are emerging, notably through the use of artificial intelligence, which could optimise usage and decision-making in real time. In the specific case of the heritage and monastic sites we manage, the use of drip irrigation makes perfect sense: as we have no intention – nor the possibility – of expanding our land area, this technology allows for precise and sustainable water management without encouraging expansion or intensification.

The presentation given by Marielle Montginoul is available at the following address:

<https://cister.net/pdf/montginoul.pdf>

Living with water at Lérins Abbey, yesterday, today and tomorrow

Dom Vladimir GAUDRAT – Abbot of Lérins



Dom Vladimir is the Father Abbot of Notre-Dame de Lérins, the last island monastery in France.

Originally from Val-de-Marne, it was after a retreat at this monastery that Vladimir Gaudrat, a medical student, felt called to monastic life. He entered the monastery in 1982, 43 years ago.

He was initially – to use the terminology of Ecclesiastica officia – a kitchen assistant. After returning from two years of study in Rome, he was then put in charge of the impressive library and the training of the community.

He became prior in 1995 and was elected abbot in 1998 at the age of only 43.

In 2023, we were blown away by his presentation at the symposium organised in Lérins by the Charter on «Cistercian Heritage: Climate and Environment», when he illustrated on a local scale the challenges that Lérins will face in the future and the community's extraordinary capacity for adaptation, with its rare ability to integrate long-term (past and future) thinking and decision-making, collegiality, multidisciplinary and social responsibility. The opportunity was too good to pass up to ask him to repeat his presentation for these new conferences and to explore the hydraulic dimension in greater depth.

Fresh water and bitter water

This subject can be understood in at least two ways, since we are on a small island. We must also be aware, of course, that our history only became Cistercian in the second half of the 19th century.

It can be understood as living with fresh water because even in the Egyptian desert, there can be no cenobitic monastic life without sufficient drinking water for the community. But on a small island, it can also be understood as living entirely surrounded by the vast mass of salt water that is the sea, which can be potentially threatening. It is significant that in the life of Saint Honoratus, one of the oldest texts about this island, we find this dual perspective on water.

«*So, under his leadership, a church sanctuary was built to welcome God's chosen people, and buildings suitable for monks to live in were erected. The waters, absent for centuries, flowed abundantly, reproducing, by their mere appearance, two miracles from the Old Testament. Indeed, springing from the rock, it was fresh water that flowed, in the midst of the bitterness of the sea. Already, those who sought God flocked there from all over the region*»².» Hilaire d'Arles refers here to the story of the Jewish people's journey through the desert as recounted in Exodus, with two miracles: one when Moses brought water from the rock at Horeb³, and another when, at his prayer, the bitter waters of Mara became sweet⁴. But the bitter waters of Mara refer to the bitterness of the sea water that surrounds the abbey on all sides. Honorat is thus evoked, like many founders of monastic life, as a new Moses leading his people into the desert. When Western Christians wanted to follow the example of Eastern monks, they were confronted with the difficulty that in the north-western quarter of the Mediterranean, the desert does not exist as a geographical reality. This has been fairly well studied today, but the closest equivalent to the desert that they found were the small islands, hence the notion of the island desert found in most Latin monastic authors of the second half of the fourth century and the first half of the fifth century.

This contrast between sweetness and bitterness, with the same references to the Book of Exodus, can already be found in the oldest text that can be attributed to the Lérinian milieu, Eucher of Lyon's eulogy of the desert, which can be dated to the end of 427 or the beginning of 428, while the text commonly known as the Life of Honoratus is a homily delivered by Hilary of Arles in 432. The figure of Moses as the founder of desert life is evoked there: *"For the Lord relieved him of his fatigue with an unexpected miracle: they were thirsty, so he struck the rock and water gushed forth; the new spring flowed in streams over the astonished stones... But*

*he did not just cause this torrent to burst forth from the parched bowels of the stones: he made the bitter waters sweet*⁵." At the end of this letter – an emblematic treatise of the Lérinian milieu – Eucher refers to the abundance of fresh water found on the island: *"Water abounds there, grasses grow green, flowers shine, and the delightful sights and scents make it a paradise for those who possess it, as they will possess it*⁶." Hilary of Arles describes in a similar way the transformation of the island from a frightening desert into the camp of God⁷.

In the 5th century, this island was considered to have an abundance of fresh water.

