

WATER AS A DESIGN MATERIAL IN NINE PLANS OF LE NÔTRE; a topological study of relations between ensemble, river and settlement

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• *Abstract:*

The plans of Le Nôtre have been extensively researched at the level of parks by many authors. In this paper we want to focus on an analysis at the level of the park design in relation to water system and settlement. Nine plans — Chantilly, Fontainebleau, Marly-le-Roi, Meudon, St. Cloud, St. Germain-en-Lay, Sceaux, Vaux-le-Vicomte, Versailles — are analysed on the basis of their topological structure in relation to water and water system. We will research the different relations in different sites. On top of that we will research three cases in particular with special reference to water, the relation to the river and the way water is used as a design material at different levels.

The results show a rich variety of solutions in the nine plans; it shows the mastery of Le Nôtre as a landscape architect. Remarkable is also the variety of design solutions at the different levels of intervention, yet in a strong structural coherence. The plans of Le Nôtre are not only important as historic artifacts that show us design as an expression of the culture of past times. For landscape architects today, they also can be a source of inspiration for contemporary design tasks, not to imitate but to apply the principles. These principles need to be made explicit by systematic analysis and research; to make them applicable for a design contribution in contemporary society. For instance in the case of the contemporary problem of water storage for the new water management policy for the 21st century. One of the key issues in this water management is the storage of water. Le Nôtre did also conserve water; to feed the numerous fountains and waterworks. He did not only achieve this storage capacity in technical sense, he also created this in a superior composition and design solution that still impresses people in the 21st century from all over the world.

• *Keywords:*

landscape architecture; Le Nôtre; structure; design at the regional scale; precedent analysis; design principles, levels of intervention, water as design material

1. Introduction

In the 17th century, Le Nôtre designed a series of parks and gardens for mansions, castles and stately homes. Versailles is the best known of them but he worked also on other cases like Vaux-le-Vicomte, Chantilly etc. They have been extensively researched from different viewpoints like historical and compositional viewpoint. [18; 35; 40; 44; 51]. Very few have made comparative studies of the different plans of Le Nôtre [49].

In this paper we research the relation between castle, garden, park, grand canal, axis and settlement with as special focus on water as a design material. More precisely: how these seven elements are related in nine plans of Le Nôtre. The nine plans are: Chantilly; Fontainebleau; Marly-le-Roi; Meudon; St. Cloud; St. Germain-en-Laye; Sceaux; Vaux-le-Vicomte; Versailles. Le Nôtre used water in all of his plans as a major element. Here we focus on water at different

levels of intervention; rivers as major structures in the landscape, strongly related to topography and geomorphology, grand canals and smaller elements. All plans are located around Paris. The different relations are being researched as a topological structure; it shows merely the relations not reflecting the real distances.

Goal of the research is to find out how Le Nôtre used water as a design material in his plans and what we could learn from that historical design experience for contemporary problems of water management in Holland where water storage plays an important role.

2. Problem analysis and research questions

The present problem with water shortage makes the plans of Le Nôtre not only interesting from a historical point of view but also from the viewpoint of water storage and especially the different design solutions for water and water systems. We have chosen nine plans of Le Nôtre as a basis for analysis. The research questions are: How did Le Nôtre use water as a design material at different levels of intervention and in different circumstances?

What can we learn from these design experiences for contemporary design problems?

Not only as a source of inspiration but also from a technical ('how to?') and methodological point of view.

How could this knowledge be applied to contemporary design problems like for the 'water management for the 21st. century'?

3. Case studies; the analysis of nine plans of Le Nôtre

The working with case-studies as a basis for analysis is called 'precedent analysis'. We use precedent analysis as a basis for making explicit the design experience in plans that have already been executed.

- Plan analysis, precedent analysis and design knowledge

In design disciplines, a precedent is an earlier developed artifact or process of which the principles can be used to solve new design problems. Until now precedent analysis is not a very well known term in landscape architecture. The term probably comes from studies of law and studies in business administration where the study of precedents plays an important role. On the

other hand in all studio teaching since a very long time, always former projects have been used to learn from, not only as a source of inspiration, but also a source of analytic structured knowledge [50]. This could also be seen as a form of precedent analysis.

