



**Milan
European
Economy
Workshops**

**CORVÉE VERSUS MONEY: MICRO-HISTORY
OF A WATER INFRASTRUCTURE IN THE ALPS,
THE RÛ COURTAUD 1393-2013**

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Working Paper n. 2013-02

Gennaio 2013

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Economics of European Integration

u n i m i UNIVERSITÀ DEGLI STUDI DI MILANO



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**XI Milan European Economic Workshop
Università degli Studi di Milano, 22-23 giugno 2012**

Corvée versus money: Micro-history of a water infrastructure in the Alps, the Rû Courtaud, 1393-2013

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This version: January 11, 2013

Abstract

This paper analyses the micro-history of an irrigation infrastructure in the Alps, the Rû Courtaud, bringing water from the glacier of Ventina along the Ayas Valley, until some villages in the countryside of Saint-Vincent. Established in 1393, the infrastructure is still working and serving the local communities. The peculiar interest of this history lies in the way the investment and the maintenance costs were afforded by the project promoters. After an initial payment of 80 golden florins to the *Seigneur* of Challant, who held the water rights, the households promoting the infrastructure offered a very well tuned supply of labour in the form of *corvées*. These were established in a voluntary contract binding the promoters and their heirs. This was indeed a very long term venture, as - given the hard local conditions - the construction of the Rû took fifty years. The returns, however, were satisfactory, and the Rû Courtaud is still operated after six centuries, and has still a not for profit consortium. The opportunity to substitute money finance with labour 'finance' is analysed, and the arrangement is found to be efficient in terms of minimising ownership-related costs. Several other water infrastructures in the Alps were provided by similar schemes. This seems an interesting example of a 'bottom up' mechanism for the provision of public investment.

Keywords:

Water infrastructure, micro-history, financial history, irrigation.

JEL codes:

N83, H42, L31

*1. Introduction*¹

One of the main difficulties faced by agriculture and cattle breeding in the Alps over centuries was how to bring water from glaciers, wells, and other sources at high altitudes downwards to the fields at lower altitudes where, despite a less favourable hydrographical situation (Zucaro and Senoglia, 2009), some economic activities were possible, at least during the summer. A suitable solution was to convey the water through small, simple water transport infrastructures, known, according to the local language, as *bisse*, *suonen*, *waale* or *ru*, also written *rû* (from the Latin '*rivus*'), see Bodini 2002. The water was then distributed through a field rotation system, with shifts set up in the local statutes of the consortia managing such infrastructures. Every day, some precious water was distributed by simple devices manually operated by a custodian of the *rû*. This short paper is about the building, financing, and operating of the Rû Courtaud (or Cortot, Corthod, or *de la montagne*, or de Saint-Vincent², or d'Amey, according to local denominations), a 25 km long infrastructure,

¹ An earlier version of this paper was presented at the XI Milan European Economy Workshop, June 22-23 2012. The MEEW was supported by the Jean Monnet Chair of EU Industrial Policy and the EIBURS program. The usual disclaimer applies.

² On the left side of the Dora Baltea river, at 575 m, the city had probably a Roman origin. It was part of the Challant's feud in the Middle Ages, and after mid XV century was under the Savoia. Saint-Vincent is in the lowest area of the Aosta Valley, as the altitude of the Region is around 60% between 1500m and 2700m, with 2700 being the highest altitude. The Dora river originates from the Mount Blanc, then changing its course near Saint-Vincent, pointing South East. In the last segment before entering into Piedmont, it receives the water of the Evançon, from the Val d'Ayas.

bringing water from the glaciers of Ventina and Nana in the Mount Rosa group, and particularly from a captation point at 2150 m, down to the arid hills of Saint-Vincent, in the Aosta Valley, notably the area going from the Col de Joux (1640 m) to Emarèse, Sommarese, Arbaz, Châtillon and other villages in the central Aosta Valley. The main interest arising from this micro-history lies in the fact that, since the Rû is still in use today (2013), we can, in principle, trace out how the technical, organisational and financial arrangements involved in its operation have been changing over six centuries. We can also see how finance, in the form of a monetary fund, was generated, gradually emerging from the *corvée* system, while the non-monetary funding of the Rû was, however, the preferred option.

2. *The Val d'Ayas and Saint-Vincent*

Located on the left side of the Aosta Valley, in the North-West of Italy, the Val d'Ayas offers an access to the Mount Rosa group (including the Breithorn, 4164 m).

It connects Italy to Switzerland (the Kramerthal was the road used to cross the Alps in this area since the Middle Ages). Its historical denomination as seen in ancient maps is Val Challant. The valley was formed by the Evançon river, flowing from the glaciers of the Mount Rosa, and then running up to the Dora river. In terms of economic space, according to Remacle *et al.* (2005), Ayas was well-integrated in the Middle Ages through the pass of the Col de Joux, into the surrounding areas, including the ancient city of Saint-Vincent and the rural villages related to it, between Montjovet and Châtillon, on the left side of the Dora river. As we shall see, this integration is important³ in order to explain the nature and history of the infrastructure we are going to present.

Saint-Vincent, situated near the central valley of the Dora, with an ancient Roman road flanking the river, was already able, in the Middle Ages, to sustain some families with a modest surplus capital, some of it invested in Ayas. The family name Heresa⁴, or Heresaz, is one of the oldest in Ayas, and originated from Saint-Vincent, on the other side of the Col de Joux. Thus, the high Ayas Valley was probably in the economic sphere of influence of Saint-Vincent already in the XIV century (Remacle *et al.*, 2000).

Despite the abundance of water in the main Dora valley, some areas in the middle mountains, while well suited for agriculture and cattle breeding, are relatively arid. This is particularly true for the Saint-Vincent area. In the Aosta Valley, the recorded rain at the end of the last century was in general of around 950 mm per year, and even below 500 mm in some areas. There is also a great variability in the persistence of snow on the ground, with some of the *envers* zones (looking northward) without direct sunlight for several months, and *adret* zones (looking southward), where the intensity of the sun exposure is such that snow is only preserved for few days. Cultivated areas are to be found mostly in the *adret* (Zucaro and Senoglia, 2009).

This special hydrogeological unbalance explains the need of transporting water from distant places. The function of a *rû* was to catch the water produced by the de-icing of the Alpine glaciers in late spring and summer, convey it through a main channel, then minor channels, up to a multitude of individual small branches, each serving one plot. In this area, irrigation water was usually running on the ground and only recently some water has been piped under pressure and sprayed onto the cultivated land. As far as delivery is concerned, for centuries water was distributed by a rationing scheme based on shifts, as described in greater detail below. Even today, in around 60% of the water districts in the Region, there is a shift rotation system, while in the remaining districts water is distributed on demand, through pipes under pressure and taps. Under the shift system, distribution is discontinuous, with each user or group of users receiving water in certain fixed days or hours, or at

³ Until 1894 there was no road for carriages in the Val d'Ayas, which at that time was, compared to Saint-Vincent, relatively insulated and living on its own resources, or trading more with the Valais than with Aosta, Piedmont, and Lombardy.

⁴ Some of the Heresaz' descendents live to our day in Magneaz and Paoluettaz, near Antagnod, in Val d'Ayas (personal information).

fixed intervals, or even variable intervals according to some rules. This has been the traditional system over the centuries, managed by removing barriers (see Fig.1) by hands at a given time along the channel, thus allowing water to flow down to the land of the participant in the rotating shift scheme.

Figure 1. The water distribution



Source: Photo by Antonella Capria

However, the Rû Courtaud was a particularly ambitious venture, as it was not designed and operated to serve the villages of the Val d'Ayas, but the more distant hills downside the Col de Joux, and lastly Saint-Vincent. The valley, including its water sources, was part of the 'Mandaments des Grains' in the IX century (there is no precise information on earlier history), which in turn was part of the Kingdom of Bourgogne. The most ancient villages included Challand-Saint Anselme, Brusson, Antagnod, Magneaz. Walser groups joined the valley in the XII century and established themselves in Saint Jacques, the 'Canton des Allemandes', and in a small number of other places. The parallel valley of Gressoney was also part of the Mandament. Politically, the authority of the valley was asymmetrically distributed between the Counts of Savoia, the Abbey of Saint Maurice (in the distant Swiss Canton du Valais), and the *Seigneurs* of Verrès, feudal tributaries of the Savoia.

