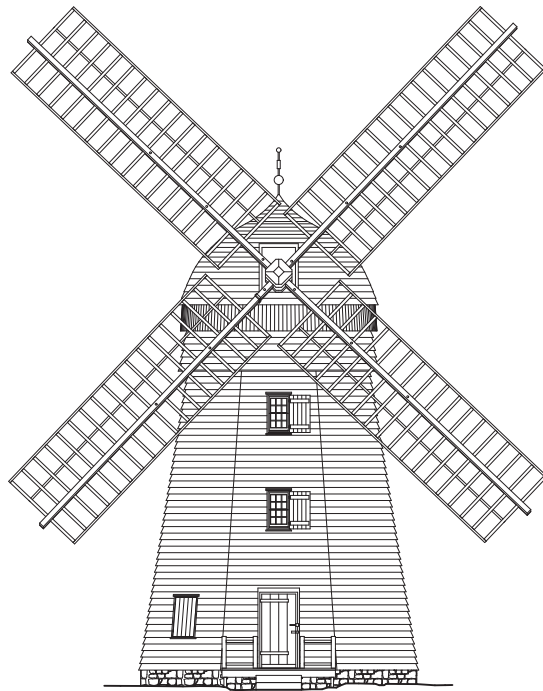


ARCHITECTURE FOR THE COMMONS

SPATIALITIES OF RESOURCE PROCESSING AND
THE PROMISE OF CONTEMPORARY COLLECTIVITY



YANN KOZEL

ARCHITECTURE FOR THE COMMONS

SPATIALITIES OF RESOURCE PROCESSING AND
THE PROMISE OF CONTEMPORARY COLLECTIVITY

THEORETICAL STATEMENT
EPFL
2023/2024

CHARLOTTE MALTERRE-BARTHES
DIETER DIETZ
CAPUCINE LEGRAND



2024, Yann Kozel. This is an open-access document distributed under the terms of the Creative Commons Attribution License. (CC BY <https://creativecommons.org/licenses/by/4.0>) Content can be used, reproduced and distributed, via all means and all formats, as long as the author is credited. Content from external sources is not subject to the CC BY license and their use requires the permission of their authors.

YANN KOZEL

THANKS

I express my gratitude to the teaching team for sharing their knowledge and giving valuable advices.

Charlotte Malterre-Barthes, professor in charge of the theoretical statement
Dieter Dietz, educational director
Capucine Legrand, EPFL mentor
Rubén Valdez, ALICE Lab.
Kathlyn Kao, RIOT Lab.

I would also like to extend my thanks to the people answering my inquiries and supporting me.

Alice
Amélie
Joanne
Marcelle
Mike
Pauline
Ronald
Sandrine
Tiago
Victor

TABLE OF CONTENTS

FOREWORD	9		
CHAPTER 1. Contemporary Challenges <i>The Rupture of Domesticity and Productivity: Ecological and Social Effects of Individualism</i>	13		
CHAPTER 2. Evolution of Labor <i>Questioning the Past to Rethink the Future</i>	17		
2.1 Proletariat or the Industrial Revolution and Labour as a Cog in the System	19		
2.2 Possibilities Explored or Revaluing the Individual to Consider a Collectivity	23		
CHAPTER 3. Reformulating the Commons through Architecture <i>Elinor Ostrom on Commons and the Link to Architecture</i>	25		
3.1 Common-Pool Resource	29		
3.2 Common-Pool Resource Institutions	33		
3.3 Categorising the Architecture of Resource Processing: from the Object to the Territory	39		
CHAPTER 4. Spatialities of Resource Processing: The Example of Flour in Switzerland <i>Evolution of Architecture from Objects to Territories through a Shift of Regimes</i>	41	GLOSSARY	77
4.1 Traditional Economy in Liddes (VS)	45	BIBLIOGRAPHY	81
4.2 Industrialised Capitalist Economy in Zürich (ZH)	47	TABLE OF ILLUSTRATIONS	89
4.3 A Comparison of Silos and Mills	53		
CHAPTER 5. The Promise of Contemporary Collectivity: The Role of Architects <i>Views on a Social and Ecological Productive's Space without Glorifying the Past</i>	69	APPENDIX	
		I.	Spatialities of Resource Processing
		II.	Organisers of the Commons

FOREWORD

“The scarcest resource is not oil, metals, clean air, capital, labour, or technology. It is our willingness to listen to each other and learn from each other and to seek the truth rather than seek to be right.”¹

– Donella Meadows

¹ Mazur, *Beyond the Numbers*, 32



Fig. 3: Drawing in *L'Usage du Monde*, travel literature book written by Nicolas Bouvier and illustrated by Thierry Vernet
© Thierry Vernet

Like many, I am concerned with climate change and its repercussions. As an architecture student soon to graduate, I sought ameliorations in architecture matching the current challenges.

While interested in some well-known solutions such as reforming the use of materials or collective housing, I wanted to find other possibilities following scientific reports.

After becoming familiar with the work of Elinor Ostrom on commons, spatialities of resource processing emerged as a path to explore to answer these interrogations. However, I am neither an economist nor a sociologist, or anthropologist. And I have no experience working in factories. Yet I seek to bring a spatial perspective and to bring the knowledge of experts in these sectors, who suggest new ways of approaching and dealing with our society and its history. By assembling these points of view, I seek to open imaginaries to foreseeing a better future that is more respectful and sustainable. Although without empirical justifications, the appendixes are shown as a result of this opening, as I try to explore and expand the theory of Elinor Ostrom with my spatial understanding.

Yann Kozel

CONTEMPORARY CHALLENGES

THE RUPTURE OF DOMESTICITY AND PRODUCTIVITY,
ECOLOGICAL AND SOCIAL EFFECTS OF INDIVIDUALISM

*“There are, certainly, tendencies in history. Some are powerful;
currents so strong that they are very difficult to swim against. [...] But the only laws are those we make up ourselves.”*²

– David Graeber & David Wengrow

² Graeber and Wengrow, *Au
Commencement Était*, 18,
translated



Fig. 4: Police protecting the mining installations in Lützerath, Germany, from activists. 2023 © Andrew Bear



Fig. 5: The authors of *Limits to Growth* in 1972. From left to right: Jorgen Randers, Jay Forrester, Donella Meadows, Dennis Meadows, William W. Behrens III. © Rauner Library

As the world's resources dwindle, their uncontrolled use leads to climate change.³ Scientists of the Club of Rome warned the world in 1972 already that a massive paradigm shift in our society was needed.⁴ More recently, the IPCC reiterated the same warning: radical changes are necessary in various sectors such as energy use, urbanism, and infrastructures.⁵ However, business continued as usual and no actions were taken.⁶

A historical overview shows that climate change is driven by the economic system on which our society is built; a system that glorifies competition between private owners. This leaves little room for collectivity and has led to a rupture between domesticity and productivity, where, in both cases, individualism is on the rise.

However, intellectuals are calling for a paradigm shift regarding how we view history. The present work, especially, is interested in Elinor Ostrom's work on commons.⁷ This approach will be investigated along with the possible links of this groundbreaking research in regard to space. First, space itself could be considered a "Common-Pool Resource", as it is a finite value. On the other hand, resource processing is directly linked to architecture, as it requires tools and significantly impact territories.

Considering the spatialities of resource processing, a case study will be analysed: wheat to bread in Switzerland, namely flour processing.

The following main questions arise: What have been the changes between a traditional economy and the capitalist economy of today and what are their impact on space and territory? Furthermore, the role of architects will be interrogated. How could the discipline of architecture be, or become, a part of this paradigm shift?

Two appendices, the first on architectural devices and the second on forms of collective institutions, articulate imaginaries.

³ MétéoSuisse, "Changement climatique mondial – état actuel des connaissances."

⁴ Final Warning: Limits to Growth.

⁵ GIEC, "Réchauffement planétaire de 1,5 °C.", 15

⁶ Final Warning: Limits to Growth, 28'42

⁷ Elinor Ostrom (1933-2012), has been awarded the 2009 Nobel Prize in Economics for her groundbreaking research on commons. The present work investigates many of her writings (see Bibliography), but more specifically her discourse in Stockholm during the reception of her Nobel Prize, which summarize many of her statements and findings.

EVOLUTION OF LABOUR

QUESTIONING THE PAST TO RETHINK THE FUTURE

*“The history of agrarian societies teaches us that people have always found ways to diversify their crops in a sustainable way, without privatizing the land or surrendering its management to a class of overseers. Communal land tenure systems, “open fields” principles, periodic redistribution of plots and cooperative management of grazing land are all formulas that have been applied for centuries in certain regions.”*⁸

– David Graeber & David Wengrow

⁸ Graeber and Wengrow, *Au Commencement Était*, 318, translated



Fig. 6: Working at Ford factory. Despite the success that the assembly line brought to the company, many skilled workers found the work monotonous and exhausting. Pictured here are workers in the tool and die department in the pressed-steel building at the River Rouge plant.

© The Henry Ford Museum

How did individualism and a devaluation of individuals and through it, of collectivities emerged? Why is a part of the population the “proletariat” – denigrating appellation from the Latin “proles” –lineage–, meaning people who only have their children left as a value for society.⁹

⁹ Reynaert, *La grande histoire du monde*, 393

2.1 PROLETARIAT OR THE INDUSTRIAL REVOLUTION AND LABOUR AS A COG IN THE SYSTEM

Economic liberalism replaced mercantilism in the 17th and 18th centuries. As it was considered before that the wealth of a nation was quantified on the amount of gold and silver it possesses, François Quesnay considered that wealth was instead land, and another founding figure of economic liberalism, Adam Smith, thinks that it is not only land, but labour.¹⁰ Along with this thought, Thomas Hobbes theory, although considering humans as selfish individuals and only capable of open war, had also a significant impact on liberalism.¹¹

¹⁰ Ibid, 328-329

¹¹ Graeber and Wengrow, *Au Commencement Était*, 15

In this context, in the beginning of the 17th century, and due to deforestation, wood is replaced by coke to melt metals, though increasing the speed by its efficiency and low cost.¹² In the second part of the century, the power of steam is brought by James Watt.¹³ These new mechanisms and the view on labour, shake the society.¹⁴ Indeed, Simone Weil states that “*things play the role of men, men play the role of things; this is the root of evil*”.¹⁵

¹² Reynaert, *La grande histoire du monde*, 388

¹³ Ibid.

¹⁴ Ibid, 389

¹⁵ Weil, *Conditions premières d'un travail non servile*, 53, translated



Fig. 7: The opening scene of *Modern Times* by Charlie Chaplin, where the workers emerging from the subway are compared to a herd of sheep, in which the main character does not fit (“black sheep”). The workers can be seen rushing to clock in on time, as there are no words exchanged.

Modern Times © Roy Export S.A.S.

The rural exodus of young people comes with new constraints, such as a daily schedule, owner control and loss of autonomy.¹⁶ This new system, where in contrary of traditional economy, workers have no more protections, leads to a “*human disaster*”.¹⁷ No surprise here, as the economic system of Taylor, Smith and others is based on considering that any human is bad.¹⁸

This dehumanisation is fulfilled of servitude due to the pointing clock and a path dominated by the thought of arriving on time.¹⁹ The factory turns workers into foreigners, exiles and uprooted in their own country.²⁰ Because the worker has no link to the space, they arrive and must show an ID card, it is not their home; it is the home of the processed parts.²¹ (cf. Fig. 7)

The fear of reprimand and expulsion and the desire for money and speed, do not allow workers to feel any other people around them.²² Added to impersonal subordination, it stops any fellowship to be created.²³ The only social relations are made of dependency rather than assistance, and cooperation and mutual appreciation are limited to higher spheres.²⁴ Not only is any collectivity though prevented in productivity, but when the workers have only the urge to go home after a day in a place they hate and are disgusted by, they arrive in domestic space, where individualism is also rising.²⁵ Indeed, the size of households is constantly shrinking.²⁶ Where could any form of collectivity be found in society?

Her experience in several factories leads Simone Weil to think that “*No society can be stable when a whole category of workers works every day, all day, with disgust.*”²⁷

¹⁶ Ferrez et al., “Scie et Moulins de Sarreyer.”, 3

¹⁷ Reynaert, *La grande histoire du monde*, 393, translated

¹⁸ Graeber and Wengrow, *Au Commencement Était*, 18

¹⁹ Weil, *Conditions premières d'un travail non servile*, 42

²⁰ Ibid, 61

²¹ Ibid, 64, 57

²² Ibid, 56-57

²³ Ibid, 52

²⁴ Ibid, 49, 52-53

²⁵ Ibid, 65

²⁶ OFS, “Personnes en ménages privés selon la taille du ménage - 1930-2022.”

²⁷ Weil, *Conditions premières d'un travail non servile*, 79, translated



Fig. 8: Simone Weil, philosopher and activist, depicted the life in factories in writings such as *The Need for Roots*



Fig. 10: David Wengrow, archaeologist & David Graeber, anthropologist, authors of *The Dawn of Everything*.



Fig. 9: Elinor Ostrom, Nobel in economics for her research on commons.



Fig. 11: Jane Jacobs, journalist and urban theorist, author of *The Death and Life of Great American Cities*.