'Precedent analysis' is the study of 'precedents' through different methods; it is not one method that gives all answers. It is an explicit analysis in order to acquire systematic design knowledge that can be used in contemporary design processes. The idea behind it, is that previous design experience is made explicit as a body of knowledge. As such it can be considered as one of the foundations for the development of 'knowledge-based design'.

In this paper we will use 'precedent analysis' as a research tool in landscape architecture. In architecture, precedent analysis is already known as such but is also in the process of further development. Presently, the relation with landscape architecture is mainly in the research of the context of buildings.

- Analytical framework

For this paper we have chosen a limited number of plans and a limited number of elements and structures that are analysed, this for reasons of space.

We make a distinction between three structures:

Ensemble

- Castle
- Garden
- Park

Basic topography

- Elevation
- Water system
- Large forests

Settlement

- Road system
- Centre
- Built up mass and space

Within these three structures we make a distinction between nine elements:

Water

- Grand Canal
- Cascade
- Fountains

Ground

- 'Tapis vert'
- Parterre
- Terrasse

Plantation

- Mass & space; clumps of forest & grass
- Linear plantations; allees, spaces
- Orangerie, flower beds

The topological structure is based on the organisation of and relation between seven elements; castle, garden, park, grand canal, main axis, river and settlement.

• Overview of nine plans and the seven elements
Chantilly

In Chantilly part of the river is transformed into a grand canal. The main axis is positioned perpendicular on the direction of the grand canal and 'passing by' the castle, so it does not include the castle directly in the composition [13; 18; 24; 35; 48]. At the same time this gives the composition an intriguing quality.

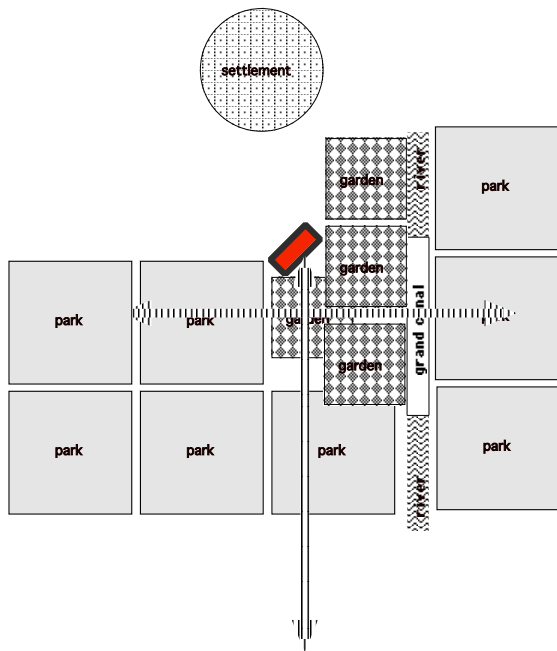


fig. 1 Chantilly

Fontainebleau

Actually the ensemble of buildings, gardens and park is not a spatial unity. This is partly due to the long history of transformation and additions to castle, gardens and park from the 12th century on [8]. Even though Le Nôtre intervened in the existing situation, he did not achieve a compositional unity. You could say though that the creation of the grand canal did create a certain focus because of sheer size and scale but it did not create a new compositional order.

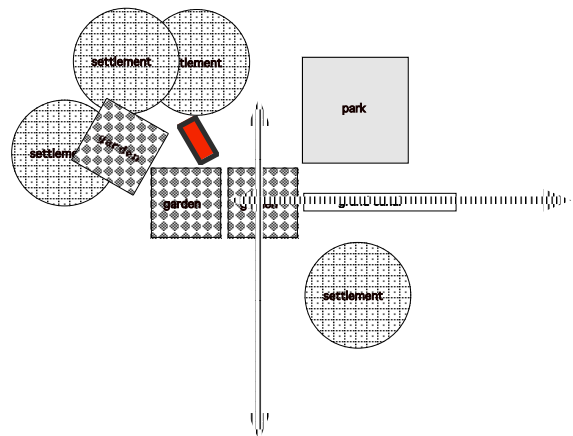


fig. 2 Fontainebleau

Marly-le-Roi

Marly is located in a lateral valley of the Seine valley and was newly created by Le Nôtre. It was meant as the 'weekend resort' for the King to escape the hustle and bustle of Versailles [14; 35; 37; 41]. In Marly the main axis is the basis of the composition [32]. This main axis crosses also small valleys and is very long. It visually organises the view towards the Seine and St. Germain. There is no grand canal, the water is used as horizontal surface to show differences in elevation.