In 1206, Thomas I of Savoy enfeoffed Ayas to Bosono of Challant⁵, and this was the beginning of the domination of this local dynasty, which came to an end six centuries later, in 1802 (feudal tributes were renounced in 1786). The first exemptions for Ayas and the nearby village of Brusson are recorded in 1418 (Remacle *et al.* 2005).

In general, the area enjoyed a relatively well developed freedom, in terms of feudal rights. Since 1191, Thomas I decreed that taxes could not be levied without previous approval of a general assembly. In 1310 a *liberté* was given to Saint-Vincent which stated, in particular, the right to pass to heirs, women included, goods and estates. In the Walser area, these rights were even more extended, and the creation of associations of free men is well documented in the Alps since the XII century (Val Camonica 1164, Pomat and Gressoney 1191, etc., see Von Fels 1962). The story of the Rû Courtaud should be seen in this context: communities that are relatively free *vis-à-vis* the local

⁵ According to Castronovo (1981), the Challants were until the XV century the most powerful aristocratic family in the feud of Aosta, after its separation from Burgundy in the X century, and particularly after the rule of Umberto Biancamano, Count of Aosta, in the mid of XI century. Castronovo confirms that even the Bishops and the other local Seigneurs were relatively poor, with only limited military forces, but through a system of castles they were relatively autonomous from the rule of the Savoy.

feudal *Seigneur* have their own land and personal rights, and petition the possibility to invest together on their economic future through an association.

3. *The beginning of a long journey*

Thanks to some sources (Centre Culturel, 1986) we know that around 1390 eighteen Sabin (the ancient name of the inhabitants of Saint-Vincent) households and those of the nearby Emarèse and other villages in the hills between Saint-Vincent and Col de Joux, after some exceptionally dry years, petitioned Ibleto of Challant, their local *Seigneur*, to award them the right to collect water from the Cortot, flowing from the glaciers of Nana and Ventina. According to Monterin (1932), the scarcity of water after a long period of dry summers rushed into a decision. This captation, transport, and usage right was granted on July 14, 1393, against the payment of 80 golden florins according to Treves (1916), through a contract between the community of the participating households and Ibleto, signed in the presence of the notary François Franquini, in his house in Saint-Vincent. The deed was in the form of a perpetual concession, named *enfeoffement*. The annual *redevance* (royalty) was 2 florins, payable in currency or in kind, the day of the celebration of Saint Étienne (December 26). Moreover, Ibleto reserved all the water to his own usage every Tuesday, day and night. In case he wanted to resell the water, he had to offer it first to the members of the consortium (see Appendix 1 based on Treves (1916), French version of his Latin copy, see below about the history of this act). One month later, the original group was extended to other households in Emarèse and Arba. The act of association (see Appendix 2) gave “one third of the Rû” to the entrants, as well as one third of the burden of payments as established in the previous act.

Ibleto, the *Seigneur*⁶ of all the area including the Evançon Valley (Ayas), was not a minor figure of his time: General Captain of Piedmont, governor of Turin and Nice, closely linked to the Savoy dynasty. The Challants’ main castle was an impressive building, and can still be admired in Verrès.

At that time, to put such a transaction about water rights into a context, the Church – at least officially – prohibited monetary loans with interest.

The contract of 1414 between the community of Ayas and the Count (a title given to Ibleto’s heir, see below) of Challant, Ibleto’s son, for example, had to state in a more detailed way which types of transactions were to be excluded so as to prevent the risk of being considered as usury (Remacle *et al.*, 2000). In fact, it is reported that for most families the possibility to access loans was a vital need, in spite of the traditional search for autarchy in the economy of the rural village. The very limited possibility of cultivation in the upper valley (the land was mostly used for cattle breeding) forced to fall back on ‘lumpy’ payments on specific occasions: buying salt for the cattle and for food storage, marriages, some taxes to the Count, food in bad years, etc. Money could enter the economic circuit of the rural household in this area only in two ways, either through loans, especially by the same landlord, or through the sale of excess product. The buyer of the latter in Ayas was often again the landlord. Hence, the investment of 80 golden florins in an irrigation infrastructure by a group of families was probably in the mutual interest of the villagers and Challant. Considering the price standards of that time, it was a reasonable amount of money, see below.

It is remarkable that, although at least another infrastructure was already in use in Ayas, the Rû Herbal (Voulaz, 1985), bringing the water of the Evançon up to Challant and lastly to Verrès (in the same Dora valley), the Rû Courtaud was a much more ambitious project, as it was intended to serve the needs of agriculture in neighbouring, but relatively distant lands, on the other side of the Col de Joux. In fact, the Rû flanked the right side of the Ayas mountains (Mount Zerbion, 2721 m), passed the Col de Joux itself, served Emarèse on the Saint-Vincent side, and another branch went to Arbaz, over Challand-St Anselme. The contract with the *Seigneur* of Challant, while crucial as the legal foundation of the project, was yet in financial and economic terms, a minor aspect of the venture.

⁶ *Seigneur* or *Signor* in Old French.

According to the existing sources⁷, the works for the Rû Courtaud took indeed forty years to be completed, and its full operation was ratified on 14 May 1433, under the rule of Ibleto's son, François of Challant, with an act signed in Brusson. Such a long time for construction is probably a reflection of the huge technical and financial difficulties faced by the promoters of the Rû in their times, an issue that will be further discussed below.

After that original act in 1393, some important changes occurred in the background. Ibleto died in 1409. In 1424 the Duke Amé of Savoy (the emperor Sigismund had made the Savoy a Duchy in 1416) raised the domain of Challant to the title of County. François was the first of fifteen Counts (the last one died in 1802). The final act of enfeoffment was done, as mentioned in 1433, between François of Challant and the representatives of the communities interested in the Rû: 50 representatives are listed from Saint-Vincent, 16 from Arba, 18 from Sommarese, 6 from Eresa, 2 from Chessan, for a total of 92 households. In fact, some of these participants represented in turn other neighbours, so that the number of inhabitants involved, including relatives, was probably some hundreds. They were asked, through an announcement by the Count displayed in the churches of Emarèse, Challant and Saint-Vincent, to personally attend the meeting for the signature in the presence of witnesses.

The act provided a perpetual right, that was automatically transferred to heirs, but also to future owners of the land after its legitimate sale (*rectum feudum*, Von Fels 1962).

4. *The economic and financial context*

We do not have much information about the income of the inhabitants of Saint-Vincent, Emarèse, Challant-Saint Anselme, and the other promoters of the Rû Courtaud venture in the XV century. The agriculture in the Aosta Valley was then based on wheat in the plains, vineyards and fruit trees in the lower hills, and wood collection and cattle breeding in the middle mountains. Farmers were often working on land owned by the landlords, usually the nobles or the monasteries, and had to pay for this right, through a system of *redevances*. Every year they had to pay a *servicium*, and occasionally a *placitum* to the heir of the original owner. Payment was in kind, known as a system of *reconneissances*.

In such a constrained context, for the Emarèse community, as project promoter for the collection of the initial money to pay Ibleto of Challant, the concession of water rights would have been a non-negligible burden. However, the greatest difficulty would have been how to finance the construction of the Rû. The mountains to be crossed by the infrastructure, at around 1800 m, are not accessible throughout most of the year because of abundant snow. Moreover, in the XV century the area was probably affected by advanced glacial fronts (the very opposite of today) and the logistics was extremely difficult. While elsewhere in the Alps the water was channelled through excavated trees, here, probably because of the lack of expertise or of suitable wood, all the Rû had to be excavated in the ground, occasionally with stones as a side protection. It is also possible that this technical solution reduced maintenance. Moreover, it was essential to build and properly maintain a service road (see Fig.3) parallel to the 25 km of the Rû, both for the custodian in charge of the operations during the irrigation shifts, and for the regular maintenance work, which was certainly burdensome because of the steep ground, landslides, and other obstructions (most of the Rû runs within a forest of larches).