2.2 POSSIBILITIES EXPLORED OR REVALUING THE INDIVIDUAL TO CONSIDER A COLLECTIVITY

However, all this pessimistic view on history must be redefined according to David Graeber and David Wengrow.²⁸ Indeed, they state that humans have always been capable of making good, in contrary to the paradigm on which our economic system is built.²⁹ In a sentence, to recentre human into its own history, no more considering the latter by technological stages.³⁰ For example, they think that what we call “primitive trade” was based on social relations, an extension of friendship, rather than the proof that human is made for capitalism.³¹

In urbanism, Jane Jacobs thinks that the city is not about buildings, it is about people.³²

For economy, Elinor Ostrom would also like to shift paradigms.³³ Her views are corroborated by the claim of the IPCC report that there is a direct link between reducing inequalities and fighting against climate change.³⁴ Indeed, as the global common good is climate, and one condition for a common good to be managed sustainably is equity and comprehension between the members.³⁵ She also responds to Thomas Hobbes – who thought that conventions without a sword are just words – that conventions, even without sword, are what make self-governance possible.³⁶

²⁸ Graeber and Wengrow, *Au Commencement Était*, 17

²⁹ Ibid, 30

³⁰ Ibid, 17

³¹ Ibid, 40-43

³² Citizen Jane: Battle for the City, 3'50

³³ Ostrom et al., *Discours de Stockholm*, 5

³⁴ GIEC, “Réchauffement planétaire de 1,5 °C.”, 22

³⁵ Ostrom et al., *Discours de Stockholm*, 25, See next chapter

³⁶ Cardenas and Sethi, “Elinor Ostrom : Par-Delà La Tragédie Des Communs.”

REFORMULATING THE COMMONS THROUGH ARCHITECTURE

ELINOR OSTROM ON COMMONS AND THE LINK TO ARCHITECTURE

“Human beings have more complex motivational structures and a greater capacity to resolve social dilemmas than older theories of rational choice suggest.”³⁷

– Elinor Ostrom

³⁷ Ostrom et al., *Discours de Stockholm*, 88-89, translated

		Prisoner 2	
		Denial (remain silent)	Confession (betray)
Prisoner 1	Denial (remain silent)	1 month each	10 years for Prisoner 1 Prisoner 2 free
	Confession (betray)	Prisoner 1 free 10 years for Prisoner 2	5 years each

Fig. 12: Prisoner’s dilemma.

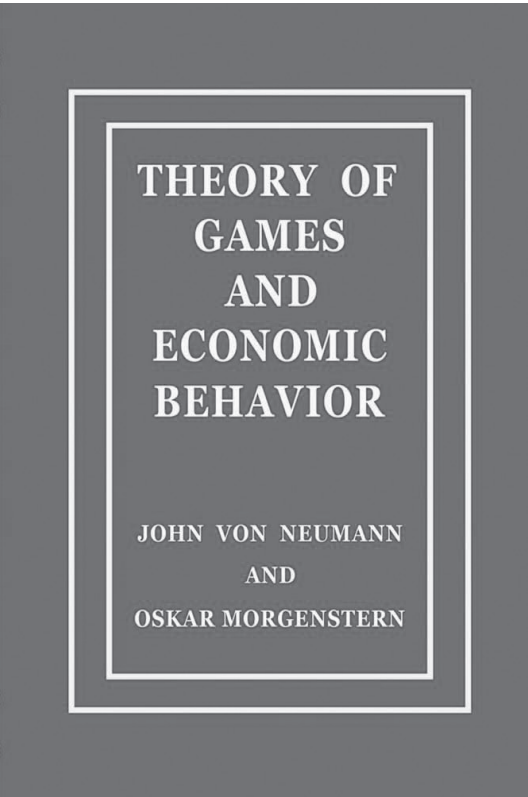


Fig. 13: John von Neumann and Oskar Morgenstern wanted to redesign world’s economy based on rational behaviours. *Theory of Games and Economic Behavior* cover, 1944.

Some economists believed that shared natural resources were meant to be overexploited.³⁸ Garrett Hardin wrote an essay on the subject, giving an example of a shared pasture, doomed to self-destruction as every owner chooses their own selfish good over the group stake.³⁹ Corresponding to a well-known situation in mathematics, the prisoner dilemma (cf. Fig. 12). Elaborated by John von Neumann and Oskar Morgenstern in 1944 (cf. Fig. 13), it refers to a situation in which two convicted are faced to a binary choice: confess or deny. The obvious best choice for both would be to deny, a Pareto-optimal situation.⁴⁰ However, as it a non-cooperative game in which both actors have the complete information but cannot communicate, the rational solution for each would be to confess. Indeed, whatever would be the decision of the second actor, the confession option would be better for the first actor, called the dominant strategy.⁴¹ This dilemma fascinates scientists, as a rational decision leads to an irrational solution.⁴²

But Elinor Ostrom proves the opposite, and that shared resources can be sustainable.⁴³ Indeed, the decision might be different in an individual rational situation or in a collective rational situation.⁴⁴ This emphasizes the importance of communication when faced to a problem. Ostrom analysed numerous case studies in favour of this statement, such as the NIIS (Nepal Irrigation and Institutions System) where an irrigation system self-governed by farmers obtained better results than when being managed by the government.⁴⁵ Ostrom also started the IFRI (International Forestry Resources and Institutions) initiative where 14 research centres analyse data from 250 communities across 15 countries.⁴⁶

³⁸ Ostrom et al., *Discours de Stockholm*, 5

³⁹ Hardin, “The Tragedy of the Commons.”, 1244

⁴⁰ Ostrom and Baechler, *Gouvernance des biens communs*, 17.

⁴¹ Ibid, 16.

⁴² Ibid.

⁴³ Ibid, 17-18.

⁴⁴ Ostrom et al., *Discours de Stockholm*, 14

⁴⁵ Ibid, 72

⁴⁶ Cardenas and Sethi, “Elinor Ostrom : Par-Delà La Tragédie Des Communs.”

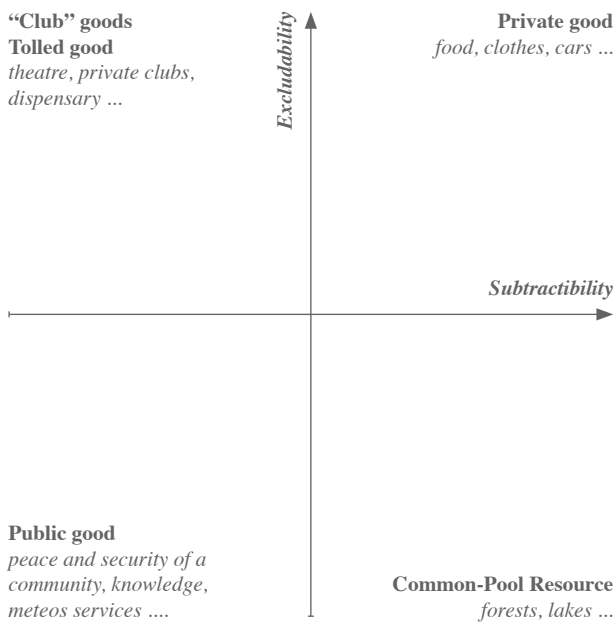


Fig. 14: Four types of goods. Elinor and Vincent Ostrom actualised the three previously accepted types of goods and added a fourth, Common-Pool Resource. This diagram is adapted from the one depicted in Ostrom's work, adding variables scales.

BUNDLE OF COMMON-POOL RESOURCE PROPERTY RIGHTS

- 1. Access**
or the right to enter in a specific property.
- 2. Withdrawal**
or the right to exploit certain products in a Common-Pool Resource.
- 3. Management**
or the right to transform a resource and to regulate it, following internal use schemas.
- 4. Exclusion**
or the right to decide on the access, the right of withdrawal and the management right.
- 5. Disposal**
or the right to rent or to sell any of the four rights above.

3.1 COMMON-POOL RESOURCE (CPR)

Elinor and Vincent Ostrom actualised the classification of goods made by Samuelson and enhanced by Buchanan, until having four types of goods (cf. Fig. 14).⁴⁷ Indeed, two types of goods were vastly accepted and determined by Samuelson in 1954: private and public. The first being purely exclusive and with competition and the second non-exclusive and without competition.⁴⁸ Buchanan then added in 1965 the "club" goods with commonly-shared private property and without competition.⁴⁹ Elinor and Vincent Ostrom completed this by adding the Common-Pool Resource, which are non-exclusive and with competition.⁵⁰ It is one of the four modifications they applied, the others being: Replace the term consummation rivalry (competition) by subtractibility of use. Conceive subtractibility and excludability as variables ranging from low to high rather than binary parameters. Rename the club goods by tolled goods.⁵¹

Ostrom and Schlager established five rights that users of a Common-Pool Resource enjoy together, forming a bundle of property rights.⁵²

⁴⁷ Ostrom et al., *Discours de Stockholm*, 45-46
⁴⁸ Ibid, 45, 41
⁴⁹ Ibid, 45-46
⁵⁰ Ibid, 46
⁵¹ Ibid.

⁵² Ibid, 59

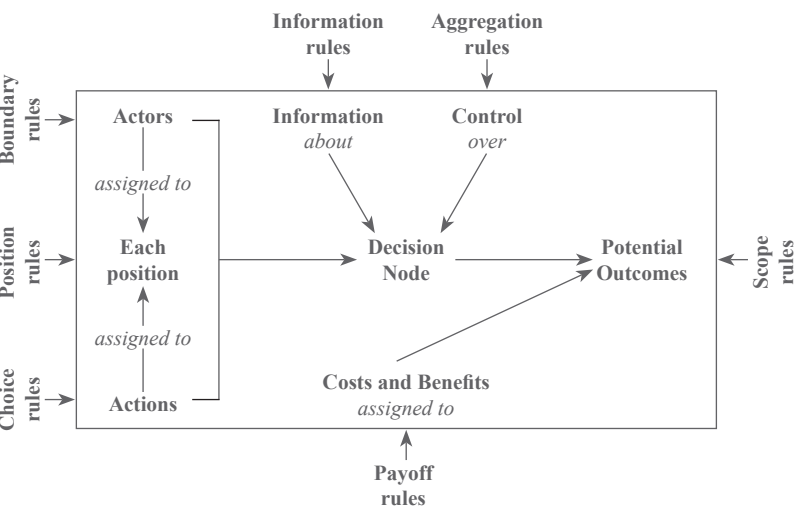


Fig. 15: Where Different Types of Rules Enter Action Situations.

RULES FROM EXTERNAL VARIABLES

- 1. Position rules**
create a number of positions and number of actors occupying it.
- 2. Boundary rules**
define which actors are chosen to occupy or leave which position.
- 3. Choice rules**
prescribe which actions the actors in positions must, must not, or may take in various circumstances.
- 4. Aggregation rules**
determine how many and which actors must participate in a given collective or operational-choice decision.
- 5. Informations rules**
authorize which channels of informations flows are available to actors, including assignation of obligations, permissions, or prohibitions on communication.
- 6. Payoff rules**
assign rewards or sanctions to particular actions that have been taken or based on outcomes.
- 7. Scope rules**
delimit the range of possible outcomes. In the absence of a scope rule, actors can affect any physically possible outcomes.

To these, they added seven general types of rules as external variables affecting diverse situations, and exemplified them in a schema representing a specific action and where the rules have any effect.⁵³ These may be implemented by an external actor or by the community itself. The following rules are generic and do not represent all the rules they encountered during their research.⁵⁴ (cf. Fig. 15)

⁵³ Ostrom et al., *Discours de Stockholm*, 60-61

⁵⁴ Ibid, 61-62

CONDITIONS OF CPRI's EMERGENCE _ ATTRIBUTES OF THE RESOURCE

1.

Possibilities to ameliorate the state of a resource

the resource system is not in a state of degradation, or in contrast in a state of under-utilization, which would make it useless for its users to organize to improve its management.
2.

Indicators

reliable and valid indicators concerning the state of the resource system are accessible in abundance and at a relatively low-cost.
3.

Predictability

availability of unit flows is relatively predictable.
4.

Spatial perimeter

the relationship between technologies of transport and communication at disposal and the perimeter of the resource system allow the users of the resource to dispose of a precise knowledge of the system limits, along with the diverse inter characteristics.

CONDITIONS OF CPRI's EMERGENCE _ ATTRIBUTES OF THE USERS

1.

Dependency on the resource

the users of the resource are dependents for a good part of their own sustenance means.
2.

Common understanding

the users share a common vision of the system resource system operation (attributes of the resource previously quoted), along with the effects of their actions on other users and on the resource system.
3.

Low discount rate

the users expect a low discount rate on the resource flow concerning the future benefits from the use of the resource.
4.

Mutual trust and reciprocity

the users trust each other and are engaged in relations full of reciprocity.
5.

Autonomy

the users have the possibility of independently defining rules of access and of use on the resource from the external authorities.
6.

Earlier experience and local leadership

the users are equipped with minimal abilities in the sector of organization and management thanks to their participation to other forms of association or to the observation of organizational experiences developed by neighbouring self-organized groups.

3.2 COMMON-POOL RESOURCE INSTITUTIONS (CPRI)

Elinor Ostrom then identified the broader institutional regularities present in the systems capable of lasting for a long time and absent in the ones that had failed.⁵² She first identified conditions for the emergence of CPRI, concerning the resources on the one hand and the users on the other hand.⁵³

⁵⁵ Ostrom et al., *Discours de Stockholm*, 62-63

⁵⁶ Nahrath et al., “Gestion des ressources communes en Suisse.”, 41

“DESIGN PRINCIPLES”
CONDITIONS OF CPRI’s PERPETUATION

- 1a.

Limits concerning the users

clearly defined limits and understood at the local scale, differencing legitimate users and non-users.
- 1b.

Limits concerning the resource

clearly defined limits separating the Common-Pool Resource from the larger socio-ecological system in which it lies.
- 2a.

Accordance with local circumstances

appropriation and provision rules according with the local, social, and environmental circumstances.
- 2b.

Appropriation and contribution

rules of appropriation according to provision rules; the distribution of costs is proportional to the distribution of benefits.
3.

Collective arrangements

most of the individuals concerned by a resource system are authorized to participate to the elaboration and modification of usage rules.
- 4.a

Control of users

individuals responsible in front of the users or users themselves control the nature and the quantity of user sampling.
- 4.b.

Control of resource

individuals responsible in front of the users or users themselves control the state of the resource.
5.