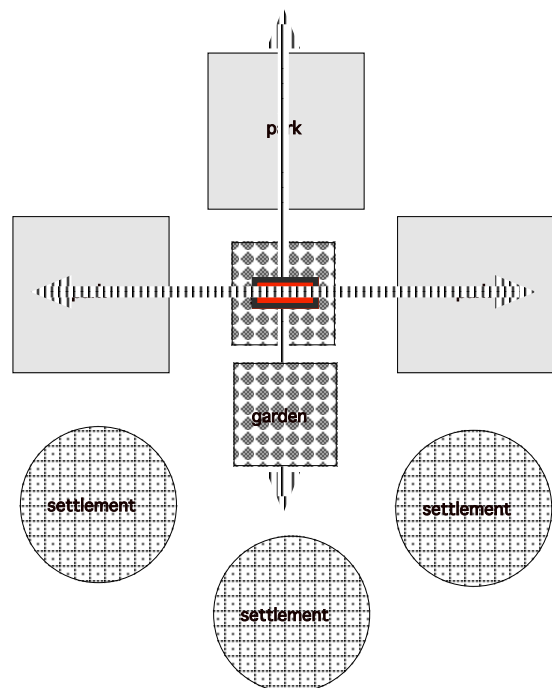


fig. 3 Marly-le-Roi

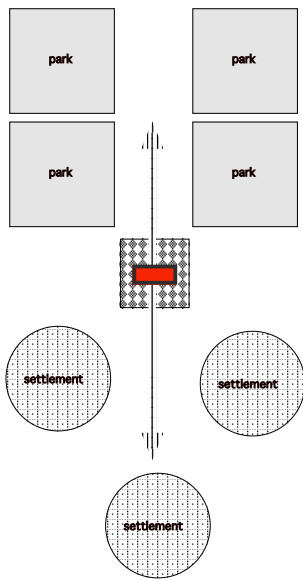


fig. 4 Meudon

Meudon
 Like Marly, in Meudon the main axis forms the basis of the composition [18; 35; 49]. It organises visually and spatially the ensemble in the existing topography. The axis connects visually the terrace and the higher elevations up in the valley. The ensemble is organised on this axis with a palace and a large water body

the newer one [18; 35; 49]. Remarkable is that in St. Germain no water is used in the composition; there is only a visual relation to the river Seine that flows below and which is visible from the terrace along the axis.

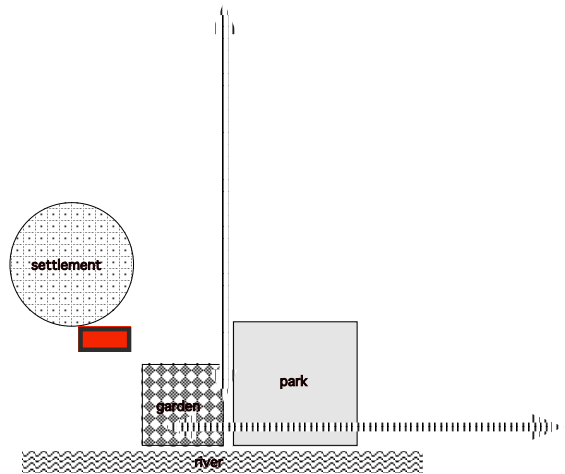


fig. 6 St. Germain

St. Cloud

St. Cloud is located in a lateral valley of the Seine. The composition is based on two axial systems, one parallel to the river and the other perpendicular to the river that dramatises the slope towards the river [18; 35; 52]. St. Cloud does not have a grand canal but it has a cascade.