Wells and cisterns

There is therefore fresh water on the smallest of the Lérins Islands, which is not the case on the larger island, where the Romans installed a whole system of cisterns, part of which still exists today. This undoubtedly explains why the smallest of the archipelago's islands was chosen as the site for what would become an iconic place of monasticism. The perception of this water as transforming the island into a quasi-paradisiacal place is very emblematic of Mediterranean culture, which sees water primarily as a source of life and blessing, which is not the case in all cultures.

In articles dating from 1965, one of which is available on the internet⁸, G Palausi studied the origin of the water found on our island and showed that *"the water from the well on Saint-Honorat Island cannot come from atmospheric precipitation, that it has the same chemical composition as the water on the mainland, and that the region's significant karstic regime lends itself to distant underground circulation. We can conclude that the Saint Honorat well is certainly fed by water that has infiltrated the Jurassic levels of the mainland from La Siagne*." He also showed that there are other freshwater resurgences, particularly in the sea to the south of our island. The well provides a relatively abundant supply of water, but with two periods of low water in February and August. The level of the well is also sensitive to variations in sea level and therefore to tides and wind. It is mixed with a small amount of sea water and its salinity is thought to have increased steadily (already mentioned in 1965), but this remains to be proven and studied. We have not made much progress today in studying this water resource, which is now considered undrinkable, mainly because of its salinity, and which is used for watering crops and a few other tasks, such as cooling the still during distillation. This well is mentioned throughout history when talking about the island. Unlike what we know about Sainte-Marguerite Island, we do not know whether the monastery had cisterns

in the early centuries of its existence, although this seems likely. No traces of cisterns have been found in the excavations that have been carried out, but there are many other areas to be studied.

It was not until the construction of the medieval cloister in the 12th century that traces of a rainwater collection system were found to supply the Roman sarcophagus used as a washbasin. Later, during the conversion of the tower on the south side of the island into a monastery, a very large cistern was built in the 13th century⁹ on the first level of the tower, fed by the roofs of this large building. There are also the remains of a cistern near the Trinity Chapel, fed by the roofs, but its dating is highly debated, given the transformations this building has undergone over the centuries¹⁰.

Water from wells and cisterns was the freshwater supply system that was put in place when the monks returned in 1869. Some of the improvements to the well even predate the community's return. In 1830, Jean-Louis Sicard, who had just bought Saint-Honorat Island, had a round tower built over the Saint Honorat well, covered with a layer of pebbles and topped with a windmill that powered a pump¹¹. Today, there are two reservoirs for storing water from the well (one used for firefighting and the other included in the round tower). I imagine that when the orphanage was built, a second well was dug near it. Groundwater from the mainland can therefore be accessed at several points on the island. Although I do not know the exact date, the Cistercian monks built two large cisterns to store rainwater, one at to the east of the abbey church and the other in the farmyard. I have no clear idea how water was managed between 1880 and 1960. I imagine that the water from the cisterns was mainly used for watering. Today, there is still a system of pipes bringing water from the well to different areas of the monastery and to the restaurant. There was no running water in the cells at that time, but after the Second World War, there were at least cold showers in the basement, which were used sparingly. There is no mention anywhere, at least in what I have read, of any feeling of water shortage. The first document to mention this issue in relation to tourists is the Nice *Matin* article discussing the arrival of water from the city of Cannes on Saint-Honorat Island.

Water from Cannes

The major change in water supply came on 26 August 1961¹², when water from the city of Cannes began to arrive via an underwater pipeline, which seemed to secure our island's water supply once and for all. Paradoxically, this

arrival of abundant and seemingly inexhaustible water will lead to the abandonment of cisterns, which will no longer be connected to roofs as they are repaired, and the creation of a system for draining rainwater into the sea (potentially linked to the wastewater system, unfortunately), as they are no longer considered an easily usable water resource. It is interesting to note that the Nice *Matin* article celebrating the arrival of fresh water from the mountains on Saint-Honorat Island mainly refers to its use by tourists and for firefighting, but makes no mention of how it can be used by the community, even though this is also a major change in the life of the community.

However, current climate change, with two years of intense drought in 2022 and 2023, has clearly shown that water is no longer (in fact, it would be better to say is not, as this has never been the case) an inexhaustible resource and that we need to question our water management. In fact, much more than usual and despite restrictions on water use, we have had to water the olive trees and part of the vineyard much more than usual during these two years of severe drought in order to preserve the harvest. It is also clear that temperatures are rising and that the seasonal rainfall patterns characteristic of our region are changing, with increasingly intense periods of drought to be expected.