Graduated sanctions

sanctions for violation of rules are weak at the first infraction but gain in severity if the user re-offends.
6.

Mechanisms of conflicts resolution

existence of structures allowing to resolve conflicts between users, or with administrators, quickly, locally, and at low cost.
7.

Minimal recognition of rights

rights of local users to establish their own rules is recognized by the government or other institutions.
8.

Embedded governance

when a Common-Pool Resource is intimately linked to a larger socio-ecological system, activities of governance are organized in several embedded layers.

Along with these conditions of the emergence of CPRI, several conditions for the perpetuation of these CPRI are mentioned. More known under the name “design principles”.⁵⁷

⁵⁷ Ostrom et al., *Discours de Stockholm*, 63-64

A collective of Stéphane Narath, Jean-David Gerber, Peter Knoepfel and Christian Bréthaud analysed the role of collective management institutions in environmental politics and regional planning. They emphasized two blind spots in the theory of Elinor Ostrom: the place of the State (that may be dismissed along with its political and institutional constraints to a blind spot position) and the possible exclusive character of club goods (causing a problem of resource accessing opportunities equality).⁵⁸

⁵⁸ Nahrath et al., “Gestion des ressources communes en Suisse.”, 42

Elinor Ostrom answers to the problem of the first blind spot that “*larger regimes can facilitate local self-organization by providing accurate information about natural resource systems, providing arenas in which participants can engage in discovery and conflict-resolution processes, and providing mechanisms to back up local monitoring and sanctioning efforts*”.⁵⁹ However, contemporary societies, especially in Europe, are not favourable to developing self-organised community management institutions, because they are based on paradigms such as private property, public policy interventions on Common-Pool Resource or territorial breakdown of public action.⁶⁰ The concept of collective property has been removed from the Civil Code and a lot of self-organised communities are difficult to match with the rigid categories of the Code of Obligations.⁶¹

⁵⁹ Ostrom, “Reformulating the Commons.”, 35

⁶⁰ Nahrath et al., “Gestion des ressources communes en Suisse.”, 40

⁶¹ Ibid.

Although these statuses may be restrictive, Elinor Ostrom emphasizes that governments and public policies are not necessarily predatory to the forms of CPRI’s.⁶² She insists that coexistence of public policies and CPRI’s are possible if the state’s control does not too much restrain the autonomy and the self-organisation of the communities.⁶³

⁶² Ibid.

⁶³ Ibid.

HYPOTHESES ON PERPETUATION OF CPRI
IN ACCORDANCE TO CONTEMPORARY PUBLIC POLICIES

1.

Mediation

the role of CPRIs should be to translate public policies management goals, facilitating behaviour shifts.
2.

Imbrication and multi-positionality

integrate/embed CPRIs in locals political-administrative arrangements for implementing resource management policies (paying attention to the risk of conflict/collusion).
3.

Division of labour and complementarity

necessity to respect the autonomy of CPRIs from the political-administrative arrangements. Clearly defined boundary between the works of the CPRIs and the locals and regionals public political-administrative arrangements.

During the 20th century, political analysts had the aim to push the government to elaborate institutions forcing individuals to have only their self-interest in mind and to succeed by this mean.⁶⁴ However, empirical research by Elinor Ostrom suggests that one of the main aspects any public policy should facilitate is the development of institutions making the most of human best abilities.⁶⁵ This is also what many intellectuals in various sectors think, like Graeber and Wengrow presented earlier, or Bernard Stiegler who states that the condition to overcoming current difficulties is to elevate collective intelligence, despite the current paradigm that reprimed people’s talents rather than cultivating them.⁶⁶ Simone Weil, in her critique of industrialised factories systems, suggests that a possible solution to this disaster would be to shift the working organisation in order to let a certain amount of autonomy in the workshops from the establishment, and for the people from the workshops.⁶⁷ In a larger context, it is also what IPCC advises: having systemic transitions in order to set up governance tools, and doing so by respecting the local and indigenous knowledges.⁶⁸

In the effort to try to match the conditions of CPRIs to the context of the contemporary governments, three hypotheses may be suggested.⁶⁹ (cf. adjacent list)

They believe that respecting these conditions of embedded CPRIs in political-administrative arrangements, the perpetuation of CPRIs is clearly possible.⁷⁰ And that another reason for their success may be following their role of models and inspiration sources by the creation and redefinition of local and internal arrangements, being then considered as alternate forms of resource management with legitimacy.⁷¹ Indeed, several forms of CPRIs or self-organised communities approaching the concept of CPRIs are old and have demonstrated their efficiency.⁷²

⁶⁴ Ostrom et al., *Discours de Stockholm*, 89

⁶⁵ Ibid.

⁶⁶ Stiegler and Kyrrou, *L’emploi est mort, vive le travail !*, 75-76

⁶⁷ See chapter 2. Weil, *Conditions premières d’un travail non servile*, 76

⁶⁸ GIEC, “Réchauffement planétaire de 1,5 °C.”, 22

⁶⁹ Nahrath et al., “Gestion des ressources communes en Suisse.”, 44-45

⁷⁰ Ibid, 50

⁷¹ Ibid.

⁷² Ibid. See Appendix II

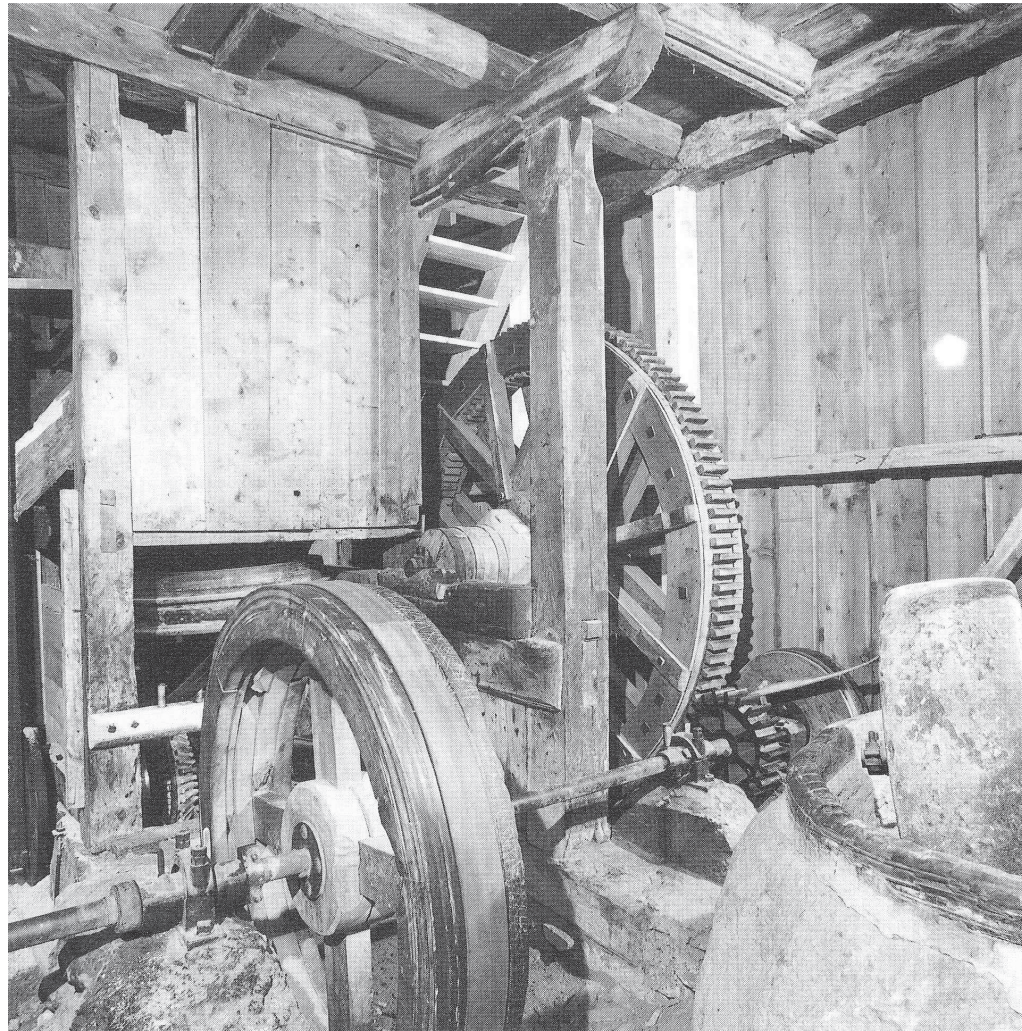


Fig. 16: Components of a vertical wheel mill in Sarreyer. © Jean-Marc Biner

3.3 CATEGORISING THE ARCHITECTURE OF RESOURCE PROCESSING: FROM THE OBJECTS TO THE TERRITORY

A first way to link architecture with Elinor Ostrom theory would be to consider domestic space and urban space as a Common-Pool Resource, as for the case of Switzerland the built surface has not ceased to grow for decades, following the population and space needed per capita growths.⁷³ Indeed, in 21 cantons, the part of built surface compared to total surface has grown from 7.9% to 10.3% between 1982 and 2015.⁷⁴ This interesting approach corroborates with the IPCC report, as they advise a change of land use and urban planning practices.⁷⁵

However, another approach would be to consider the impact of resource processing on architecture, and the evolution of this impact in the shift from a traditional economy to the current industrialised economy. This approach also corroborates with the IPCC report as changes in practices are needed in various sectors. For example, in the industrial sector, a reduction of 65% to 90% of CO₂ emissions is necessary.⁷⁶ Less consuming diets are also advised, as exploring the traditional economy could bring back local consumption.⁷⁷ Moreover, regarding the explorations mentioned earlier, a more humanistic approach of labour could be found again, rather than the beneficiary shift in transports use.⁷⁸ A world with more social relations and self-organised communities with less poverty and inequalities are mentioned several times as a primary factor to try to repair the damage done.⁷⁹

To try to understand the differences at several levels (and without excluding any form of collectivity, as such can be found in every layer or scale of these resource processing), a scaling will be done. Starting with the resource, or value (XS), it is processed by an object (S), in a structure (M), embedded in a larger infrastructure (L), and implanted in a territory (XL).

⁷³ OFS, "Évolution Des Surfaces d'habitat et d'infrastructure.", 1

⁷⁴ Ibid.

⁷⁵ GIEC, "Réchauffement planétaire de 1,5 °C.", 16

⁷⁶ Ibid, 15

⁷⁷ Ibid, 16

⁷⁸ Ibid, 15

⁷⁹ Ibid, 18-22

SPATIALITIES OF RESOURCE PROCESSING: THE EXAMPLE OF FLOUR IN SWITZERLAND

EVOLUTION OF ARCHITECTURE FROM OBJECTS TO TERRITORIES
THROUGH A SHIFT OF REGIMES

*“Cities have the capability of providing something for everybody,
only because, and only when, they are created by everybody.”*⁸⁰

– Jane Jacobs

⁸⁰ Jacobs, *The Death and Life
of Great American Cities*, 238



Fig. 17: Le four du Village (The Village oven). A communal oven photographed, in Savièse, Switzerland.

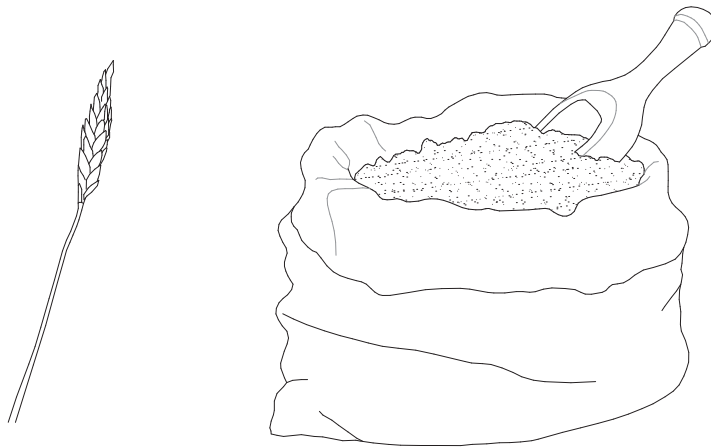


Fig. 18: Wheat to flour. The transformation process is required and has been the same for centuries.

The evolution of the trajectory from wheat to bread is a protagonist of the evolution of resource management in our society, as well as the impact of this management on architecture and urbanism. Indeed, bread is one of the most widely consumed foods worldwide and in Switzerland. Bread is a fairly simple food to produce, requiring few ingredients in which the necessity to transform wheat into flour has remained the same for centuries. This necessity allows flour processing to represent the previously mentioned evolution.

Mills have been in use since Neolithic times.⁸¹ A hydraulic mill was first mentioned in 563 in Geneva, before their use spread and formed a dense network in the Plateau region in the 13th century.⁸² Since the democratisation of their use, flour processing can be depicted in two main phases, having significantly different political, economic, and architectural characteristics. The revolutionary event that splits this timeline in two eras is the appearance of steam-powered mills during the Industrial Revolution in the 19th century, followed by electrical-powered mills in the 20th century without major characteristics changes.⁸³

⁸¹ Dubler, "Moulins."

⁸² Ibid.

⁸³ Dubler, "Meunerie."



Fig. 19: Liddes mills, 1984.



Fig. 20: The miller, 1989.