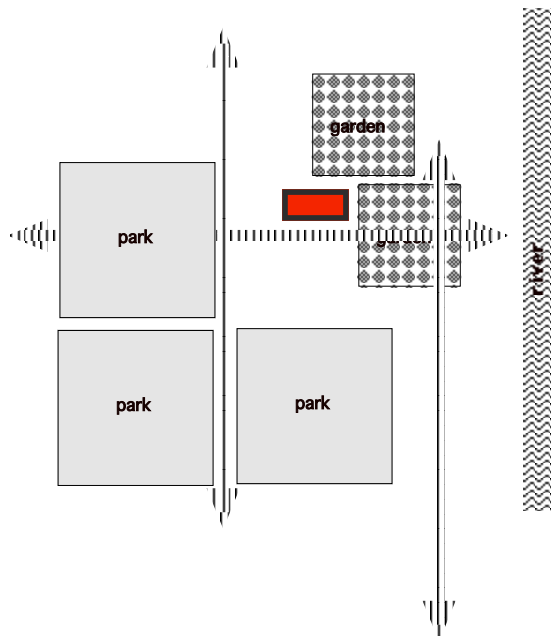


fig. 5 St. Cloud

Sceaux

Sceaux is a relatively small ensemble compared to the other ones. The composition is based on different axial systems [35; 47]. First the main axis that includes the castle. Secondly there are two axes based on water; the grand canal and the cascade both perpendicular to the main axis. The structure gives the composition an effect of surprise; you don't expect the water because you don't see it from the building.

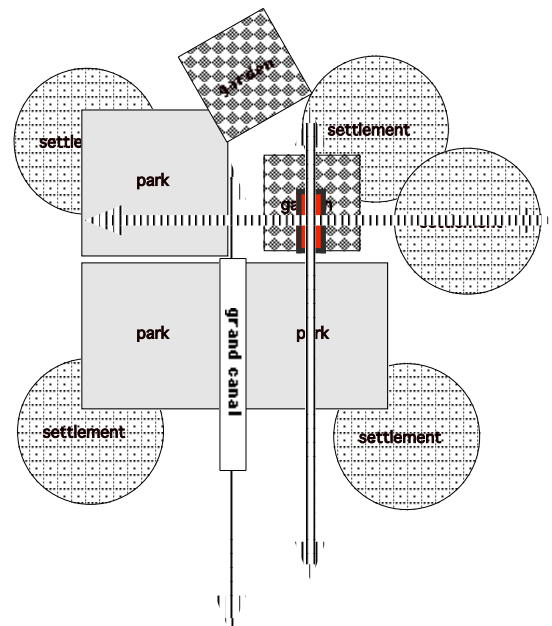


fig. 7 Sceaux

St. Germain-en-Laye

In St. Germain there are two castles; the old and

Vaux-le-Vicomte

Vaux can be considered as a starting point of the Baroque style in landscape architecture in France [4]. Here, the architect Louis le Vau, the landscape architect Le Nôtre and the painter - decorator Charles Le Brun worked together on a large scale project for the first time. Le Nôtre's park was certainly the most dominant and most striking of the ensemble [12; 34; 42]. In Vaux, the river is transformed into a grand canal and is positioned perpendicular to the main axis of the ensemble [17; 24]. Vaux is the only one of the nine examples analysed in this paper, that is newly constructed.

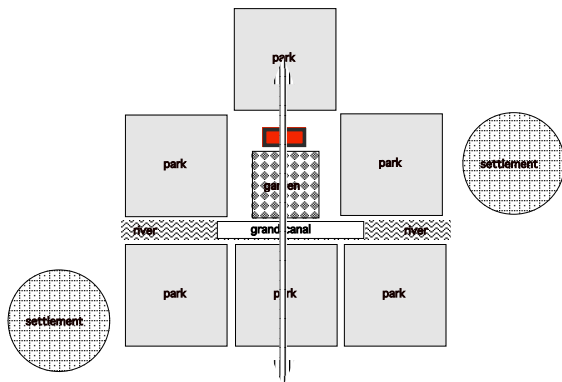


fig. 8 Vaux-le-Vicomte

Versailles

Versailles is the best known work of Le Nôtre. He started at Versailles right after Vaux-le-Vicomte. Contrary to Vaux, the plan for Versailles was developed in different steps [2; 4; 22; 28; 35]. Versailles originally was an existing 'hunting lodge' with grounds, forests and a marshy valley [36]. First Le Nôtre designed the grand canal, then in subsequent steps the castle and gardens were enlarged. The Trianon was added later, the same goes for Clagny.