The solution to the financing and the maintenance of the infrastructure were *corvées*. This was, however, different from the most common form of *corvée*, compulsory, unpaid labour due to the

⁷ Trèves (1916) reports that he has seen the original Latin copy of the document by the Notary Pierre Calzini, courtesy of another priest of Saint-Vincent, Dominique Noussan, who received it in 1878 from the heirs of a local solicitor Avocat Charbonnier, who in turn owned a number of ancient documents around 1850, including this Codex. According to von Fels (1962), the original copies are lost, as well as the copies owned by the notaries Jean Jacquemina and Boniface Calzini. A further copy was the one owned by Pierre Calzini, under the title "Minucte avec Homage de Leinfudation (sic) du Ruseau venant de Ayas a Sent Vincent 1433 le 13 May Infeudatio 1393 14 Julii". This Codex is reported to be 29 x 22 cm, 3 cm thickness, 92 folios.

feudal *Seigneur* by his vassals in lieu of taxes (Webber and Wildavski, 1986): in this context, the contribution of working time to build and preserve the infrastructure was not mandatory. It was instead a contractual obligation stemming from the participation of the household in the consortium as expression of the local community. In exchange for this work, the household was entitled to the water service. This was strictly regulated, as we show below, but the use of water was then for free.

As far as we know, for similar projects in the Alps (Bodini, 2002), there was a simple but effective organisation of labour. The custodian of the *rû* or another authority announced by means of a *grida* (i.e. verbal commands delivered outside the church in an appropriate day) that at a given point in time in a specific place all the households had to provide workers, and convene with their working tools. Women were not dispensed, but had to collect minor obstacles, such as leaves on the ground, etc., while men had to deal with removing rocks, cutting trees and other heavy duties. This work was typically organised in springtime.

There was an elected board that was in charge of the work, including the selection of the *capomastri* (Master Builders) the skilled directors of the work, when needed, for example to solve the technical problems of building channels in almost vertical sides of the mountains.

It is admirable that the Rû Courtaud main branches regularly functioned until the Great Plague in 1630, that hit particularly hard in Aosta Valley. The branch from Emarèse to Challand-S. Anselme had to be abandoned because of lack of workforce for the *corvées*⁸. Yet, this remained the preferred system for the operation of the rest of the infrastructure. The Rû is still working nowadays, even if a large part of it now runs underground through pipes and the legal arrangements are different, see below.

There was a precise relation between the *Égances* (*'egue'* means water in the local dialect, the *patois*), i.e. the irrigation shifts and the *corvées* (mentioned as *'roydae'*), in fact it was all a combination of hours of irrigation and hours of work. All this, before the invention and spreading of clocks, had to be based on the observation of the sun in order to be able to establish times of operation. A typical working day (from sunrise at the Cross of Col de Joux until sunset, or according to other detailed indication of sunrise in any given specific location) was in exchange to the right of some hours of irrigation. According to some sources (see below) the value of both was equivalent to two *soldi* (shillings).

According to a source, “The member of the consortium which has an obligation to deliver the *corvée* must begin his work at sunrise on the Croix de Joux, or his day will have no value. For any day of absence he must pay six *soldi*, and the money will be used for building the Rû”⁹.

Similar rules are recorded in the *coutoumiers*, written collection of customary local laws, and this suggests that the most productive households were probably able to free themselves from the *corvées* and occasionally finance the infrastructure in money terms. We do not know the total value of the funds raised in this way, and it would be very interesting to discern the proportion of labour against money used for the infrastructure over the centuries. Another source of money to fund the Rû were occasional fines levied against those who were caught while stealing water.

For another *rû* built in the same period (Charniclos, located in Fénis) we have detailed information about the rotation of water (Bodini 2002), and this offers a benchmark for the Courtaud. The local *Seigneur* (resident in the beautiful *château* of Fénis) was entitled a full day in the first day shift, the priest one day repeated four times, then a Petrus Kogne one half of a day, eventually some households only ¼ of a day in day XI, then the shift restarted again, and so on. This eleven-day rotation of the Rû de Charniclos was in the beginning established *in aeternum* in the *coutoumier*, but then changed to 15 days in 1445. The fine for one day of illegal irrigation was 10 *soldi* (i.e. probably five times its conventional value) but it was 40 *soldi* if the water was kept overnight. It

⁸ An abandoned Rû was said *du pan perdu*, ‘of lost bread’ (Treves, 1916). There are however other possible etymologies for this generic name. Equivalently, *Rû Mort*. Von Fels (1962) mentions several other ancient Rûs, such as du Joux (1250), Baudin (1287), Prevôt (1300), Chavacour (1350), Neuf (1327), and others.

⁹ See Bodini G. 2002, p. 16.

seems that the members of the consortium wanted to sleep peacefully after a hard working day, hence severely punished the night offenders. In spite of these fines, there is a rich evidence of water litigation, until recent days.

5. *The original regulation*

It is interesting to look in greater detail at the regulation of the Rû, as provided by the act of 1433. We draw from Treves (1916), an abbey born in Emarèse and early historian of this infrastructure, that he acknowledged as a symbol of cooperation, shared religious values, and freedom of his ancestors.

The main rules governing the Rû were as follows:

- 1) The Rû had to be built from its origin (the Cortot stream) up to Jou d'Arba and the cultivated land of Perrière and after its construction had to be maintained by all the participants;
- 2) Every *corvéiste* had to begin his working time when the sun rose at the Croix de Jou, or his working day would not be counted;
- 3) For any day of absence without a legitimate justification, a fine of 6 *soldi* would be levied, and the fines would accrue to a fund for the construction of the Rû;
- 4) For any day of work, until the construction was complete, two iron hammers, three iron yokes, four picks, three shovels, four pickaxes and four wedges all made of good quality iron had to be brought along. Their repair would be at everybody's expenses. After the work, they had to be returned to the owner of the tools;
- 5) Each mason (*mouriour*) would bring his hammer;
- 6) For every day of water usage, and during the construction, four full time labourers had to be provided and, if necessary, the *macons* (skilled workers probably to be paid money) had to be provided at the users' own expenses;
- 7) Each director of the *corvées* could ask for the accounts of the participants of his village. He was in fact in charge of keeping a record of working days and expenses;
- 8) Each participant was not allowed to resell the water to a third party, except to another participant entitled to receive water in the same day. The price of water resold among the participants had to be reasonable;
- 9) The illegal appropriation of water was fined 60 *soldi*, for each fact, the fine to be levied by the Count of Challant. The Count had in fact to act as the court for any water litigation;
- 10) Those who ruined or damaged the Rû would incur the perpetual indignation of the Count.

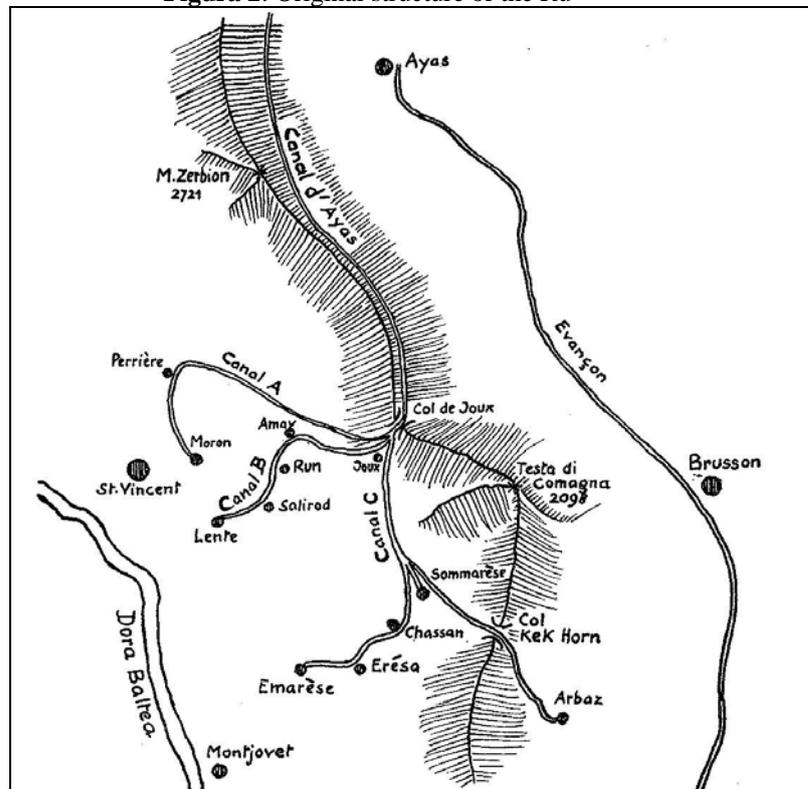
The names of the initial directors of the works have been preserved¹⁰ as well as the details of the distribution of water through the *Égance*. First of all, the main structure of distribution was established as follows:

- a. At its arrival at Joux, the water had to be divided into three parts: the first one for the village of Amey, Grand and Petit Run, Salirod, Lentès; the second part for Perrière and Moron; the third part for Arbaz, Sommarese, Eresa, Chessan, Emarèse;
- b. The other branch, running from Joux to Arba, was also divided into three parts: the first one for Arbaz, the second to Sommarese; the third one to Eresa, Chessan, Emarèse;

¹⁰ They were Pierre the son of Guillaumet (and nephew of Perrod Nicolin), Jean di Disselle, Jean d'Amay, Antoine d'Amay (brothers and sons of Jeannot Roy), Aymonin son of the late Jacquemin Grand Martin, Antoine Martinod and Pierre, sons of Jano Favre (from Loyne, resident in Salirod), Antoine de Clevoite, Jacquemet Blandin, Antoine de Gagnepain, Bonon Gorric, Pierre Voule, Pierre Novalet, Michel and Humbert Bonin, Pierre de Clapey, Martin Varisselle, Barthélemy Brun, Martin Dagnès, Laurent Dagnès, see footnote 11.

Figure 2, from Von Fels (1962), shows the original structure of the Rû, named Canal d'Ayas in this map, running on the top of the mountains of the Evançon Valley (or Ayas) and then taking three different directions from the Col de Joux;

Figura 2. Original structure of the Rû



Source: Van Fels (1962)

Figura 3. The existing Rû and service road near Barmasc



Source: Photo by Antonella Capria

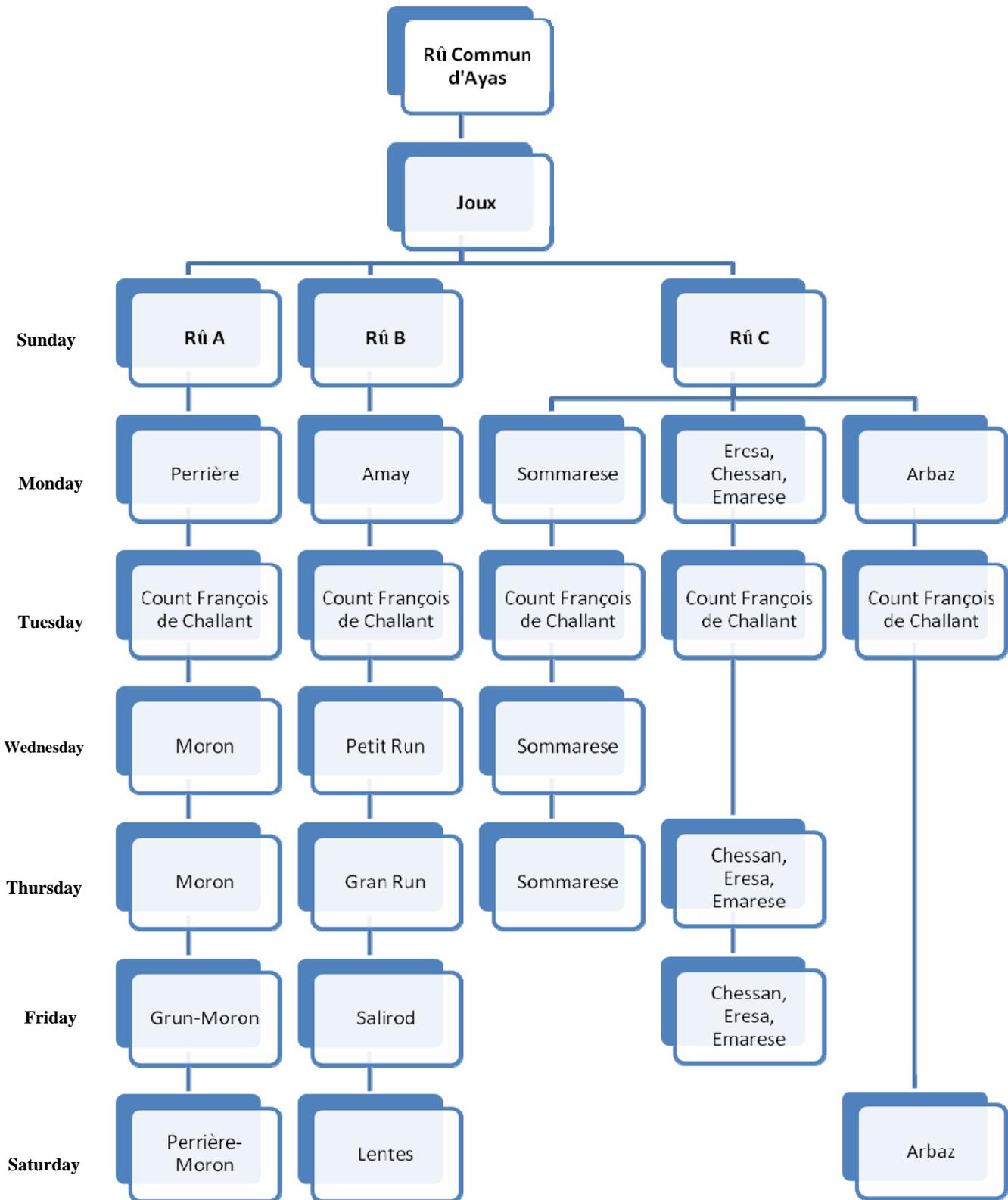
Then the *Égance* is established. This is reported in Appendix 3. See Fig. 2 for a visual representation while Tables 1 and 2, based on the previous analysis by Von Fels (1962) show the different branches, the days of the week, and the fractions of the water flow per day allocated to each participant. According to Treves (1916), some of the family names reported in the 1393 and in the 1433 acts were still represented in the area at his time. We can confirm that some family names are still found today in some of the same villages or in the nearby ones. A notable example: Torrent, found in the 1433 act, is the family name of the president of the Consorzio di Miglioramento Fondiario for the years 2002 and 2008.

The text of the *Égance* shows that, in many cases, fractions of $\frac{1}{4}$ are considered as the unit of account, as the day was divided that way, such as “ $\frac{1}{4}$ of $\frac{1}{4}$ ”, i.e. $\frac{1}{16}$. Thus, for example, Étienne Trèves was entitled $\frac{1}{16}$ of the water of the Emarèse branch every Wednesday, from sunrise on that day until sunrise on Thursday. In other words, and using our system of 24 hours in a day, Étienne Trèves, as a member of the original consortium, could enjoy exactly 40 minutes of water every week. Given the relatively modest flow per minute, it is notable how valuable those few litres of water were for Étienne, which he paid with his labour and that of his heirs in perpetuity in order to build and maintain the Rû. On Sundays, the water usage was not rationed, and anybody could take it in proportion to his estate. On Tuesdays, all the water was for the Count.

The time of water supply allocated was probably proportional to the surface to be irrigated, and this is an early record of the distribution of wealth in the area. It seems apparent that some estates were much bigger than others. Probably they had surplus output to sell and, as previously mentioned, they were able perhaps to work overtime to exchange the *corvées* for money.

The Count allowed the consortium to use the wood necessary for building the channel, to include in the contract any new source of water discovered during the construction, and offered one half of the revenues of any fine for funding further construction work.