4.1 TRADITIONAL ECONOMY IN LIDDES (VS)

Given their necessity, mills were implanted without exception in every lordship, rural or urban, and near every castle or monastery.⁸⁴ The proximity of wheat fields, watercourses, and carriageways determined their placement.⁸⁵ They were often part of a bigger infrastructure containing fields, horse farms and sawmills for example.⁸⁶

Mills, mostly hydraulic powered in Switzerland, were expensive and therefore constructed by lords and given by tenure to millers; meaning that they could use the land and facilities owned by the lord in exchange of a cens (natural or monetary fee).⁸⁷ Originally these tenures were only short-termed, until the 13th century with the appearance of hereditary tenures which would generalise in the 16th century.⁸⁸ Being banalities and therefore objects of a monopoly, mills were popular investments among lords until the crisis of the landed seigneuries in the 14th and 15th centuries.⁸⁹ In the 16th and 17th centuries new mills were built and old mills were renovated, but from now on owned by farmers and millers and under the pricing jurisdiction of sovereign authorities which remunerated 5-10% of the volume to the millers and began the capitalistic era in this sector.⁹⁰

*“In the 17th and 18th centuries, the great mills of the Plateau’s cereal-growing areas became flourishing commercial enterprises.”*⁹¹

Although it is no longer in operation, the Glarey factory in Liddes along the Dranse d’Entremont river allows a detailed analysis of the mountain communes that remained on the sidelines of the industrial revolution for decades.⁹²

⁸⁴ Dubler, “Moulins.”

⁸⁵ Ibid.

⁸⁶ Dubler, “Meunerie.”

⁸⁷ See glossary. Dubler, “Moulins.”

⁸⁸ Ibid. Dubler, “Tenure.”

⁸⁹ See glossary. Dubler, “Moulins.”

⁹⁰ Ibid. Dubler, “Meunerie.”

⁹¹ Ibid, translated

⁹² Pelet, “Survivre à la révolution industrielle.”, 241



Fig. 21: Swissmill factory, Sihlquai Zürich, Switzerland. The Swissmill tower (highest grain elevator in the world, stands next to the old city mill – *Stadtmühle* – in the city centre. 2017.



Fig. 22: Swissmill employees in front of the machinery.

4.2 INDUSTRIALISED CAPITALIST ECONOMY IN ZÜRICH (ZH)

Given the innovations of the Industrial Revolution, such as steam-powered mills and the use of cast iron, the flour processing industry became even more profitable. But the most important impact was given by the creation of the cylinder mill in Switzerland.⁹³ This new machinery, costly, was not within reach of the smaller mills.⁹⁴ Leading to a significant advantage for the middle and big enterprises possessing a great capital, which renamed themselves “commercial mills”.⁹⁵

Despite the difficult times for smaller mills, they still represented a vast majority in the sector at the end of the 19th century. Indeed, only 130 mills, in Switzerland, were registered as employing more than two workers, this represented only approximately 5% of the total number of mills in the entire country.⁹⁶ An explanation could be that, despite the improvement of transport ways, such as the railway network, a large number of mills can still be found on hills and mountains, where cereal self-subsistence has persisted into modern times.⁹⁷

During the 20th century, a number of mills equipped themselves with electric mills, reaching an international reputation as “*the best and finest flour in the world*” and obtaining a proficient amount of flour, even exceeding the needs.⁹⁸ This led to a “*ruinous fighting on the home market*”.⁹⁹ This competition has led to an accelerated concentration process since 1970, where the biggest enterprises have the best chance of survival.¹⁰⁰ Therefore, the number of mills has shrunk, as an example, in the canton of Lucerne their number went from 117 in 1695 to only 3 in 2001.¹⁰¹ Furthermore, Swissmill owned by Coop, states in its 2022 report that with 220’000 tons of flour, they represent 35.6% of the market share of cereals processed in Switzerland for human consumption.¹⁰²

⁹³ Dubler, “Meunerie.”

⁹⁴ Ibid.

⁹⁵ Ibid.

⁹⁶ Ibid.

⁹⁷ Dubler, “Moulins.”

⁹⁸ Dubler, “Meunerie.”, translated

⁹⁹ Ibid, translated

¹⁰⁰ Ibid.

¹⁰¹ Dubler, “Moulins.”

¹⁰² Coop, “Rapport 2022 : Entreprises de Production.”

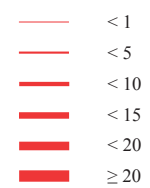
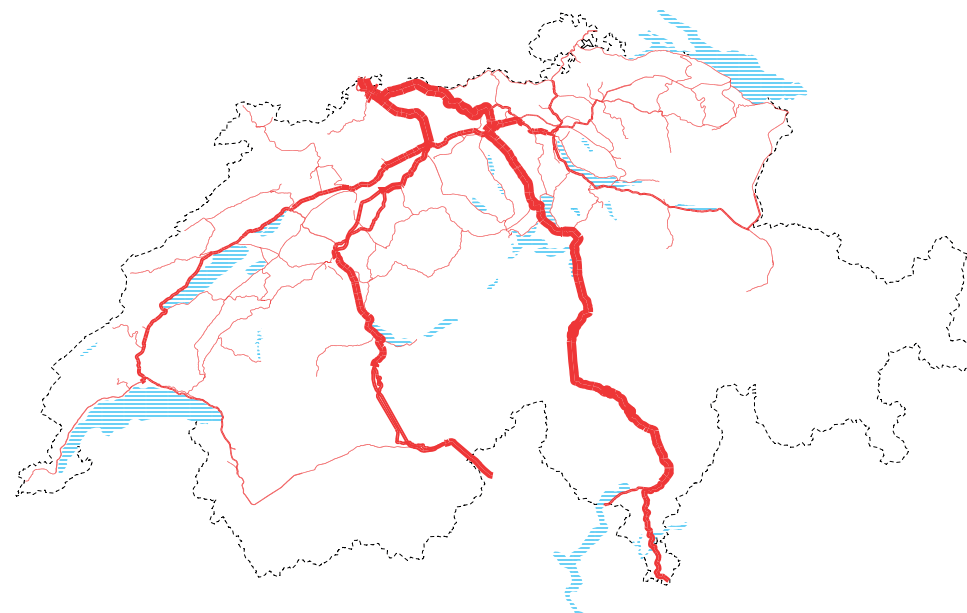
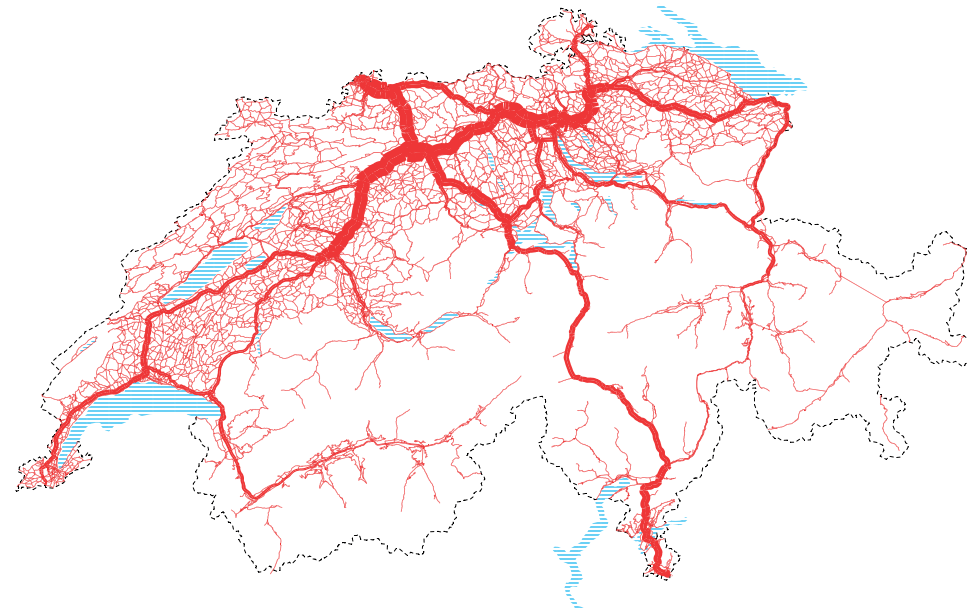
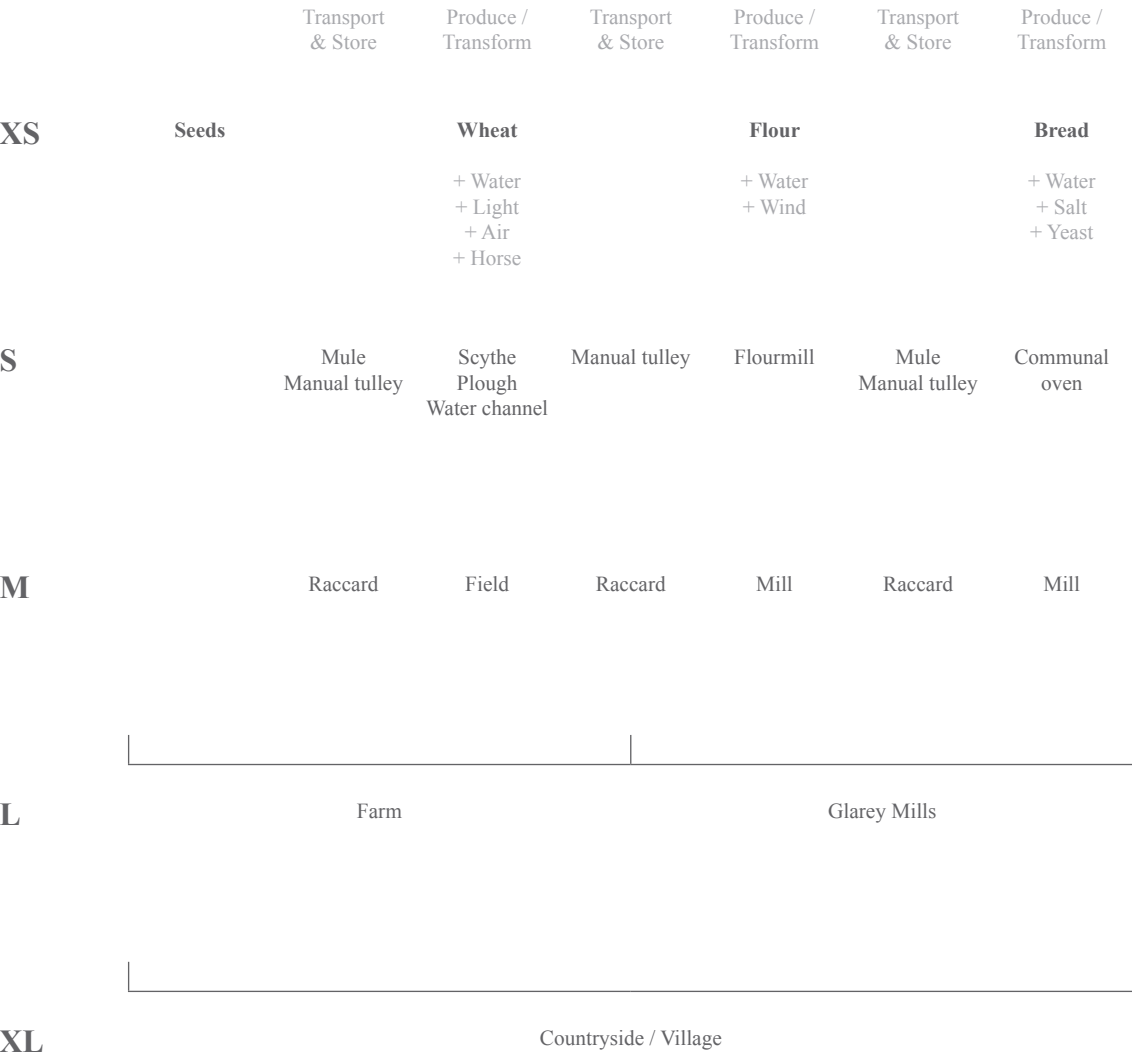


Fig. 23 & 24: Freight traffic flow in millions tons per year,
by road (above) and by rail (below) © FSO, Federal Statistical Office

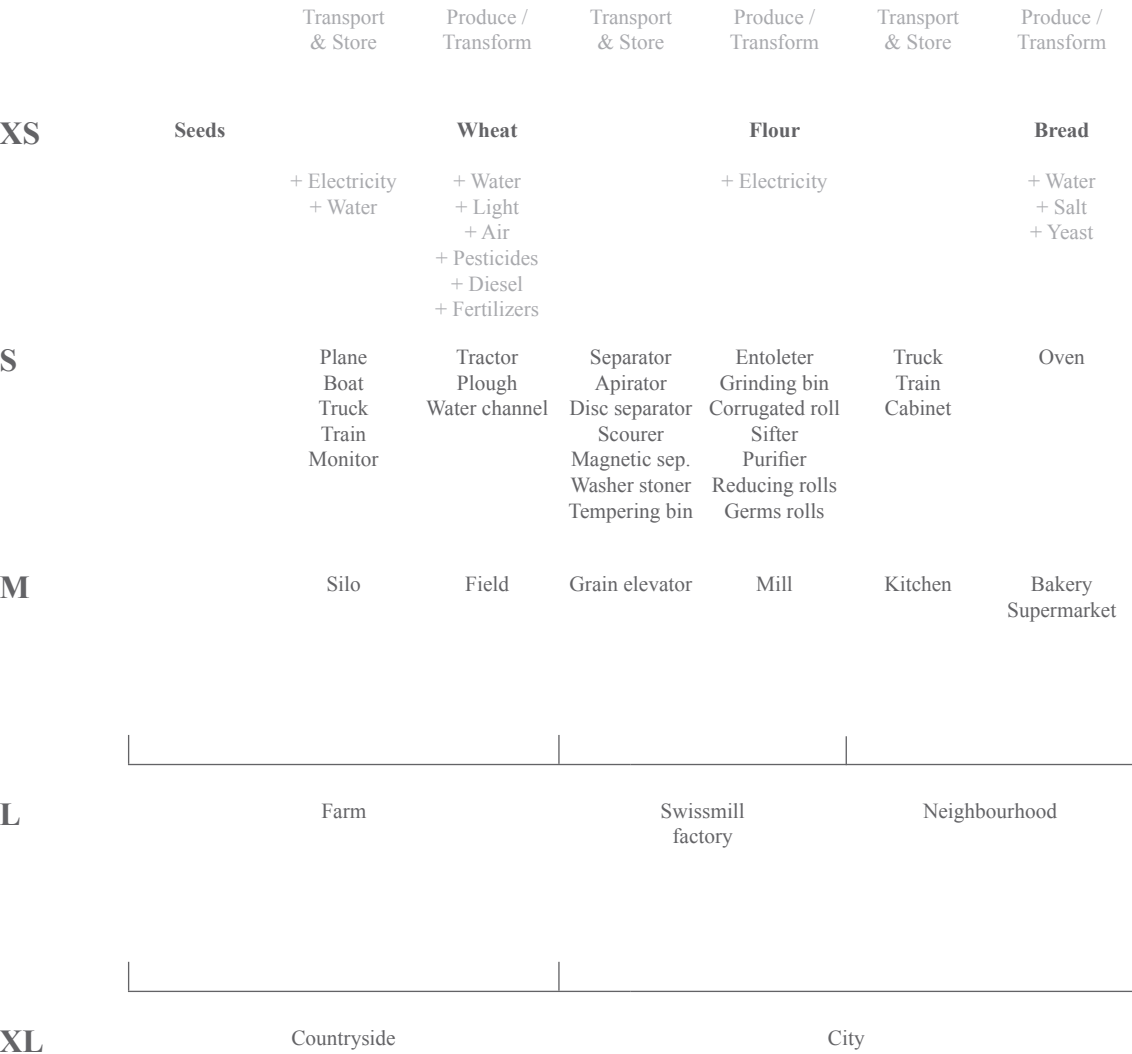


Along with the competition, the evolution of transports should be considered as having a role in the result of having more than a third of the production of flour based in one site. Indeed, since the 19th century, the accessibility in the Alps has changed. The freight traffic by road accesses the valleys, as the traffic by rail mainly stays in plain and crosses boundaries for export/import. (cf. Fig. 23, 24)