In Versailles, the organisation of spaces in the composition of the ensemble is based on the laws of perspective and the perception [18; 51]. Also in the visual organisation of space; focal points like the fountain of Apollo and view lines along different axial systems, either roads or water bodies, is adding a different dimension to the whole ensemble. Finally the water is used as a metaphor for the re-creation of the reading of classical themes [16; 27; 43]. It adds a layer of narrative dimension to the plan. The same goes for the many sculptures that are designed specifically for gardens and park of Versailles. Versailles is in every sense 'a working out' and deepening of

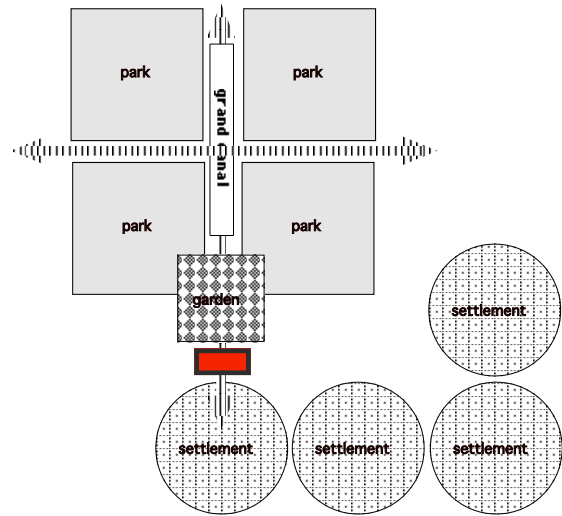


fig. 9 Versailles

design principles developed in Vaux.

• Conclusions and results

If we compare the nine plans we first of all are struck by the rich variety of plans, yet using the same elements and design principles. It is amazing to see how on the basis of this design approach, such a variety of solutions can be created. Note in this respect that Le Nôtre made very cleverly use of the topographic conditions of the terrain, not only in searching a source for water but also in the use of valleys and differences in elevation like for instance in Sceaux where the two side axes dramatise the steep slopes on the south side of the main axis.

We see that some plans (Vaux, Marly) were newly developed and others were transformations of existing situations. In both cases the same design approach seemed perfectly applicable.

	Castle	Garden	Park	Grand canal	Main axis	River	Settlement
Chantilly	x	x	x	x	x	x	x
Fontainebleau	x	x	x	x	-	-	x
Marly-le-Roi	->	->	x	-	x	-	x
Meudon	->	->	x	-	x	-	x
St. Cloud	->	x	x	-	x	x	x
St. Germain-en-Laye	x	x	x	-	x	x	x
Sceaux	x	x	x	x	x	-	x
Vaux-le-Vicomte	x	x	x	x	x	x	x
Versailles	x	x	x	x	x	-	x