Table 1. The *Égance* d’Emarèse (1433)



Source: our adaptation from Von Fels (1962). Table 1 shows the villages, while Table 2 shows the name of the beneficiaries and the time of supply available to each of them.

Table 2.

Canal d'Ayas, water distribution rotation, 1433					
Rû commun d'Ayas					
Joux					
	<u>Rû A</u> (Perrière, Moron)	<u>Rû B</u> (Amay, Petit Run, Salirod, Grand Run, Lentes)	<u>Rû C</u> (Arbaz, Sommarese, Eresa, Chessan, Emarèse)		
			Sommarese	Eresa, Chessan, Emarèse	Arbaz
Sunday	Free	Free	Free	Free	Free
Monday	<u>Perrière</u> 1/6 Guillaume de Perrot Nicolin 1/4 Antoine, Jeannin and Jacques, son of Pierre of the late Arondelle de Disselle 1/4 Antoinet, Pierre called Pierrot and Guillaume, son of the late Martin	<u>Amay</u> 1/4 Martin d'Amay 1/4 Jean and Vincent, son of the late Guillaume d'Amay/Jean and Pierre, son of the late Jacquement d'Amay 1/8 Aymonet Pages 1/8 Jean Mattet 1/8 Martin, Aymonet and Bosonin, son of the late Pierre, Hugonnet de Petit			<u>Arbaz</u> 1/4 Marquiand Vole, notary and his brothers 1/24 Marquiand Vole, notary and his brothers 1/24 Antoine Bouvier 1/8 Pierre called Nouvalet 1/8 Michel and Humbert, son of Bonin 1/12 Boniface and Jean Arbet, brothers 2/16 Jean Pierre Paysan and hid brothers 2/16 Michel and Pierre, son of the late Michellet Roy
Tuesday	Count François de Challant	Count François de Challant	Count François de Challant	Count François de Challant	Count François de Challant
Wednesday	<u>Moron</u> 1/4 Clement and Jean, son of the late Antoine Morisse/Bertholin, Michel, Pierre and André, son of the late Vincent d'Antoine Morisse 1/8 Berthou, Vincent, Jacques and Barthélémy, son of Copère called Pille 1/4 Bonin de Gorric and Bien Jean, his nephew 1/8 Berthod ans Antoine called Charbonnier, brothers 1/4 Jacquement, Bertholin, Pierre and Jeannin, son of the late Bonin Blandin/André and Jean, son of the late Martin Blandin/Antoine and Pierre, son of the late Jacquement Gagnepain	<u>Petit Run</u> 1/4 Jean Roy 1/8 Martin, Aymonet and Bosonin, son of the late Hugonnet 1/8 Pierre de Musyng 1/8 Clément, son of the late Pierre Goyl de Torrent 1/8 Antoine de Torrent and Aymonet his father 2/16 Jean Mare de Grives and Martin, his father 3/16 Antoine de Torrent	<u>Sommarese</u> 1/4 The 4 from Péaquin 1/16 Jean de Trèves 1/16 Etienne de Trèves 1/16 Jean de Bruno 1/16 Guillaume and Martonod Corcet, brothers 1/8 Those from Clapey 1/16 Berthod de Pierre de Lonjon and his brothers 1/16 Pierre de Crestier 1/16 Martin de Varisselle and his brothers 1/16 Jacques de Nouvalet 1/12 Pierre called Goyl 1/24 Aimon de Varisselle		
Thursday	<u>Moron</u> 1/4 Jean of the late Jacques de Flour/Jean of the late Antoine of the late Bruno Pestillod and Garin, his natural brother 1/4 Jeannin called Tendro and Jacques and Nicolas, sons of Guillaume called Tendrot 1/4 Jean of the late Pierre Polla 1/4 Laurent and Jacquement, sons of Jean de Crest/Berthoud of the late Pierre Bailiff de Crest/Pierre d'Ayas/Bertholin called Brun	<u>Grand Run</u> 1/24 Pierre de Filiey, son of the late Martinod 1/24 Antoine Martinod, his brother, 1/48 Aymonin, Amédé, Germain and Martin son of Martinod 1/8 Aymonin, Aymonet, Jacques and Vincent, son of the late Jacquemin Grand Martin, 1/16 Pierre Grand Martin, 1/32 Aymonin Brun called Bariotte/Jacquemet, son of the late Jean Perronet 1/16 Aymonin de Camox 1/8 Aymonin de Cornaz 1/8 Antoine de Gatynère 1/16 Jano de Reyffier	<u>Sommarese</u> 1/16 Jacques de Chatellionet 1/16 Jean de Trenchant 1/8 Aymonet of the late Martin, of the late Jean d'Oger de Cresta and his brothers 1/8 Perret of the late Aymonet Jean Oger, Martin Peuple, Aymonet of the late Martin, Jean d'Oger and his brothers, Perret d'Aymonet Jean Oger and his affiliates	<u>Chessan, Eresa, Emarèse</u> 3/16 Oger de Chessan 1/8 Jeannin de Chessan 1/4 Jean d'Agnet d'Eresa 1/8 Barthélemy de Comun/Agnesson de grox d'Eresa 1/16 Jean de Lonjon 1/16 Pierre de Bulliac 1/8 Martin Duc de Monjovet	

Friday	<p><u>Grun-Moron</u> $\frac{1}{4}$ Jean de Séric/Martin, Guillaumet, Bertholin and Aymonin, son of the late Jean Mellery, Grun $\frac{1}{8}$ Pierre de Séric, Grun $\frac{1}{8}$ Martin, Aymonet and Pierre, son of the late Pierre de Galerme called Mabilie, Grun/Milain, Jean and Philippe, son of Jeanin Rapa de Fobelle, Moron $\frac{1}{8}$ Jean de Pierre Brunard de la Combe, Moron $\frac{1}{4}$ Jean de Fourne $\frac{1}{8}$ Jean Michod de Tholles</p>	<p><u>Salirod</u> $\frac{1}{16}$ Jean Chadelle $\frac{1}{16}$ Aymonod, Laurent and Jean, son of the late Domonique Chadelle $\frac{2}{16}$ Jacquemet de Noysey $\frac{2}{16}$ Jean Ravet $\frac{2}{16}$ Bonin and Ansermin, son of the late Aymonin $\frac{1}{8}$ Antoine Martinod $\frac{1}{8}$ Jean de Jean Andrée $\frac{1}{16}$ Germain de Trèves</p>		<p><u>Chessan, eresa, Emarèse</u> $\frac{3}{16}$ the sons of Jean de Mavila and Antoine $\frac{1}{8}$ Barthèlemey de Mavila 8their parents) $\frac{1}{8}$ Barthèlemey of the late Martin, Emarèse $\frac{1}{16}$ Etienne de Mériane $\frac{1}{16}$ Jacquemine de Corlio $\frac{1}{16}$ Pierre Montat $\frac{1}{8} + \frac{1}{12}$ Pierre de Nabiano/Martin de Plangéry</p>	
Saturday	<p><u>Perrière-Moron</u> $\frac{1}{4}$ Jean Bonin and Aymonet, son of the late Pierre Jean de Galerme/Jean and Antoine son of the late Martin Jean de Galerme $\frac{1}{8}$ Jean Michid de Tholles, Moron $\frac{1}{8}$ Pierre and Antoine, son of the late Bonin de Champion $\frac{1}{4}$ Guillaumet Chibot, Perrière $\frac{1}{8}$ Bathélémy de Robe, Perrière</p>	<p><u>Lentes</u> $\frac{1}{8}$ Antoine de Chevotte $\frac{1}{8}$ Jeannin Rumelle $\frac{1}{8}$ Jean de Pierre Lou $\frac{1}{8}$ Dominique and Antoine, son of the late Jacques de Vagnon $\frac{1}{8}$ Guillaumet de Noysey called Gevro $\frac{1}{8}$ Jean de Camox $\frac{1}{16}$ Jean de Jeannet Comte $\frac{1}{16}$ Jacquemin de Jeannet Comte, his brother</p>			<p><u>Arbaz</u> $\frac{1}{16}$ Humbert de Jacques de Binfa and his broche $\frac{1}{16}$ Pierre called Pitet and his relatives $\frac{1}{16}$ Pierre Aymonin and his brothers $\frac{1}{16}$ Jean defenestra and his uncle $\frac{2}{16}$ Pierre de Martin de Jeanne $\frac{2}{16}$ Jean Carogne/Aymonet and his brothers $\frac{1}{6}$ Boniface Michelles de Nemour d'Arba $\frac{1}{8}$ Antoine-Jean Agnesson $\frac{1}{8}$ Jean Michelles de Nemour and his brothers</p>

Source: See Table 1.