Fresh water on Saint-Honorat Island today and tomorrow

The main source of water today comes from water transported via an underwater pipeline. An article in Nice *Matin* in 1961 stated that the first pipeline had a potential lifespan of 50 years and, in fact, it was rebuilt around 2010. Due to the *Posidonia* seaweed present in the stretch of sea between the two islands, another solution was sought at the time to supply the island with water, such as the creation of a very large cistern periodically refilled by boat, but no other solution was ultimately feasible. This water supplies the community, the hotel and restaurant, as well as the Saint-Salvien house for groups. There are two water points available for tourists on the island. There was also a public shower supplied by this water in the sheltered harbour managed by the municipality on the island, but as part of the harbour renovation programme, it is planned to remove it, in line with the policy of most municipalities in beach management. Apart from the fact that this water is not used for watering or for the needs of the cellar and distillery, we have not yet considered reducing our water consumption.

Well water is used for all agricultural purposes and for watering the gardens (where we have a drip irrigation sys-

tem in place). We only have plants in the gardens that do not require much watering. We do not have drip irrigation for the vines and olive trees (except for the conservation orchard that we are currently planting). Ultimately, we need to rethink these agricultural practices. But this requires a thorough study of this water resource in terms of quantity and also the possible increase in its salinity. This also applies to its use for the distillery and the cellar.

Ultimately, we will also have to reuse the cisterns by re-connecting them to the roofs, possibly for watering.

One of the latest avenues for freshwater supply concerns wastewater treatment.

We do not currently have a centralised, efficient wastewater treatment system. We are considering treatment in two areas: the restaurant and the community and hotel areas. The community and hotel areas would be treated using micro-lagooning with reeds. A recent change in the law makes it possible to use this water for watering after treatment.

A flat island surrounded by salt water

Our flat island, whose highest point is 8 m above sea level, faces two major risks.

We are in a tsunami risk zone, even though tsunamis in the Mediterranean are not like those seen in films. The city of Cannes has conducted a tsunami risk study on the island, which shows that there are easily accessible refuge areas in the centre of the island.

Rising sea levels are likely to cause problems in certain areas of the island, particularly the south-east coast, which is the flattest and where problems may arise. We will need to carry out a study in the coming years.



2. Hilaire of Arles, *Life of Honoratus* 17

3. Exodus 17:1-7.

4. Exodus 15:22-25.

5. Eucher of Lyon, *Praise of the Desert* 11.

6. Eucher of Lyon, *Praise of the Desert* 42.

7. Hilary of Arles, *Life of Honoratus* 15 and 16.

8. http://paleopolis.rediris.es/benthos/REF/som/R-pdf/1965-36-52_237.pdf

9. *History of Lérins Abbey*, pp. 282-292.

10. *History of Lérins Abbey*, p. 299.

11. *History of Lérins Abbey*, p. 467.

12. Nice *Matin* article dated 27 August 1961. See:

<https://cister.net/pdf/gaudrat.pdf>

Architectural heritage put to the test by water

Renzo WIEDER – Architect (Architecture et Héritage)

Renzo Wieder, an engineer and architect with a degree in architecture and heritage restoration, trained at the Delft University of Technology in the Netherlands. He has been practising since 1984 and has solid experience in the conservation and preservation of old buildings, whether or not they are protected as historic monuments. He himself has a particular interest in murals, archaeology and scientific research on authentic elements.

The Architecture et Héritage agency, which he chairs, has four collaborating architects and an art historian in charge of documentary studies. Depending on the nature of the projects, the team is supported by various specialists (engineers, restorers, economists, etc.). The Architecture et Héritage agency is currently working on the consolidation of the abbey church of Sénanque.

Water, in all its forms – liquid, gaseous, or even symbolic – has always posed a fundamental challenge to architecture. It is at once a source of life, an element of purification, and a potentially destructive force. There are many examples that illustrate this ambivalence: the mikveh in Cavaillon, the traditions of purification by water seen in Morocco, and religious representations of water, such as in a stained-glass window recreated in Marseille, a faithful reproduction of a 19th-century work.