fig. 10 Overview of nine plans and seven elements

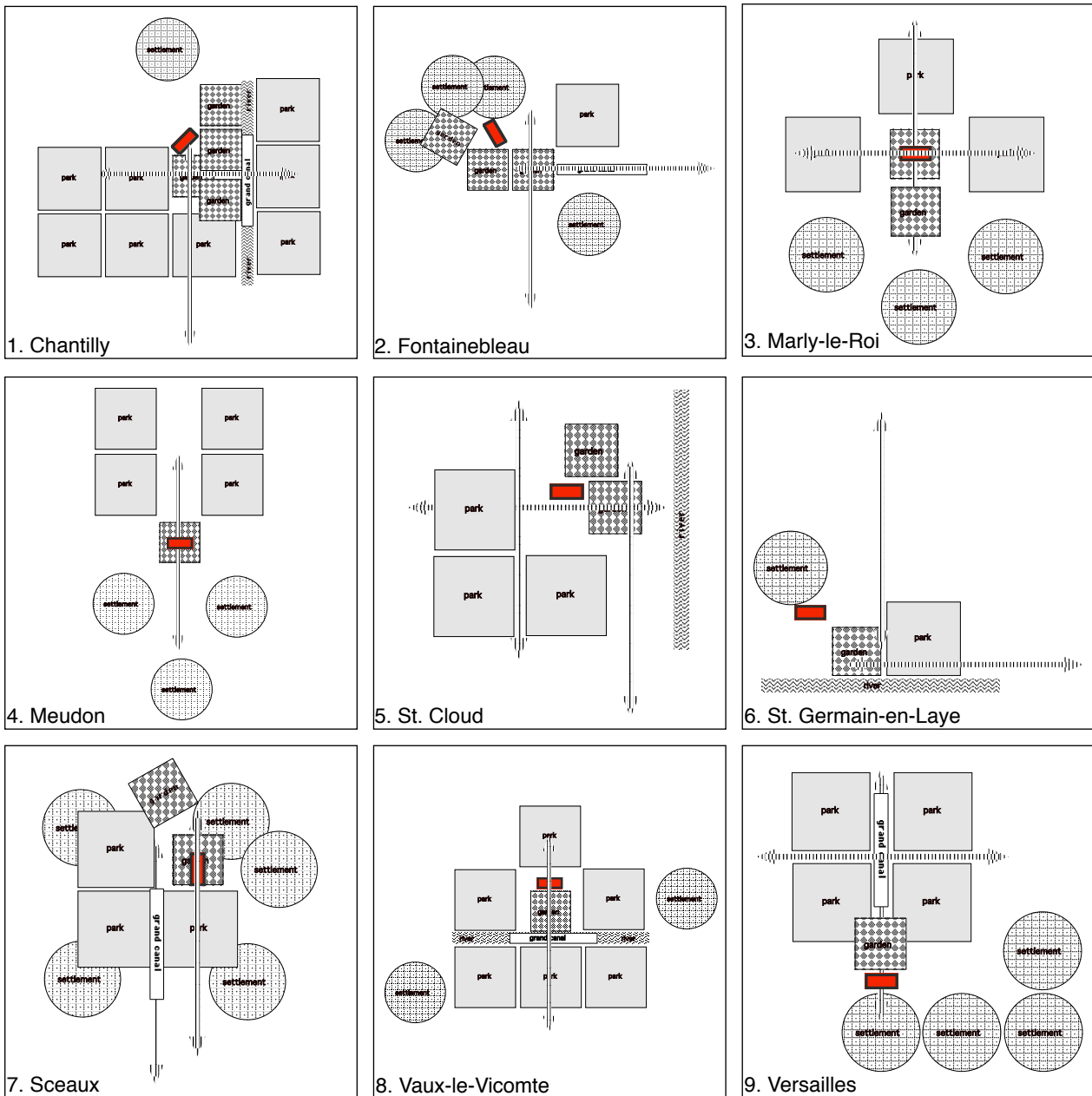


fig. 11 Overview of diagrams of nine plans

4. A closer look at specific cases; how is water used as design material at different levels of intervention?

The first level of intervention is the level of process and context; the water system at large. How does the ensemble relate to the water system at large? There is almost always a need for water, since in all cases water is an important element in the design of the ensemble, except in St. Germain-en-Laye. In Vaux-le-Vicomte [4] and Chantilly

[13] the natural water system is integrated into the ensemble. (fig. 12)

In St. Germain-en-Laye there is no water in the ensemble as such, only the visual relation to the river Seine that flows below. This is achieved by the construction of the terrace [11].

In the case of Versailles and Fontainebleau a former marshy and wet area is transformed into a grand canal. The natural system is redesigned and in this way integrated into the ensemble. In the case of Versailles (fig. 14) the grand canal organises the structure of the ensemble, visually

and spatially [6; 7]. In Fontainebleau the grand canal is part of the ensemble but not really integrated in the composition.

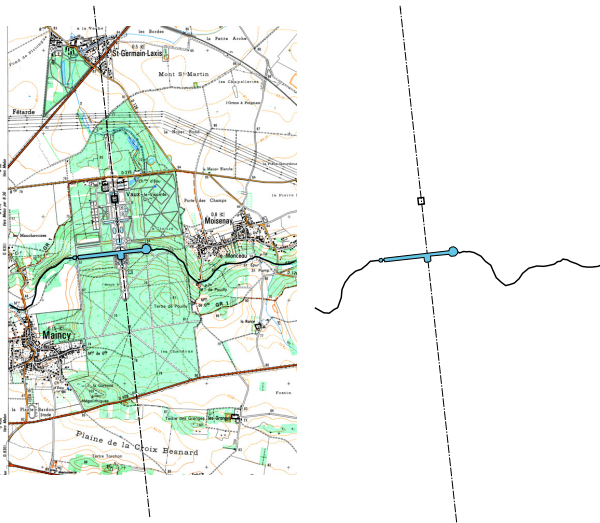


fig. 12 Vaux-le-Vicomte: the composition is based on the main axis. Grand canal as transformation of the river.