TRADITIONAL ECONOMY (LIDDES, VS)



CAPITALIST ECONOMY (ZÜRICH, ZH)



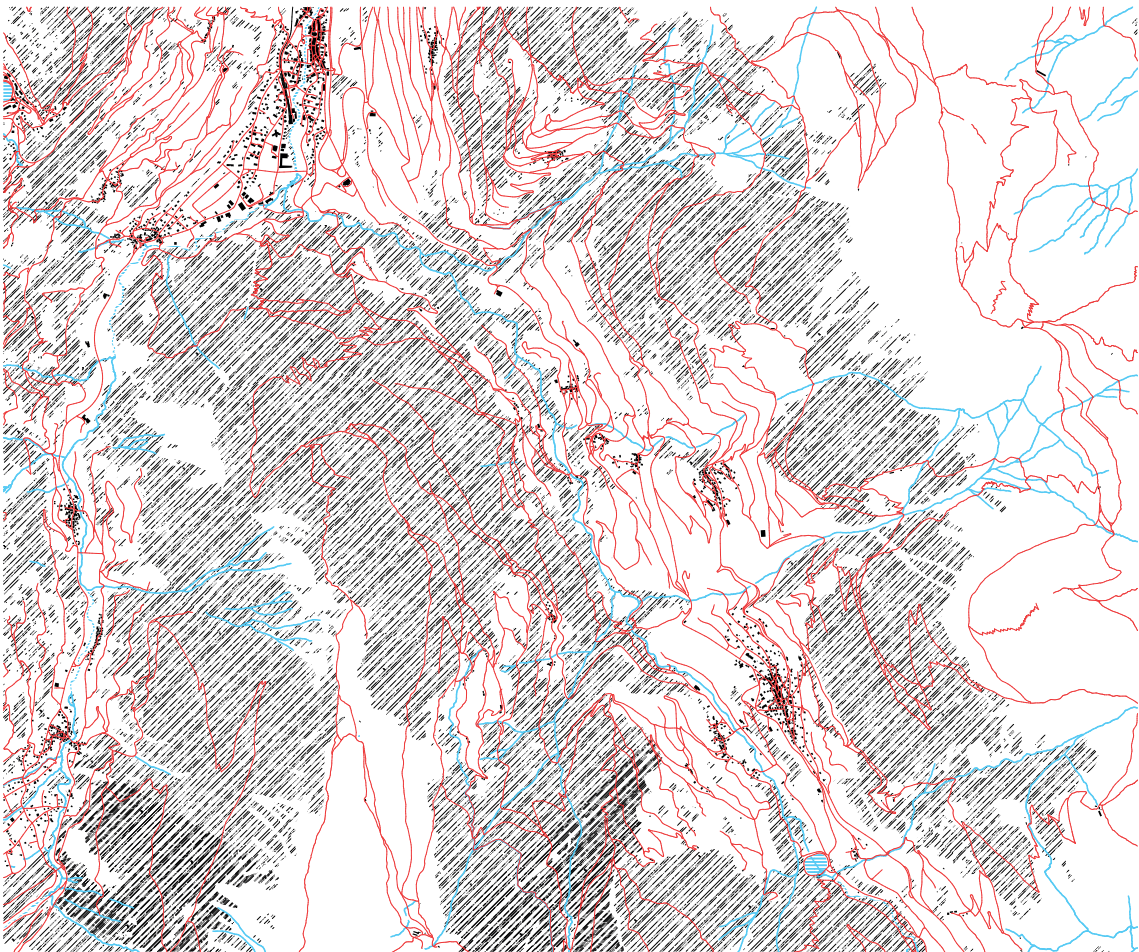


Fig. 25: Liddes

4.3 A COMPARISON OF SILOS AND MILLS

It has been said that the placement of mills was determined by the proximity of fields, carriageways, and watercourses.

The importance of today carriageways can be observed in Zürich, as the mill is located near the main rail station (cf. Fig. 26) and possesses its own railroads (cf. Fig. 30). Indeed, the site, on which each building is interconnected, can produce a large amount of flour each day and thus needs a lot of transport facilities. Whereas in Liddes, one access is sufficient, as the resources come from and are destined for the surroundings, approximatively the commune. Still, the sites have the bridge, necessary to access both sides of the river and the quality to separate in four directions (cf. Fig. 28).

The absence of proximity of wheat fields emphasises the necessity of transport facilities for Swissmill, as it is in the city centre. In contrast, the valley located in Valais offers several fields and the quantities do not require a lot of transports.

The energy in Zürich is provided by various sources, including solar panels on the facade of the Swissmill tower (cf. Fig. 29). Therefore, the proximity of the water is more a vestige of the past (as one of the factory buildings was then the city mill, “Stadtmühle”) than a necessity. While in traditional economy, the proximity of water is an absolute necessity, as the river is derived in a bisse, and several installations are installed along this bisse, five of which are equipped with hydraulic wheels (cf. Fig. 27, 28).¹⁰³

¹⁰³ See glossary

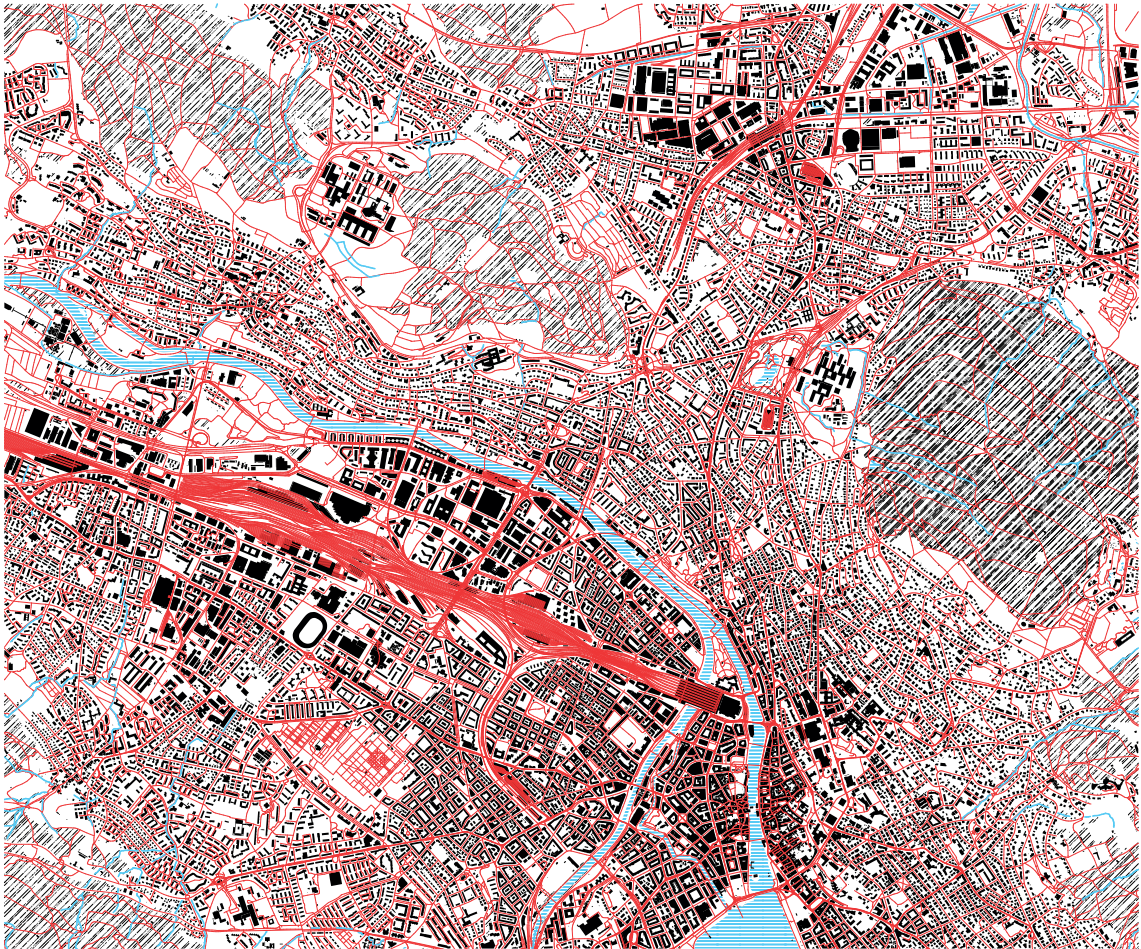


Fig. 26: Zürich

0 2500 m

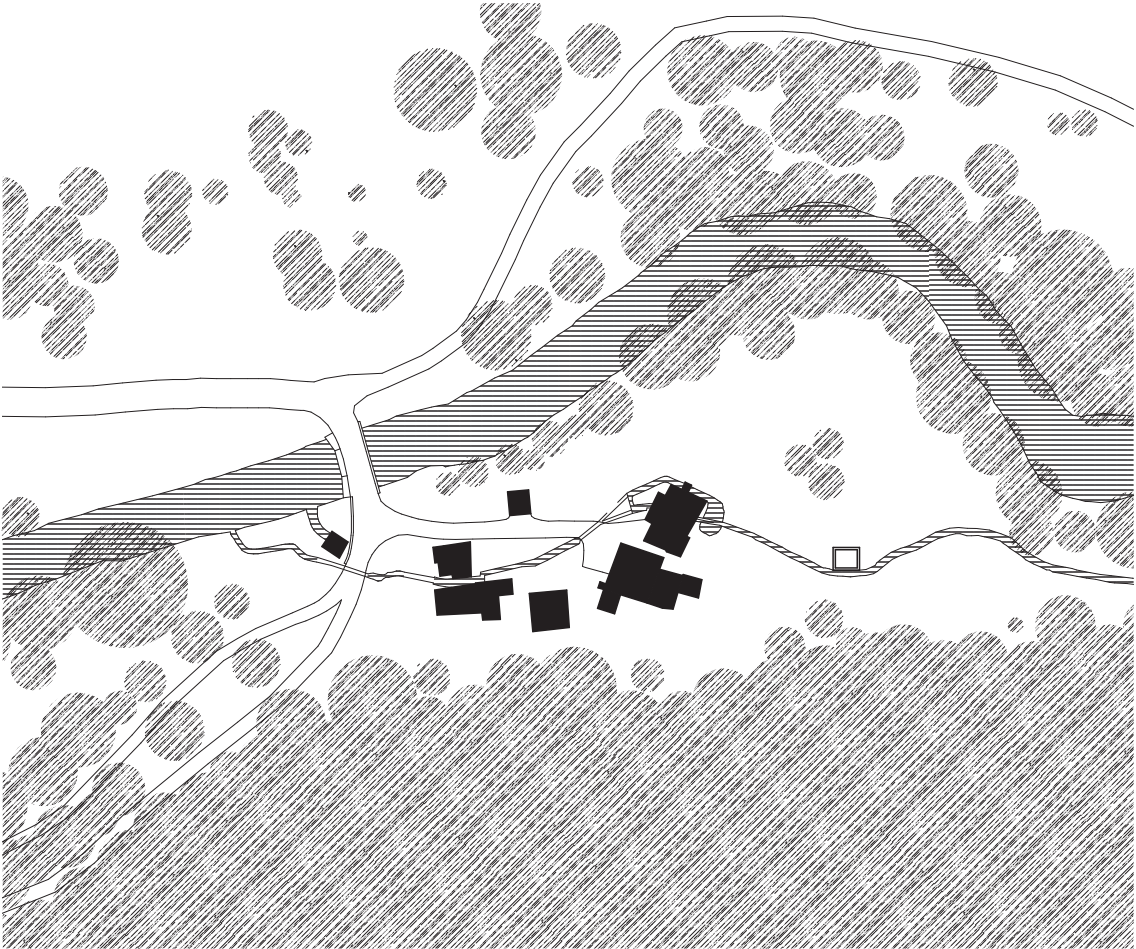


Fig. 27 & 28: Glarey mills section & plan.