But beyond these spiritual or aesthetic uses, water confronts buildings with unavoidable physical realities. For example, water in the form of vapour must be taken into account, as it penetrates walls, circulates in the indoor air, and directly influences comfort and the preservation of materials. At 0% relative humidity, a space becomes uncomfortable or even harmful to humans – so aiming for total dryness in a building makes no sense: what we need to strive for is balance.

Water is also a physical substance with specific properties. Unlike air, it is incompressible. This has practical implications for how it behaves in the event of a leak, infiltration,



or accumulation in a structure. Understanding water-related problems therefore requires a good knowledge of the internal dynamics of the building, careful observation of visible effects (cracks, mould, capillary rise), but also the ability to anticipate what is not immediately visible.

Water is neither simply a friend nor purely an adversary. The real challenge is to understand what it is trying to do, how it circulates, and how architecture can, or cannot, adapt to it. Since ancient times, climate cycles have undergone significant variations – even if the current situation is unprecedented – but the water cycle itself remains constant. This means thinking of buildings as dynamic entities, in constant interaction with ambient humidity and water movements.

In Annecy, for example, defensive architecture has taken advantage of water: thick V-shaped walls both resist infiltration and use water as a defensive element. In Lyon, the cathedral is located below Fourvière because the heights were not occupied in ancient times – a topographical choice influenced, among other things, by the proximity of water.

Humidity is also a matter of time. It can sometimes take a whole year for a building to start «breathing» naturally and for excess humidity to balance out. This can be seen in the woodwork: creaking, cracks, warping. That is why it is essential to take these phenomena into account before, during and after construction work.

Among traditional building materials, lime is emblematic of architecture that interacts with water. Used since before ancient times, it can be found in ancient structures such as the ruins of an aqueduct near Aix, which has remained unchanged for a century. Quicklime, obtained by calcining stone at around 900°C, is extremely reactive to water – it «bubbles» when immersed in water to extingui-



sh it. This slaked lime, called air lime, hardens on contact with air and is ideal for breathable masonry.

Conversely, hydraulic lime contains clay impurities, which allow it to harden on contact with water – a useful property for certain humid environments. However, the choice of lime must be adapted to the local climate. A striking example comes from Singapore, where, as part of the restoration of a former convent of the Ladies of Saint Maur, the use of air lime was considered. However, in this extremely hot and humid climate, air lime never hardens! The teachers therefore recover their material intact for the next class... Proof that each context imposes its own constraints.

The Abbey of Sénanque, well known for its lavender fields, offers an interesting example of water management. It uses very little water – mainly rainwater – but is crossed by the Sénancole, a stream that can cause flooding, especially when it carries water from neighbouring farmland. The stream flows directly under the buildings, which requires great vigilance.

As part of the restoration of the abbey church, the community wanted to replace the furniture. Unfortunately, a design error was made: the wooden components were not designed for the local climate. Manufactured in Charente, the furniture was immediately delivered to Provence, where the climate is particularly unstable, with sudden changes from cold and damp to hot and dry. As a result, the furniture, subjected to these variations, has developed persistent cracks.

Swelling clay soils pose another challenge. The prin-

ciple of a simple foundation only works if the soil is stable. However, differential subsidence is sometimes observed, causing cracks and even the partial collapse of buildings. Older buildings were often better adapted to this than some newer ones. For example, a poorly founded modern extension to a railway station has completely deteriorated, while the older main building has remained stable.

Today, soil studies are mandatory, even for historic monuments, in order to avoid such problems. It is also crucial to avoid any development around buildings that could capture or retain excess water.

The management of stagnant water is also essential. In Saint-Hilaire, barbicans allow accumulated water to be drained away so that it does not place excessive pressure on the walls. This is because it is much easier to get water into masonry than to get it out. It can take years.

The presentation material for Renzo Wieder's talk is available at the following address:

<https://cister.net/pdf/wieder.pdf>

Water, between nature and creation: a source of inspiration for contemporary artists

Sarah GUILAIN (François Schneider Foundation)

Given that all the sites covered by the Charter have a close connection with water, and that many of them are also cultural centres hosting various exhibitions, it was appropriate to include this artistic dimension in our conference on Cistercian hydraulics. The «academic» part of our conference therefore ended on a slightly different theme from the previous ones, as it addressed a purely artistic dimension.

Alongside the study of the development plan for Pontigny Abbey, La Charte discovered the activities carried out by the François Schneider Foundation. This foundation is setting up a tourist and cultural centre dedicated to the theme of the Earth. Micheline Durant and Bernard Aléonard, from the Friends of Pontigny association, regularly talk about it at La Charte with great enthusiasm.