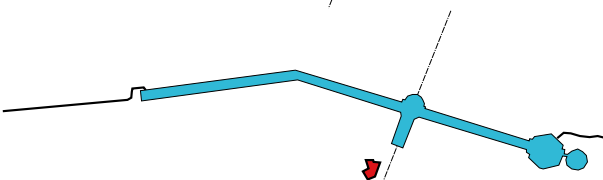
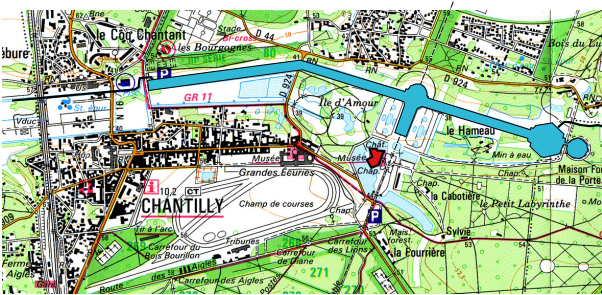


fig. 13 In Chantilly the river is transformed into a grand canal. The main axis 'passes by' the castle and connects the two sides of the canal.

A second level of intervention is the structural level. How is water used as a structural element? In many cases the Grand Canal is used in that sense. In Versailles (fig. 14) the grand canal forms the main axis and organises the ensemble of castle, garden and park in a visual and spatial unity. In Chantilly (fig. 13) it dramatises the river, spatially it also organises space because the river is located in a valley.

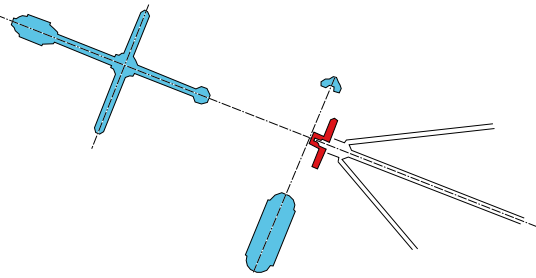


fig. 14 Versailles: the axis organises the composition and the grand canal is integral part of the axis. The grand canal is an important structural element.

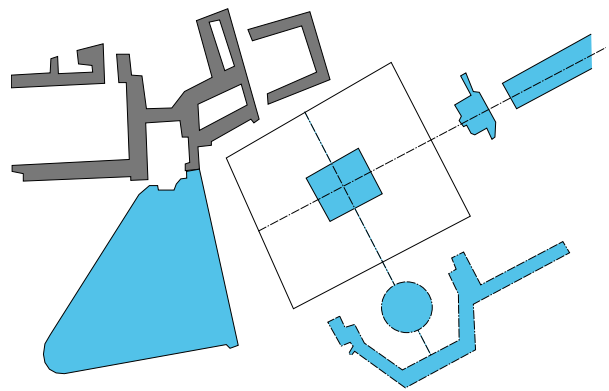


fig. 15 In Fontainebleau the grand canal is part of the ensemble but not really integrated in the composition.

Finally we distinguish the level of materialisation of form. How is water used as design material in the different forms like fountains, mirror, cascades? Here three cases can be mentioned where a rich variety of different forms of water is used and where the material qualities of water are used at its very limits, both physically and culturally. Versailles, Sceaux and Chantilly are rich in the variety of forms of water [13; 31]. In point, line and surface elements, Le Nôtre has materialised water as design material. Especially for water this is interesting from a design point of view since water does not have colour and does not have form. The two other classic design materials in landscape architecture, ground and plantation, are also in this sense very different. It means that for form of water, the container, the edges and the transitions between water and land are determining the visual effect of material forms. Special mention should be made of the use of other sensory qualities of water; sound and being colourless. Both are used in a wide diversity