0 75 m

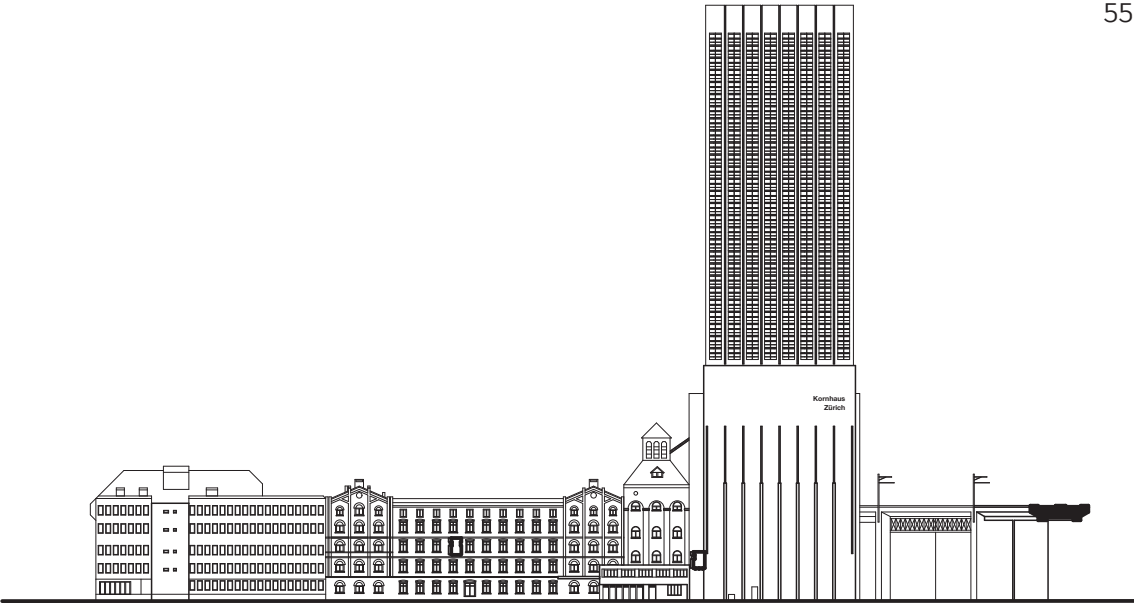
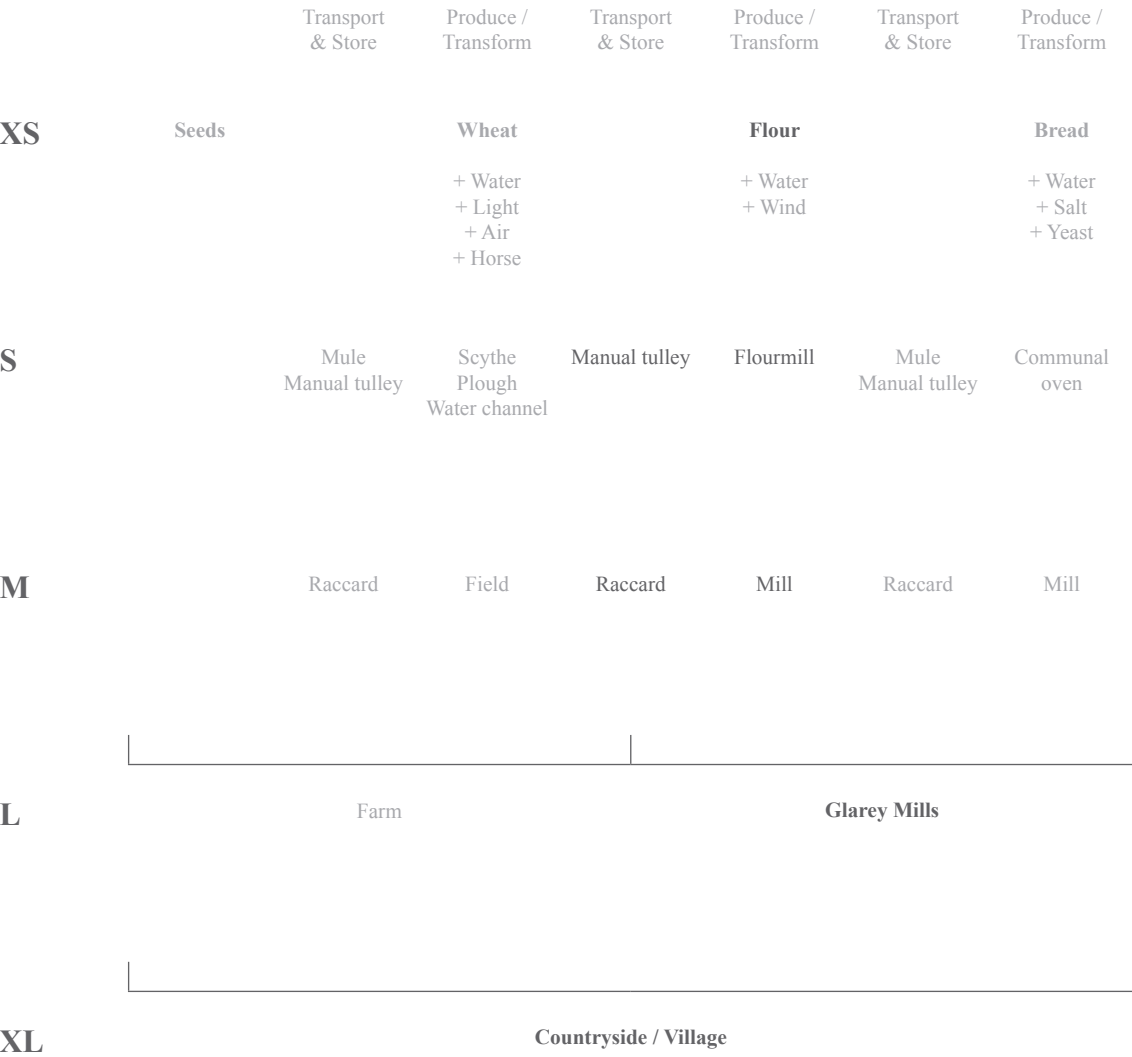


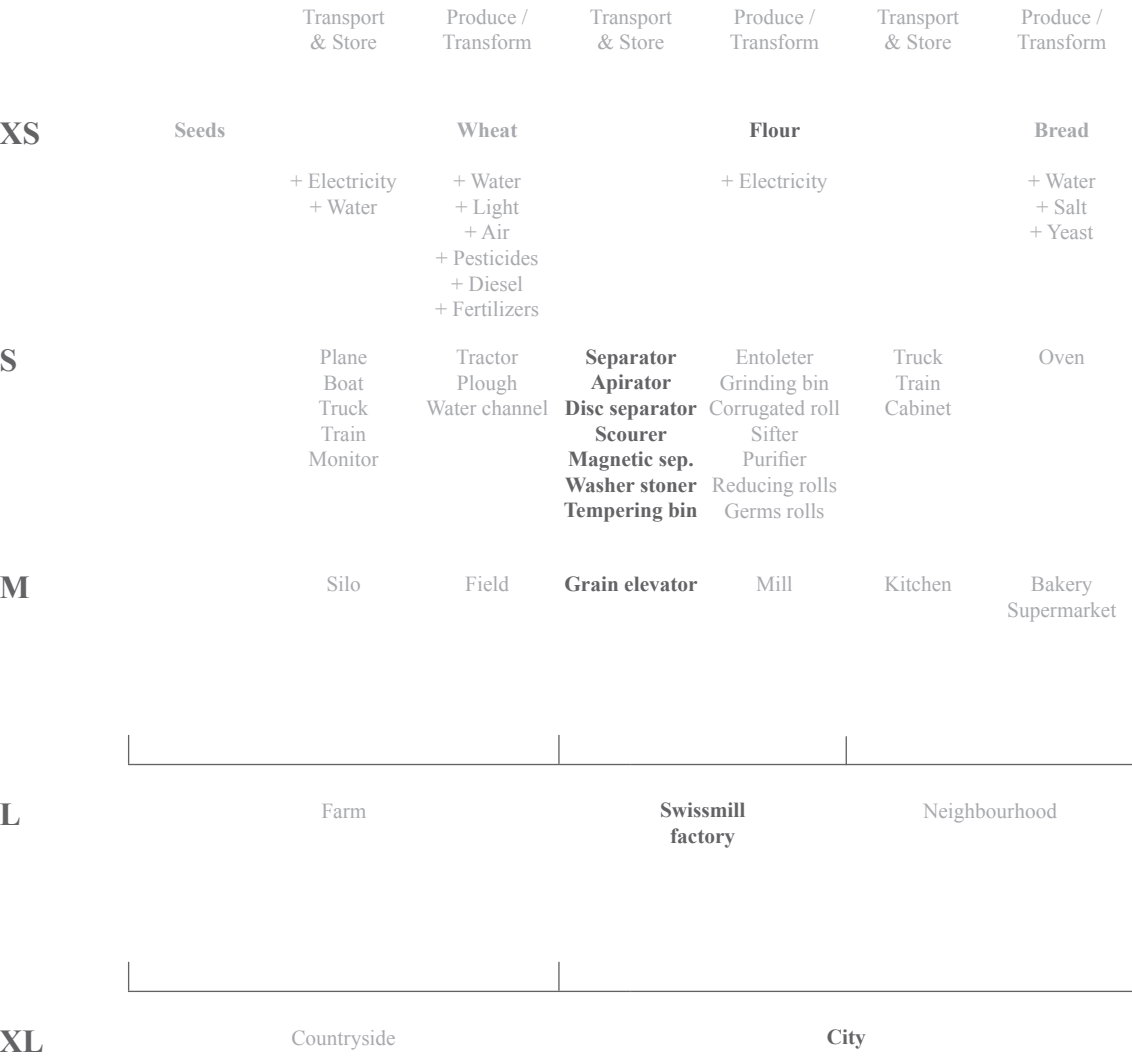
Fig. 29 & 30: Swissmill factory elevation & plan

0 75 m

TRADITIONAL ECONOMY (LIDDES, VS)



CAPITALIST ECONOMY (ZÜRICH, ZH)



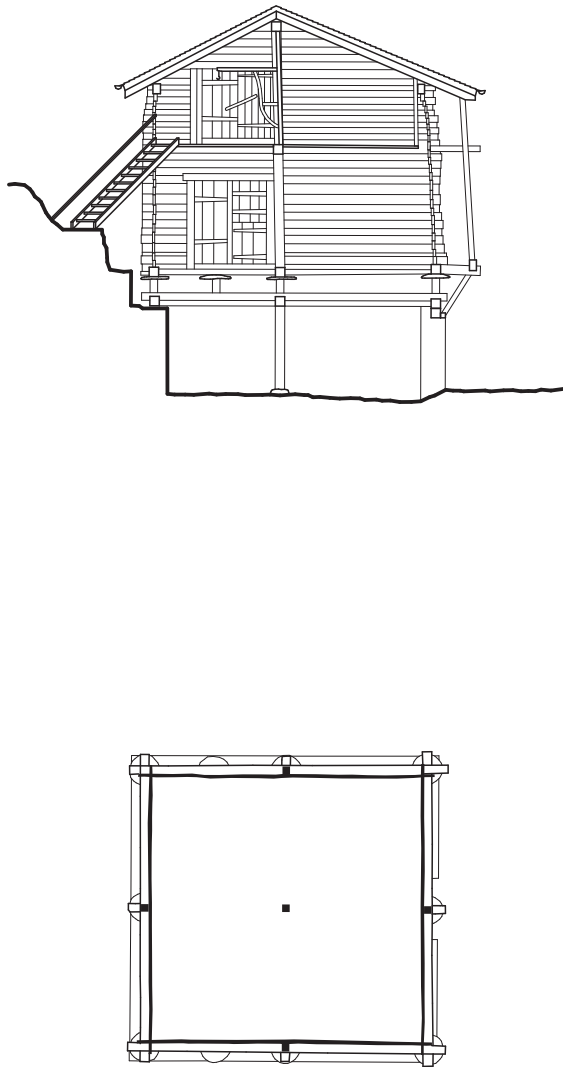


Fig. 31 & 32: Liddes raccard elevation & plan.

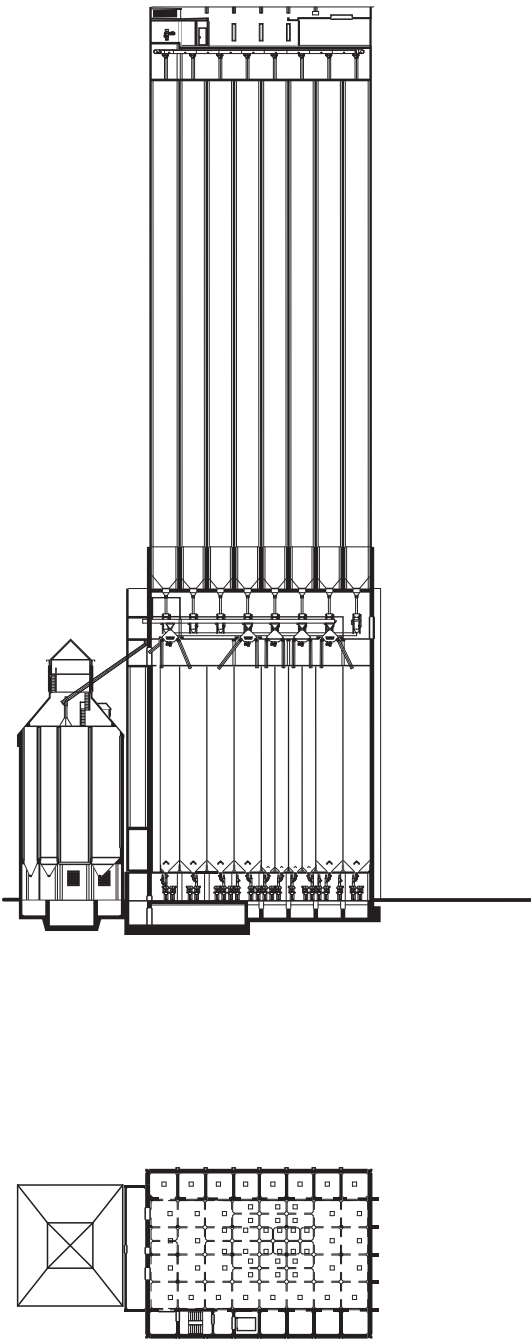


Fig. 33 & 34: Swissmill tower section & 9th floor plan.