Figure 3. The pumping station at Col de Joux



Source: Photo by Antonella Capria

The still existing Rû is currently managed by the *Consorzio per il miglioramento fondiario Rû Courtaud*, founded in its present form in 1960 in the municipality of Saint-Vincent (see Fig.3). The first President was Mr Lucien Morise from Moron, the current one is Mr Mirco Torrent. Their names follow a long list of predecessors, some of them recorded in a document in the archives of the municipality of Saint-Vincent, see below.

The contemporary legislative framework for the *Consorzio Rû Courtaud* is based on the Law 36/94 (norms on hydric resources) and the Regional Law 3/01. The latter establishes that the *Consorzi di Miglioramento Fondiario* are responsible for restructuring of land tenure, preservation of soil, flood control, protection of the environment. The Consorzio, following the provisions of the Decree 215/33, is a non-profit private entity, pursuing objectives of general interest, and formed by all the owners of real estate, agricultural or non agricultural, in the administrative area it includes. The core difference between the current organisation and the earlier one is that the participation in the Consorzio is now compulsory, and automatic when the ownership of land or buildings is written in the official records. The Statute, approved by a decree of the regional government, provides for the organisation of the Consorzio, the election of the governing board and, most importantly, establishes the duties of the participants as for the main infrastructure and any other works.

There are currently 159 irrigation consortia in the Aosta Valley, most of them around an original Rû. They cover 177,000 ha, or 55% of the Region, but with an extreme variability of dimensions: from 11 to 11,000 hectares. The Rû Courtaud is now part of the Mount Cervin administrative area, that includes 22 consortia.

Some of the key figures for the current Rû Courtaud Consortium and for the total Mount Cervin area are shown in Table 3 below which reveals that irrigation for cattle breeding is the main function of the Rû in our days.

As an acknowledgment of the cultural value of the Rû Courtaud, the European Commission has recently approved a Leader project, the *Rû Retrové* for enhancing informed trekking over the remaining service road of the Rû. This will add a new tourism function to this old infrastructure.

Table 3.

The Rû Courtaud Consortium and the Mount Cervin irrigation area (total of 22 consortia) - 2004 (ha)		
	Rû Courtaud	Mount Cervin
Administrative surface	1,973	18,288
Infrastructured area	591	4,082
Irrigation area	210	1,679
Fruits	0	6
Vegetables	0	6
Meadows and pastures	205	1616
Vineyards	1	40
Other cultivation	1	1
Flow	124	1076
Perfusion	85	595

Source: adapted from SIGRIA Val d'Aosta Data, elaboration INEA (Zucaro and Senoglia, 2009)

The *corvées* have not entirely disappeared. According to Zucaro and Seroglia (2009), based on a survey among the administrators, most of the existing consortia do not have a permanent staff, and all administrative and managerial activity is done by members, without claiming a monetary compensation, and repairs and other works are still based on the *corvée* system. Only in a relatively small number of cases some activities are delegated to third parties, typically the municipality, or to private contractors.

In terms of financing the operations, in the large majority of the consortia, no tariffs are raised for the water service, particularly in case of a system of voluntary work organized and managed by the participants. When a tariff is raised, it is not per quantity of water delivered, but a charge based on the irrigated surface, or for other standard parameters. Another source of finance are transfers from the budget of the municipalities, or the region, but this is usually for ancillary works, not for the irrigation infrastructure or service. However, the Regional government in the planning period 2000-2006 has provided 77.98 million Euro for capital grants to irrigation works managed by the *ConSORZI* and similar bodies, and a substantial part of these funds have been allocated to works related to the *rûs*.

Interestingly, for most of the existing consortia, the legal basis in terms of concession of water rights is under the so called *antichi diritti* (ancient rights) granted before 1948, in many cases going back to the XIII century. These were concessions to fetch water granted by the feudal *Seigneurs* (the dukes of Savoy, the *Seigneurs* of Challant, the Bishops, the *Seigneurs* of Nus, of Vallaise, some monasteries, etc.). Every fifteen years these concessions are simply validated by the Regional government. A different legal regime applies to concessions based on demands in the last century.

7. Discussion

According to Brean (1950)¹¹, who compared several case histories, the construction of the *rû* in the Middle Ages was usually an initiative of the local community. Once an informal agreement was reached, the households convened an assembly, chaired by a nobleman or a notary, in some cases the meeting was in a public place, the announcement was done *à voix des cries*, and eventually the noble owner of the water rights was addressed. The authorisation, as far as we know, was always granted. The *redevances* were modest: compared to the 80 florins of *intrade* and 2 of yearly contribution for the Rû Courtaud, elsewhere (Rû Bourgeois, reported by Brean, 1950), the annual *redevance* was just one florin, plus nine *libres grosses* de France, but only two florins of *intrade*.

¹¹ For an overview of irrigation issues in the Middle Ages in Italy, see Jones (1966), who however pays scant attention to agriculture in the mountains

Given that there were 20 *soldi* in one florin, and one working day – as we already mentioned – was probably valued two *soldi*, in the case of the Rû Courtaud the original payment was perhaps equivalent to 800 working days spread among the participants, i.e. around eight working days on average per each participating household.

The appointment of the directors (*sindics du Rû* in some later documents) was a crucial step. They managed the combination of working times for construction, maintenance and operation, the modest capital in terms of tools and staples needed, and the distribution of the water according to extremely precise rules. The guardians of the Rû were typically in charge for one year, according to a rotation among the households. The ancient and contemporary directors' names are recorded in an 'Albo d'Oro' of the current *Consorzio*¹².

This micro-historical evidence can be discussed in terms of the Hansmann's theory of ownership (Hansmann, 1996). Our research question is this: why this peculiar arrangement for provisioning and operating the infrastructure emerged in the first place, and why it was so resilient over centuries.

According to Hansmann, the preferred ownership assignment is the one that minimizes the total cost of transaction between the firm and its patrons, i.e. the suppliers of inputs and users of outputs:

"The analysis (...) suggests that, all other things being equal, costs will be minimized if ownership is assigned to the class of patrons for whom the problems of market contracting – that is the cost of market imperfection – are most severe. For example, if the firm is a natural monopoly, but obtains its capital, labour, and other factors of production in reasonably competitive markets, then total costs are likely to be minimized by assigning ownership to the firm's customers. This presumably explains why (...) so many rural electric utilities are organized as consumer cooperatives" (Hansmann, 1996, p.21).

To such transaction costs, one has to add the costs of ownership itself, related to governance:

"They include the costs of making collective decisions among the owners, the costs of monitoring managers, and the costs of poor decisions and excessive managerial discretion that result when collective decision making or managerial monitoring are imperfect (...). Consequently, when deciding which class of patrons is to own the firm, the costs of ownership must be considered in addition to the costs of market contracting" (*ibidem*, p. 21).

Hence, the assignment of ownership is the one that minimizes the sum of the (1) transaction costs for non-owners, and (2) the ownership costs for patrons who own the firm. Investors, as suppliers of capital in this frame, are here considered just as one class of patrons, and equity finance as their input.

The Rû Courtaud ownership arrangement, while a peculiar one, is similar to a users' cooperative. It has been resilient to change over six centuries, and ubiquitous in a relatively wide geographical area, that include the Aosta Valley and other Alpine regions. This is indirect evidence that such ownership assignment was efficient or it would have been abandoned, given the wide changes in the legal and economic environment over such a long period of time. Only a comparative analysis with other irrigation infrastructure systems would prove this efficiency argument, but if we assume it, we can analyse our case study in the Hansmann's frame as follows.