Ms Guilain is responsible for the artistic projects and collection of the François Schneider Foundation in Wattwiller. With a bachelor's degree in history and a master's degree in museology, she coordinates the centre's artistic activities.

The François Schneider Foundation, created in 2000 and recognised as a public utility since 2005, pursues a dual commitment to education and culture. In particular, it offers scholarships to young high school graduates to enable them to access higher education, while supporting contemporary artists in the development of their careers.

The Foundation is currently investing in Pontigny Abbey with several artistic projects related to the theme of Earth. The Foundation is also active at another site, this one non-Cistercian, located in Wattwiller, Alsace.

Inaugurated in 2013, the Wattwiller Art Centre offers visitors an exhibition space dedicated exclusively to the theme of water. The François Schneider Foundation in Wattwiller is a unique institution in Europe. Since its creation, it has encouraged and exhibited contemporary artistic works exploring this element in all its dimensions – plastic, poetic, aesthetic, geographical, political and scientific. Every year, the Foundation organises an international competition, «Talents Contemporains», which rewards between four and seven emerging artists working on the theme of water. It then acquires their works to enrich its collection, which now includes more than 105 artists.

The temporary exhibitions are all devoted to water, exploring its many facets: source of life, mirror of our societies, precious resource, devastating force, symbol of purification or memory. Past exhibitions include «The Mechanics of Water,» «Geology of Floods,» «Shifting Territories,» «Confluences» and «The Impermanence of Water,» all of which illustrate the richness and diversity of perspectives on this theme.

The presentation material for Sarah Guilain's talk is available at the following address:

<https://cister.net/pdf/guilain.pdf>

Hydraulics between ancient networks and contemporary issues



Benoît ROUZEAU – Historian and archaeologist (University of Picardy)

In 2008, Benoit Rouzeau defended his thesis under the supervision of Paul Benoit at the University of Paris 1: *The hydraulic and industrial heritage of Morimond Abbey between its foundation and the Thirty Years' War.*

After working as a research fellow at the Laboratoire de médiévisique occidentale de Paris between 2008 and 2021, he has been a senior lecturer in medieval history and archaeology at the University of Picardie Jules Verne since 2021.

His research topics include public housing, monasticism (mainly the Cistercian order), the history and archaeology of technology, the anthropisation of medieval rural areas, and legal practices (e.g. marriage rights, wills, court rulings/arbitration, privileges/exemptions, donations/sales/credit agreements).

Since 2020, he has been organising a research programme entitled *Cistercians and Resource Exploitation* with Danielle Aribet-Deroin, and since 2018 he has been co-directing a collective research programme entitled *Landscapes*,

Location and Architecture of Monasteries between the Seine and the Rhine from the 12th to the 18th Century.

Michel Dubuisson took the opportunity to pay tribute on behalf of the Charter to the memory of Paul Benoît, who passed away at the end of last year. Professor Emeritus of History at Paris 1 Panthéon-Sorbonne University and a specialist in the history of technology, he developed experimental archaeology, particularly at Fontenay Abbey, with the reconstruction of the abbey's water wheel and hammer. This historian and archaeologist shared his scientific knowledge with a wide audience. He had regularly participated in the Charter's activities over the last few decades, particularly in guide training meetings. A recent collective work, which included no fewer than 24 contributions from France, the United Kingdom, Belgium, Germany, Spain and Portugal, paid tribute to him in 2020, under the title «Les cisterciens et l'eau» (The Cistercians and Water), edited by B. ROUZEAU and A. GRÉLOIS¹³.

In his presentation, Benoît Rouzeau offered a structured overview of water use in a Cistercian monastery, drawing on various thematic chapters and examples from the field.

He began by recalling the foundations of the Rule of Saint Benedict, which governs monastic life and forms the basis of Cistercian practices. When the Cistercians appeared in the 12th century, they entered a landscape already marked by the presence of numerous Benedictine monasteries, which had often developed complex hydraulic infrastructures – as evidenced, for example, by the plan of Christchurch. With the arrival of the «Cistercian lightning bolt» (Robert Fossier), the white monks found relatively advanced hydraulic expertise, and their mastery of water was gradual.