The raccard is private and only the miller family stores their supplies. The clients arrive with their own, which are directly processed in exchange of an “émine” – a certain amount of the resource. Replaced later in the second part of the 20th century with monetary payment.¹⁰⁴

The Swissmill tower, highest grain elevator in the world, stores large amounts of resource and had to develop in height due to the urban context.

¹⁰⁴ See glossary. Pelet, “Survivre à la révolution industrielle.”, 263, 289

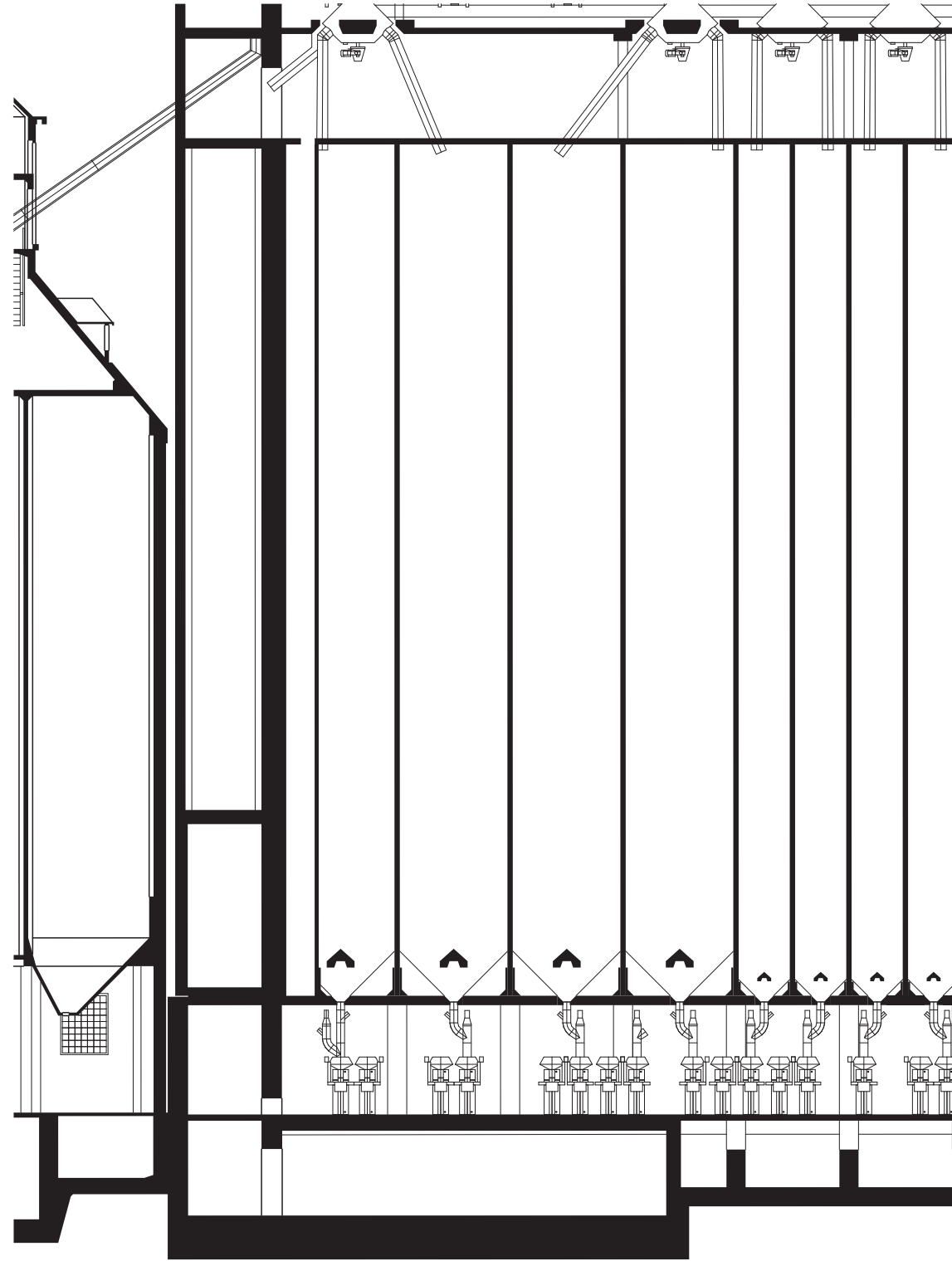


Fig. 33: Swissmill tower section.

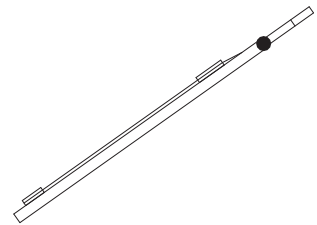
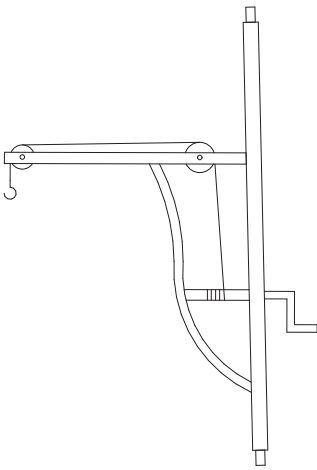


Fig. 35 & 36: Manual pulley system elevation & plan.

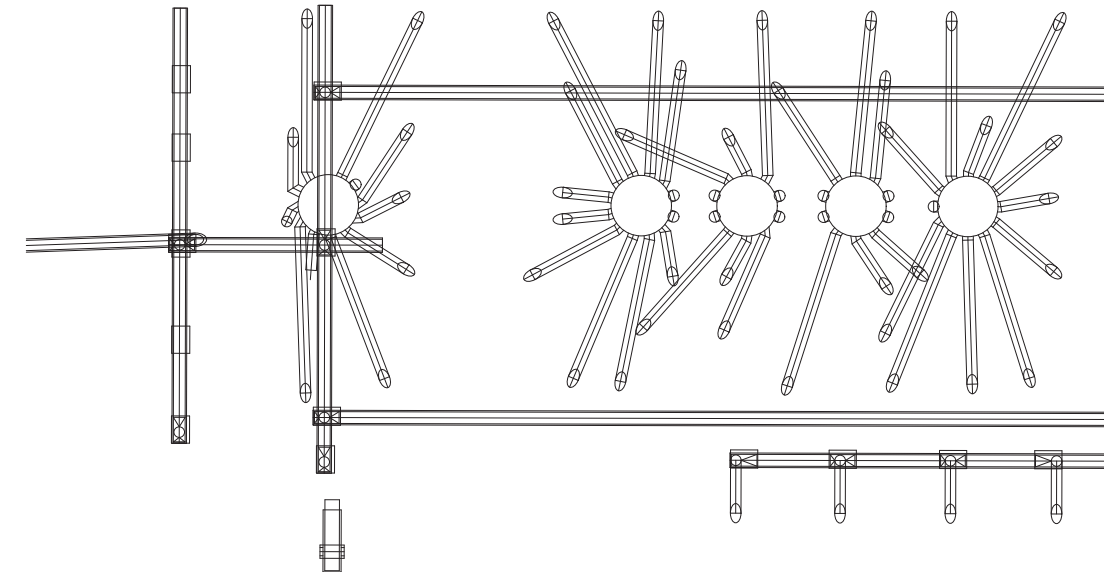
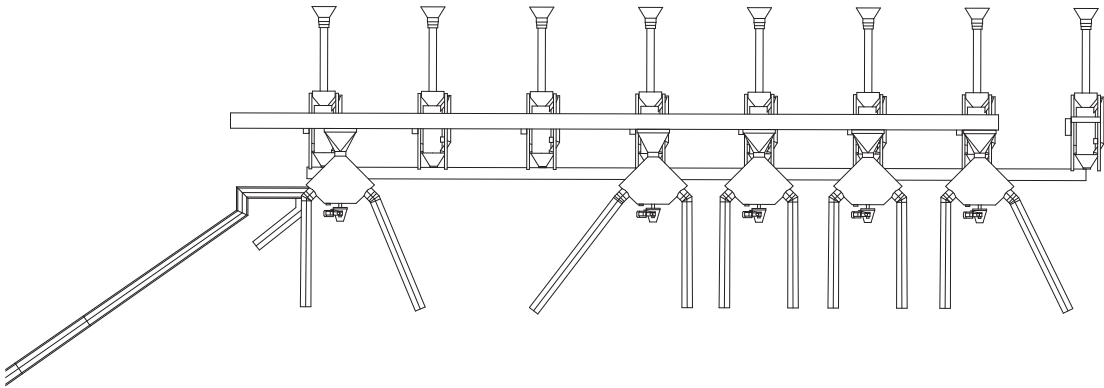
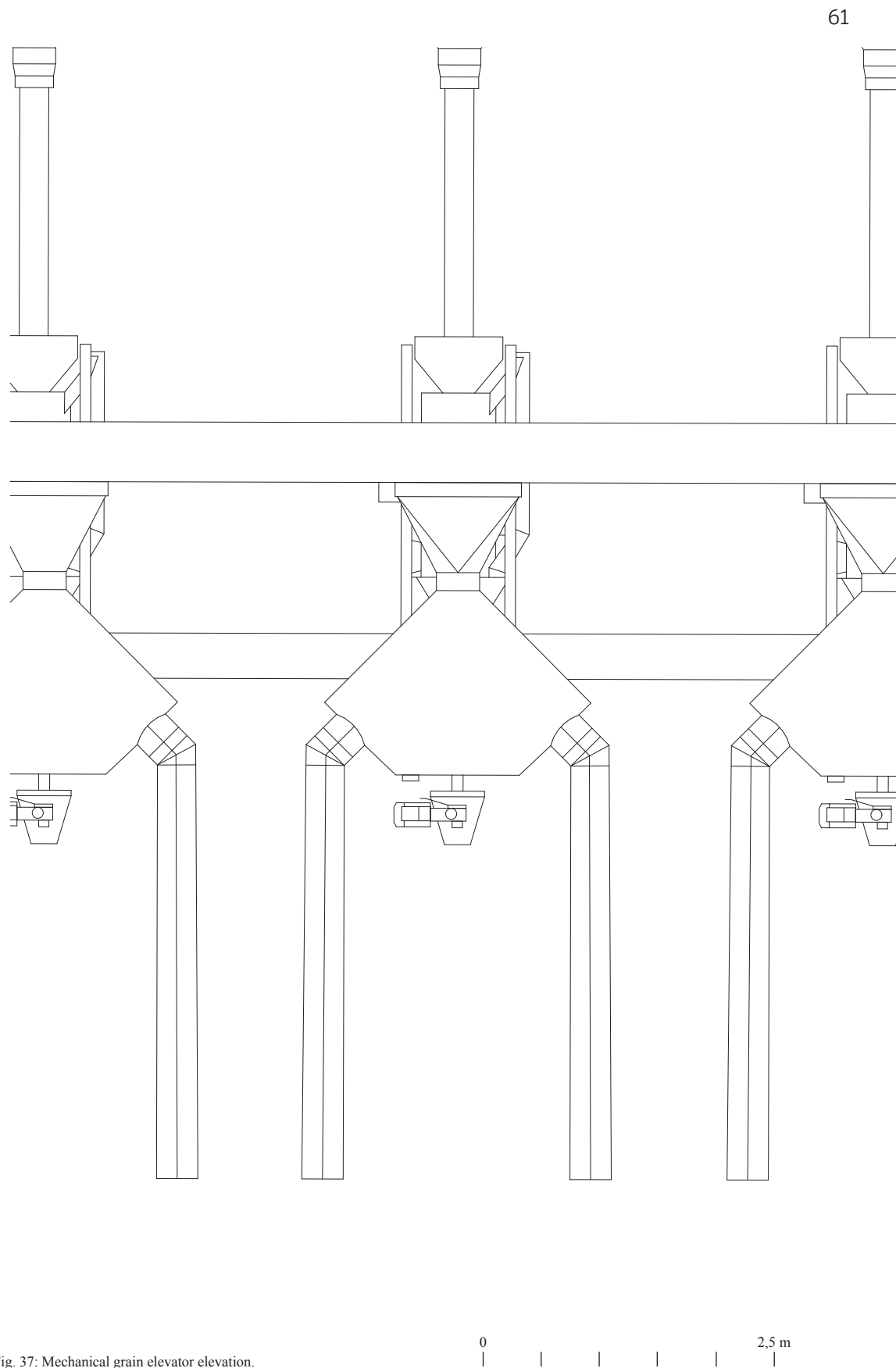


Fig. 37 & 38: Mechanical grain elevator elevation & plan.



In Liddes, the resources are lifted to the raccard using a manual pulley system, requiring no energy but significant effort.

While in Zürich, the mechanical system is complex and demands a substantial amount of energy.