A possible approach is to think in terms of counterfactuals, i.e. in terms of virtual alternatives, drawing from experiences elsewhere. One of such alternatives could have been that of the Count of Challant taking the initiative of building and managing the infrastructure. The Count of Challant was de facto the local government, with the power to levy taxes, to dictate laws, and to administer police and justice. If the infrastructure was needed to develop the local agriculture and cattle breeding, why didn't the Count of Challant, and his equivalent elsewhere, build themselves the irrigation channel?

¹² Available at <http://www.comune.saint-vincent.ao.it/di/c/cd/Albo%20oro%20del%20Consorzio.pdf>.

To do this, in terms of our interpretation, there were probably two important cost disadvantages. In an economy constrained in terms of money finance, the *Seigneur* would have needed a considerable amount of borrowed capital to hire labour for the works, as probably the investment cost largely exceeded the cash resources of the Challants. However, external finance in the Middle Ages was difficult for practical, legal, and religious constraints. Historically, the alternative was to use the power of government to impose *corvées* to build infrastructures, a solution experienced on a large scale elsewhere and well documented by literature. The question then is: Why were the *corvées* not *commanded* by the Count, instead of arising from a voluntary scheme?

There are two possible answers. *First*, it is not clear that the feudal system in the Aosta Valley actually gave these legal powers to a local *Seigneur*. *Second*, it is not self-evident that the system would have been efficient.

On the first point, one has to consider that the powers of the Challants were not absolute. The inhabitants enjoyed a complex system of *libertés* that constrained the possibility to extract labour at will by the *Seigneur*. Moreover, building a *rû* from a glacial stream of water up to a distant valley, with the technologies and infrastructures available at that time, was an extremely hard work, and it is likely that extracting the necessary effort to the villages would have implied a policing activity well beyond the usual capacity of the *Seigneur* (for example, probably the permanent armed forces under the Challants were just fifteen units in year of peace). Hence, the *Seigneur* would have had to spend additional considerable resources and enforce the mandatory *corvées* during a protracted construction phase. Differently from major roads and other infrastructures in the plains, there is obviously no strategic value in a *rû*, and no large taxable income from its usage, only small increments of rural income in the long run. Then, the only motivation for the investor would have been a fair return on its own capital, i.e. land.

The critical issue, however, and the one that would have been common to the Count and to any external private investor (if you may suppose that such an alternative was available), is related to the collecting of the revenues from the operation of the *Rû*. It is revealing interesting to note that even today irrigation water from the *rûs* in the Aosta valley is still not paid in terms of a tariff per unit of water, but as a lump sum proportional to ownership of land. A counterfactual investor-owned *Rû* would have faced the substantial transaction cost of enforcing a scheme of payment for the water distributed. The costs of policing, and the constraints in terms of availability of money by the users, would have made the water revenue collection a risky and costly affair.

To sum up, the solution of a users-owned infrastructure based on voluntary *corvées* and managed turns of water distribution was probably more efficient than any investor-owned alternative for several reasons:

- a. The necessity of highly constrained and possibly costly initial money finance by an investor was avoided, as capital investment was ‘financed’ by voluntary or self-regulated labour of users.
- b. The operation and maintenance costs was also mostly in terms of voluntary labour, but with a flexible opportunity for the most productive participants, i.e. those with surplus agricultural output, to exchange their *corvées* for a money payment. The latter arrangement created a fund for hiring external services when needed.
- c. The monitoring costs, either during construction and operations, were minimized as the directors were elected by users and the latter were working together, hence everybody was monitoring everybody’s effort, in the context of a small community.
- d. In the perspective of the Count of Challant, who owned the water captation rights, devolving them to the users ensured a net rent: the modest initial *intrade*, plus the yearly *redevance*, plus the water on his own land every Tuesday, a share of the fines, plus probably the indirect benefit of levying modest additional taxes on the increased rural output allowed by irrigation. In exchange, the Count only had to implement fines and hear controversies when needed, without any direct involvement in monitoring of construction and operation.

In the perspective of the users-participants of the consortium, they exchanged marginal labour, probably with a relatively low opportunity cost in the construction and operation of the Rû, against a permanent increase of agricultural output, presumably with a higher opportunity cost because of excess labour available in the household. Literally, the participants exchanged collective labour for food, only some of them for surplus food output. We do not have information on the relative prices, but the fact that the Rû survives to our days, is a clear indication of its long-term social profitability. Interestingly, as the water distributed was and is not priced in money terms, the economic arrangements were based on an implicit shadow pricing: the shadow price of irrigation water, the marginal benefit for the user had to match the shadow price of *corvée* labour provided by each user, i.e. the marginal cost. In turn, the shadow price of water, in this context, was simply the marginal social value of the agricultural output.

Thus, the Rû Courtaud story has probably a sensible economic interpretation. The local institutional context was favourable to finding a cost-effective alternative to money finance and to market mechanisms in the provision and operation of a challenging infrastructure investment. This alternative was based on voluntary labour, complemented by the exchange of labour with money when surplus output was available.

It is also possible that this peculiar institutional arrangement minimised potential distributive conflicts, as suggested in the wider context of feudal history by Volckart (2004), and restated by Olgivie (2006). This additional line of interpretation would need further research on the evidence of conflict between *Seigneurs* and rural households, and within the latter groups. One path to establishing the balance between efficiency and distributive issues in ancient water institutions would be to consider the legal controversies on water rights in contexts where different systems were operated. In general, the control of water resources in several social contexts originates wide conflict. Hence the existence of a detailed contractual arrangement based on a collective initiative, creating a mutual interest in the infrastructure within the local communities, may have been beneficial in terms of channelling potential conflicts over water claims under a well defined system of rights.

8. Conclusion

Further research¹³ is needed to understand how this ancient example of rural irrigation in the Alps has been preserved until today through a combination of working duties and money finance in exchange of the freeing of some households from their labour obligations. In a transparent form, we can see here how a peculiar combination of labour and capital, raised bottom-up within the community, generation after generation, was able to sustain public investment, supported by self-discipline, without the need of external finance. This is a micro-story, but one that would perhaps support the view by Elinor Ostrom (Ostrom, 1990) about the creativity of communities in finding their own solutions to the provision of common goods.

In this perspective, the core issue, yet to be explored, are the social, cultural, and economic conditions that made this achievement possible and sustainable in a remote Alpine area, six centuries ago.

¹³ The specific literature on the *rûs* and early irrigation in the Alps is mostly in French or Italian, and difficult to access. It would include: Brean (1950), Reggio (1965), Berard (1982), Grimod, Lexert, Voulaz (1985), Voulaz (1985), Cretier (1994), Daudry (1995), Gerbore (1995), Cont (1998), Pellissier (1998), Mollo (1999), Gerbore (2000), Barocco, Giai, Rivolin (2001), Biasioni (2002), Bodini (2002), Dumont (2002), Ferraris, Glarey (2002), Gerbore (2002), Gerbore, Rio, Les (2002), Massazza (2002), Righi (2002), Schwery (2002), Valsecchi (2002), Vauterin (2002), Trevisan (2003), Vauterin (2003), Cerruti (2004), Francois, Garelo (2004).

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Appendix 1. Text of the enfeoffment, 14 July 1393¹⁴

«In the year of Our *Seigneur* 1393, 14 July, following the plea of the undersigned people and of the community they belong to, living in Saint-Vincent from Romilliod i.e. the Grand Ruisseau de St-Vincent up to the top of the mentioned parish, the powerful *Seigneur* Iblet, *Seigneur* of Challant and Montjovet, grants a perpetual fief to Pierre Polla de Moron, Antoine Morise de Insuardis, Pierre Jacquemini de Toles, Jean Michod de Toles, Jean called Champion de Moron, Pierre called Folliou from the aforesaid place, Jean called Coper de Moron, Brun Regis de Run, Martinod Regis de Run, his brother, Jean Perronet de Charboneillis, Jean Bonin di Buthier de Moron, Nicolet Ramelli de Lentz, Joannet Comitis from the aforesaid place, Jacquemet Arondelli de Disseglija and Martin Pierre Perronet de Perrière, Vuillermet son of Perrod Nicolin inhabitant of the aforesaid place and Antoine called Caremyntant de Moron, present and receiving, in their name and in the name of the community they belong to, the right and the faculty to raise and to allow raising a *rû* from the sources of Aventina and Nana, within the parish of Ayas, with the purpose of irrigating their properties.