Among notable hydraulic devices, the example of Igny Abbey illustrates the ingenuity of Cistercian installations: an underground aqueduct carried water by gravity to the cloister. Other cases show the decisive importance of water in the choice or adaptation of monastic sites. For example, Clairvaux Abbey, founded in 1115, was moved a few hundred metres closer to the sources of the Saint-Bernard stream; a similar move is documented for Morimond Abbey, also motivated by a need for access to water.

Water also had a spiritual and ritual dimension, particularly through liturgical or domestic uses, as illustrated by the case of Maubuisson, with a drinking water supply system that enabled the mandatum (washing of hands or feet). The management of rainwater and groundwater was

also a particular focus: drainage networks, sometimes very elaborate, were set up to remove water from around and under buildings.

Water also played a central role in the subsistence of communities. Fish farming, often practised in ponds built by monks, as at Longpont Abbey, ensured that food was produced in accordance with monastic rules. Similarly, mills were essential for grinding wheat; some abbeys made intensive use of them, while elsewhere old mills were dismantled when the Cistercians arrived.

Water was also piped to workshops and kitchens: at Rievaulx, large vats bear witness to the scale of activities, particularly tanning. Beyond these utilitarian uses, the monks also took care to protect their buildings from unwanted water, while providing water points for livestock in the enclosure.

Amenities for pleasure were not absent, although they were secondary in medieval times. Watering gardens is mentioned in the plan of St. Gall, and later examples, such as Fontaine-Guérard or Beaupré in modern times, testify to the increasing refinement of landscaping.

Finally, Benoît Rouzeau emphasised the importance of regular maintenance of all these infrastructures to ensure their long-term effectiveness.

He then proposed a typology of the sites represented at the round table, classifying them according to their hydrological situation:

- sites where monks built millponds to capture and direct water,
- those located at the head of the watershed, where ponds were built for regulation and storage,
- confluence sites, benefiting from several watercourses,
- and finally, special cases, whose specific characteristics warrant further study.

The presentation given by Benoît Rouzeau is available at the following address:

<https://cister.net/pdf/rouzeau.pdf>

Round table:

«What about my abbey tomorrow?...»

In order to prepare and inform the final part, the «round table» discussion, participants in the conference

1. De B. Rouzeau und A. Grélois: *Les cisterciens et l'eau. Hommage à Paul Benoît, Cîteaux, Commentarii cistercienses*, 2020, Bd. 71, Fasz. 1-4, 504 S.

were contacted in advance and asked to spend a few minutes answering the five questions below. These questions, helped to better identify the main challenges facing each site represented in terms of water management.

- When was your abbey founded?
- Is its ancient hydraulic network known? In detail? Partially? What elements are known/unknown?
- If you do not own/manage the entire ancient hydraulic network, which parts of it are part of the plot that you own/manage?
- What types of problems do you face (flooding, seepage, collapses, droughts, etc.)? Can you explain them?
- What solutions have already been implemented (or envisaged) to overcome these problems?

Whether they were in-depth reflections or simply testimonials or impressions, as specialists or enthusiasts of your site, all feedback was welcome!

The round table, whose discussions were prepared and moderated by Benoît Rouzeau and Michel Dubuisson, brought together a number of heritage sites: Busnière-les-Nonains, Cercanceaux, l'Escaladieu, Fontmorigny, Grandpré, L'Étoile, Maubuisson, Petit-Cîteaux, Pontigny, Royaumont, Saint-Maurice, Tabosa, le Thoronet, Valsaintes, Vauluisant, Villers.

Their representatives exchanged experiences on several common issues. Discussions focused in particular on water shortages caused by blocked millponds or dried-up springs,

problems such as the proliferation of aquatic plants in open canals or ponds, and odours associated with plant decomposition.

Some sites face an overabundance of water, causing flooding during heavy rainfall, due to old networks that are blocked, poorly maintained or undersized.

Other concerns relate to infrastructure maintenance: the risk of collapse of collectors located under buildings, rising damp in walls due to faulty drainage systems, and the maintenance of cisterns.

Particular attention was paid to the consequences of certain works carried out after the Revolution, such as the raising of road surfaces, the capture of springs or the cultivation of former ponds, which sometimes disrupted the old hydraulic networks.

The discussions also highlighted solutions that had already been considered or implemented by monastic communities, such as repairing drains, restoring water supply and drainage networks, vaulting open collectors, dredging canals and raising floors.

Ultimately, one conclusion was clear: improving our knowledge and understanding of ancient networks enables us to better preserve them and adapt them to current challenges.

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