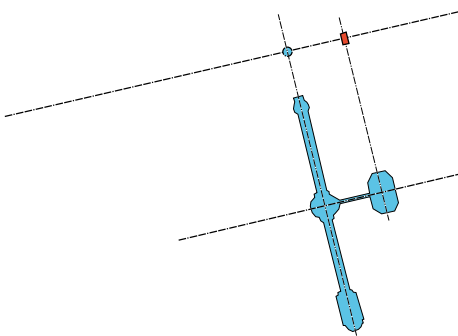
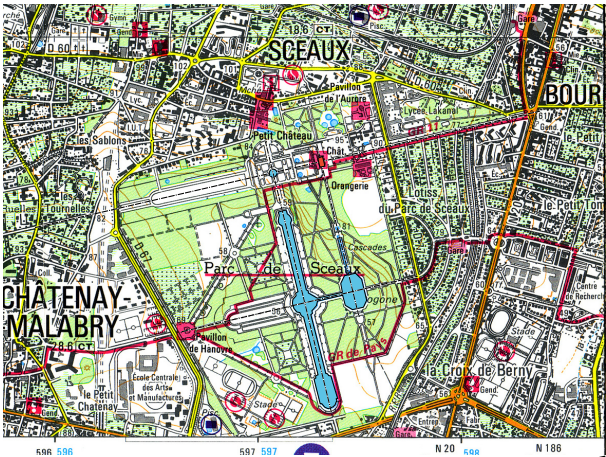


fig. 16 Sceaux The main axis and the two side axes that use water elements.

of forms and locations thus creating a very special atmosphere and ambiance.

How did Le Nôtre make use of water as design material?

First of all he made use of the existing situation. In Vaux and Chantilly he used the river as a source of water and at the same transformed part of the river into a grand canal, a form of water storage and at the same time a strong visual element. In Versailles and Fontainebleau he found marshy areas that he transformed into a grand canal for the same reasons [36].

Secondly, he used water to structure his plans and organise space. In Versailles, the grand canal forms the basis of the composition of the ensemble as a whole.

Thirdly, he made use of the rich material qualities of water in the materialisation of form like in fountains ('vertical water', sound), in cascades (sound) and of mirroring qualities of water [35].

Fourthly he made use of water as a reference that is always horizontal in reservoirs and basins. In Meudon and Marly he created water surfaces that

dramatise the huge differences in elevation and make them observable [35].

Last but not least in the context of this paper; Le Nôtre showed how you could create a system and form for water storage. In his case the water was needed to feed the many fountains [31].

5. The challenge for the future; watermanagement for the 21st century

Watermanagement for the 21st century means a radical shift to use, management and production of (fresh) water. The shortage of (fresh) water is already a problem in the well known cases of dry areas. But also in Holland water is becoming a problem; Holland — known for its extensive drainage systems — has to conserve water as well. Holland is 'drying out' because of the use of deep groundwater sources that has been built up over very long periods (sometimes more than ages!) is being used for the production of drinking water. Due to population growth, increase in the consumption of drinking water per person, Holland has to conserve its relatively clean rainwater that falls in great quantities.

What can we learn from Le Nôtre for contemporary water management?

> The plans of Le Nôtre are a source of inspiration for all designers, especially landscape architects.

> The design of storage; how did Le Nôtre organise and design his water storage needed to feed the many fountains and water works?

> The design with water as design material at different levels of intervention.

- At the level of process and context; how to relate the plan to the existing water system?

- At the level of structure; how to structure a plan with water as design material?

- At the level of materialisation of form; how to materialise different forms of water like basins, reservoirs, fountains, cascades.

6. Results and conclusions

The comparative method of precedent analysis of plans of one designer, gives new information on design principles and approach.

First of all it is astonishing to see the richness of the design solutions by Le Nôtre, using basically a limited number of elements in different settings and in different compositions.

Secondly, we see that water plays an important

role in all of the nine plans that have analysed in this paper. Even in St. Germain-en-Laye, the layout of the gardens and the terrace is visually related to the Seine that flows below.

Thirdly we have seen a great number of solutions for giving form to water at different levels. First of all at the level of the layout of the ensembles; the form and location of the Grand Canal. The Grand Canals are quite often the most important spatial element that organises the composition

spatially. So at this level, water is used as a structural element.

Secondly at the level of materialisation of form; the form of reservoirs, the visual effects of water as 'mirror'. The working of water as a horizontal flat surface to create space.

Finally the sensory qualities of water like the sound of the cascades, the rich variety of forms of water by making use of fountains.

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