«Done at the burg of Saint-Vincent, at the lower house of Pierre Astesan, burgher of Saint-Vincent, in the presence of Vuillermet Alexine, noble burgher of Saint-Vincent and of Arduction de Simon de Donnas, witnesses.

«François Franquini, inhabitant of St-Vincent, imperial notary».

Appendix 2. Text of the act of association, 10 August 1393

«In the year of Our Lord 1393, 10 August, the powerful *Seigneur* Iblet, *Seigneur* of Challant and Montjovet, having granted as a perpetual fief to Pierre Polla de Moron and affiliates of the parish of Saint-Vincent the faculty to raise a *rû*, within the parish of Ayas, with the purpose of irrigating their lands, at the conditions and with the reserves stated in the above mentioned act, Pierre Polla and affiliates in their name and in the name of the community they belong to, join for the third part of the mentioned *rû* the undersigned persons of Arba, Eresa, Sommarèse and Chessan.

First, Martin Mavila d'Eresa, Jean Dagnès (Agnètis) from the mentioned place, Barthélemy son-in-law of Perronet de Comun and Laurent son-in-law of Boniface Grossi d'Eresa receiving in their name and in the name of other people from Eresa and Aymon de Chessan (Cheysano) receiving in his name and in the name of Davisot de Chessan.

Similarly, Jean Meriana, Pierre de Valet Péaquin (Peaquin), Antoine Clapey and Vuillermet Trèves (de Trevi) receiving in their name as well as in the name of all the other people from Arba. Similarly, Martin Voula (de Voula) from Arba, Antoine Bonin from Arba, Brun son of the late François d'Arba receiving in their name and in the name of other people from Arba.

The aforesaid commit themselves to pay the third of the service and the judgement due to the mentioned *Seigneur*, provided that the two thirds of the expenses of the *rû* fall to the people from St-Vincent and the other third, to the new foretold associates.

Similarly, it has been agreed that the people from St-Vincent would help drawing the *rû* from Jou montis de Rûn up to the Croix de Berial.

The people from Saint-Vincent shall have two portions of the *rû* and the associates, the third portion. The latter shall contribute by paying one third of the *intrade*.

The people from Saint-Vincent beg the foretold *Seigneur* Iblet to approve and guarantee this act of association and to indenture the third part of the *rû*, at the aforesaid conditions to the new associates.

¹⁴ The source for Appendixes 1,2,3 is Treves (1916), our translation.

Done at the burg of Saint-Vincent outside my house, the undersigned notary in the presence of Vincent called Morello Fournier and Boniface son of the late Bosonet Mistral de Saint-Vincent, witnesses.

François Franquini de Montalto, diocese of Ivrée, living in Saint-Vincent, imperial notary».

Appendix 3. *Égance d'Emarèse*, 13 May 1433

«The water of the *rû* running from the side of Emarèse every Wednesday and Thursday will belong to the people of the village (town) of Sommarèse for their $\frac{6}{4}$ and the $\frac{1}{3}$ of the other quarter, i.e. On Wednesdays after the dawn till next Thursday at the time of the day when the darkness reaches the feet of the castle de Montjovet, at the place called Porta Chinigly.

And first $\frac{1}{4}$ of the water of every Wednesday after the dawn of that day till the dawn of Thursday shall belong to the people of Péaquin i.e. the four affiliates, $\frac{1}{4}$ of $\frac{1}{4}$ to Jean Trèves; $\frac{1}{4}$ of $\frac{1}{4}$ to Étienne Trèves, $\frac{1}{4}$ of $\frac{1}{4}$ to Jean Brun de Sommarèse, $\frac{1}{4}$ of $\frac{1}{4}$ to Vuillermet Corczeti and his brother Martinod, half of $\frac{1}{4}$ to the people of Clapey de Sommarèse, $\frac{1}{4}$ of $\frac{1}{4}$ to Berthod de Pierre de Lonjon and his brothers, $\frac{1}{4}$ of $\frac{1}{4}$ to Pierre Crétier (de Crestier), $\frac{1}{4}$ of $\frac{1}{4}$ to Martin Varisella and his brothers, $\frac{1}{4}$ of $\frac{1}{4}$ to Jacques Novalet, to Pierre dou Goyl two parts of half $\frac{1}{4}$, to Aymon Varisella three parts of half $\frac{1}{4}$.

2) Every Thursday after the dawn of that day till the time of the day when the darkness reaches the feet of the castle of Monjovet at the place called Porta Chinigly, the same river branch will belong to the following people of Sommarèse; $\frac{1}{4}$ of $\frac{1}{4}$ of the mentioned water bulletin to Jacques Chatillonnet (de castellionet), $\frac{1}{4}$ of $\frac{1}{4}$ to Pierre Chatillonnet, $\frac{1}{4}$ of $\frac{1}{4}$ to Michel Chatillonnet, $\frac{1}{4}$ of $\frac{1}{4}$ to Jean de Trenchent, to Aymonet son of the late Martin de Jaen de Ogier and his brothers de Cresta half of $\frac{1}{4}$, to Martin Populo and to the aforesaid Aymonet and his brothers as well as Perret his third-party affiliate, a third of $\frac{1}{4}$.

3) Thursdays, Fridays and Saturdays the water of the same river branch, $\frac{7}{4}$ with the third of the other quarter, will belong to the people of Erèsa, Chessan and Emarèse (Ymaresa), who will collect the water every Thursday at the time of the day when the darkness reaches the feet of the castle of Monjovet at the place called Porta Chinigly and will keep it till next Saturday at the time of the day when the sun rises where the first houses of the people of Clapey from the side of Cresta of Sommarèse are.

4) Every Thursday, after the time of the day when the shade reaches the foot of the castle of Monjovet at the place called Porta Chinigly till the next Friday when the shade reaches the Doire, to the following people: Ogier de Chessan, the three parts of $\frac{1}{4}$ of the mentioned bulletin, Johannin de Chessan, half of $\frac{1}{4}$, Jean Dagnès d'eresà, $\frac{1}{4}$, Barthélemy Comun, half of $\frac{1}{4}$, again Barthélemy Comun and Agnexon di Grox d'Eresa, $\frac{1}{4}$ of $\frac{1}{4}$, Jean de Lonjon $\frac{1}{4}$ of $\frac{1}{4}$, Pierre Buillas (de Bulliaz), $\frac{1}{4}$ of $\frac{1}{4}$, Martin Duc (Ducis), living in Monjovet, half of $\frac{1}{4}$.

5) In the end, Fridays at the time of the day when the shade reaches the Doire till the next Saturday at the time of the day when the sun rises in the morning where the first houses of the people of Clapey from the side of Cresta of Sommarèse are. The same branch of the *Rû* will belong to the following people: to those of Jean Mavila and to their cousin Antoine, the three parts of $\frac{1}{4}$, to Bertholin Mavila, half of $\frac{1}{4}$, to Barthélemy son of the late Martin d'Emarèse, half of $\frac{1}{4}$, to Étienne Meriana, $\frac{1}{4}$ of $\frac{1}{4}$, to Jacquemin de Corlio, $\frac{1}{4}$ of $\frac{1}{4}$, to Pierre de Montat, $\frac{1}{4}$ of $\frac{1}{4}$, to Pierre de Nabiano and Martin de Plangerp, half of $\frac{1}{4}$ with the third of the other quarter».

Acknowledgements

Giuseppe De Luca, University of Milan, provided important comments on an earlier version. I am grateful to Jean Voulaz, Centre Culturel Challand-Saint-Anselme, for providing me with some relevant sources, to Rosa Carmosino for assistance with editing, bibliographical researches and translations, and participants in the XI Milan European economic Workshop for comments. The support of EIBURS is gratefully acknowledged.