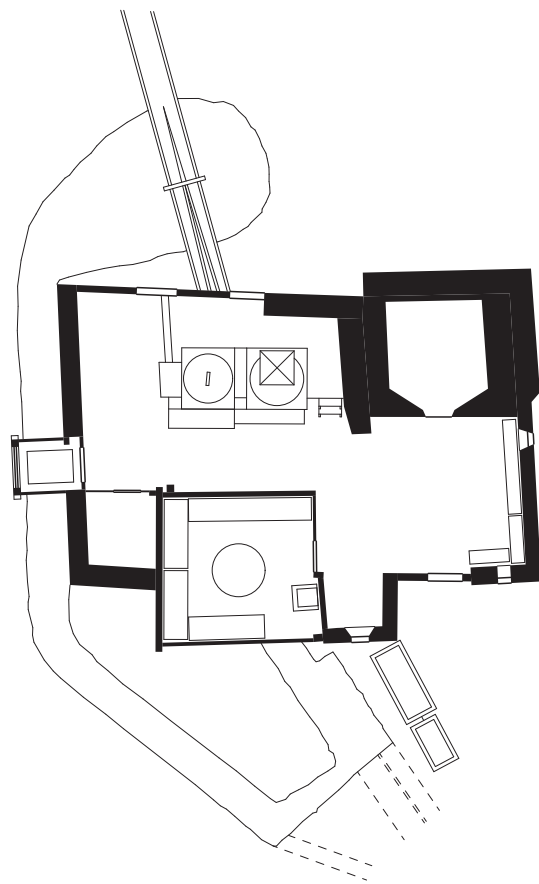


Fig. 39 & 40: Mill section & plan.

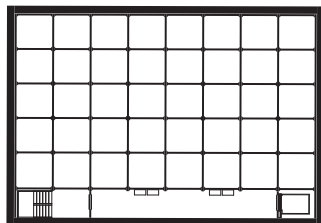
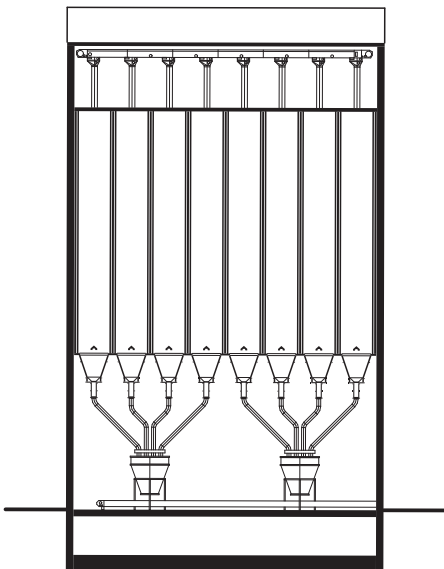


Fig. 41 & 42: Mill section & plan.

The arrangement of the mills differs from one factory to another only in a few details, the same elements can be found in all of them.¹⁰⁵ Next to the two mills, the oven was imposed to be sold to a consortage by the commune.¹⁰⁶ Making it a communal oven, next to the bakery room.

In Zürich, the mill hast the same typology as the grain elevator, following function and the need for storage.

¹⁰⁵ Pelet, “Survivre à la révolution industrielle.”, 270

¹⁰⁶ See glossary. Ibid, 259

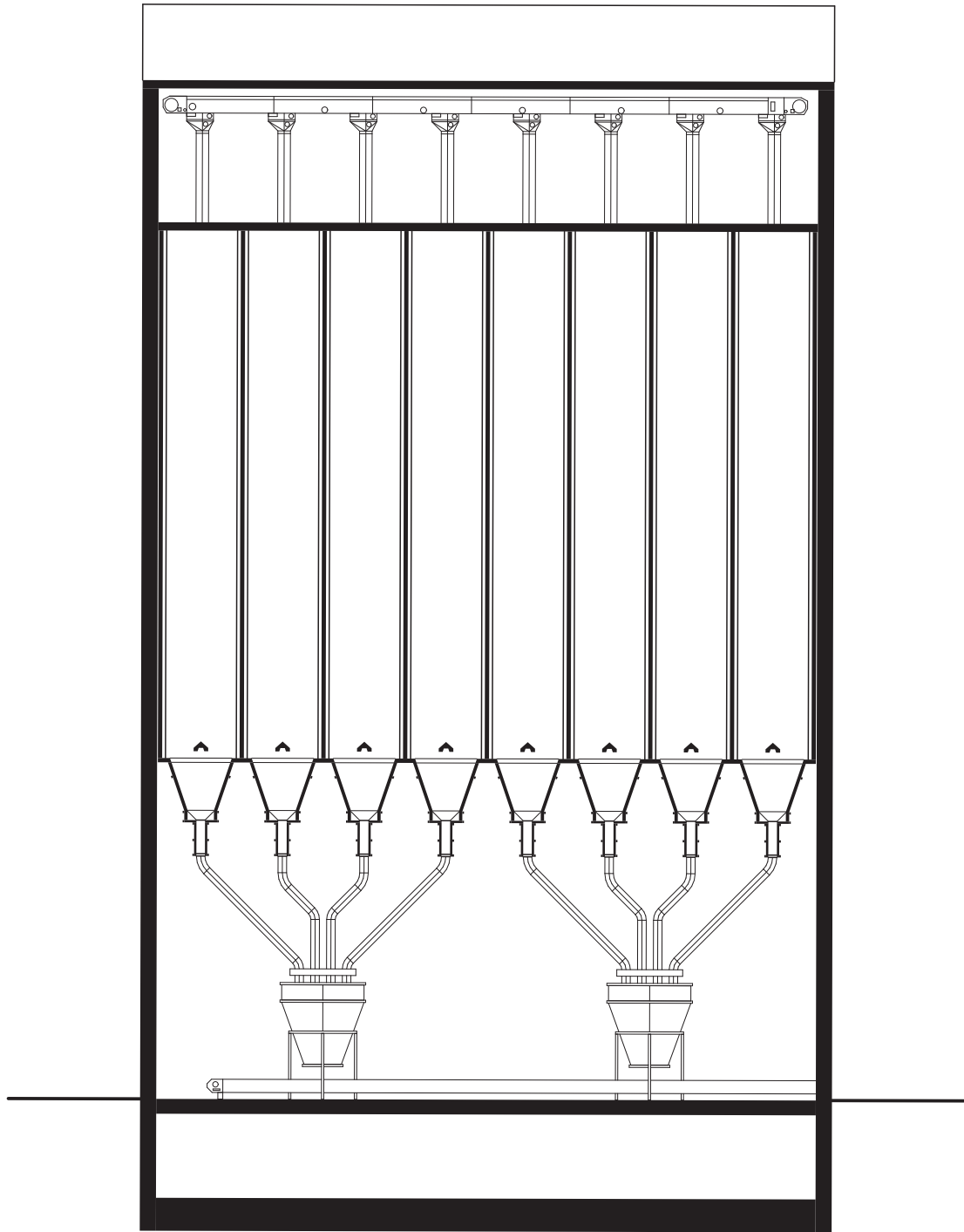


Fig. 41: Mill section.

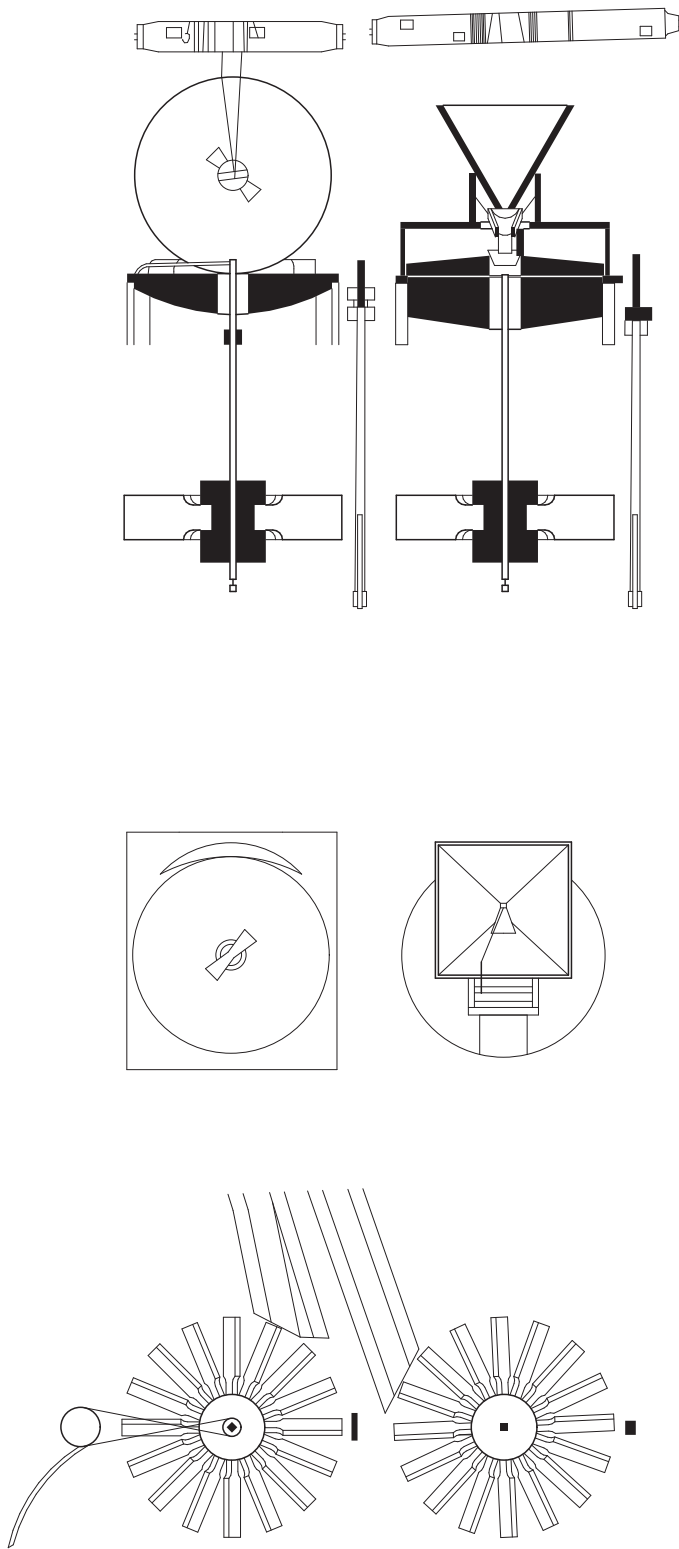


Fig. 43, 44 & 45: Flour mill front section, ground floor plan & basement plan.

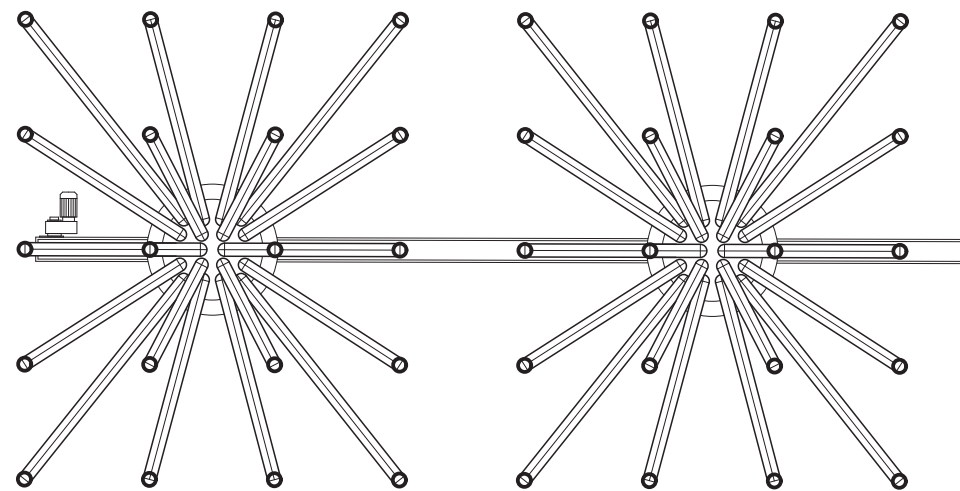
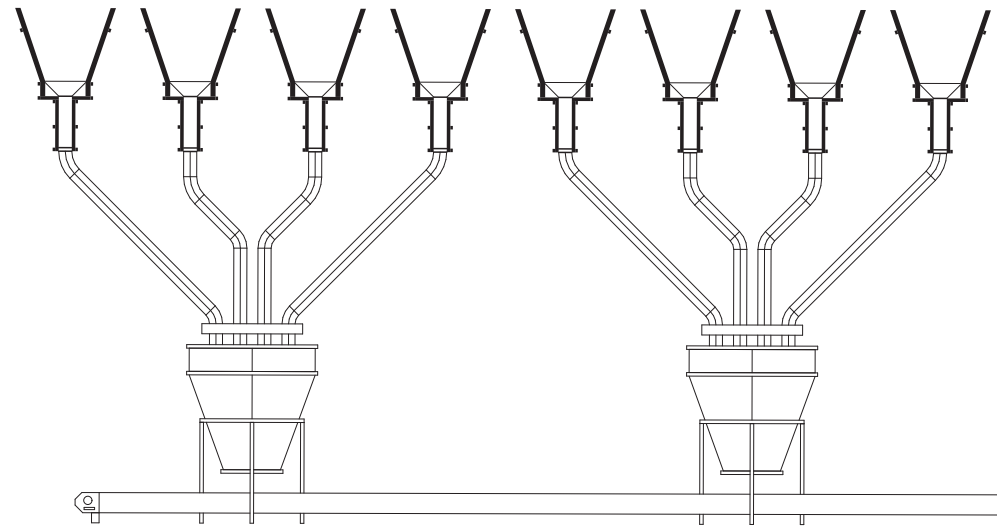


Fig. 46 & 47: Mechanical flour mill elevation & plan.



The two hydraulic mills in Liddes are activated by horizontal wheels, cheaper than vertical wheels but more fragile.¹⁰⁷ One mill is depicted with its grindstone raised.

In Zürich, the typology still resembles to the grain elevator, with many pipes and a conveyor belt, emphasising the continuous journey of the processed resource across the factory facilities.

¹⁰⁷ Pelet, “Survivre à la révolution industrielle.”, 243

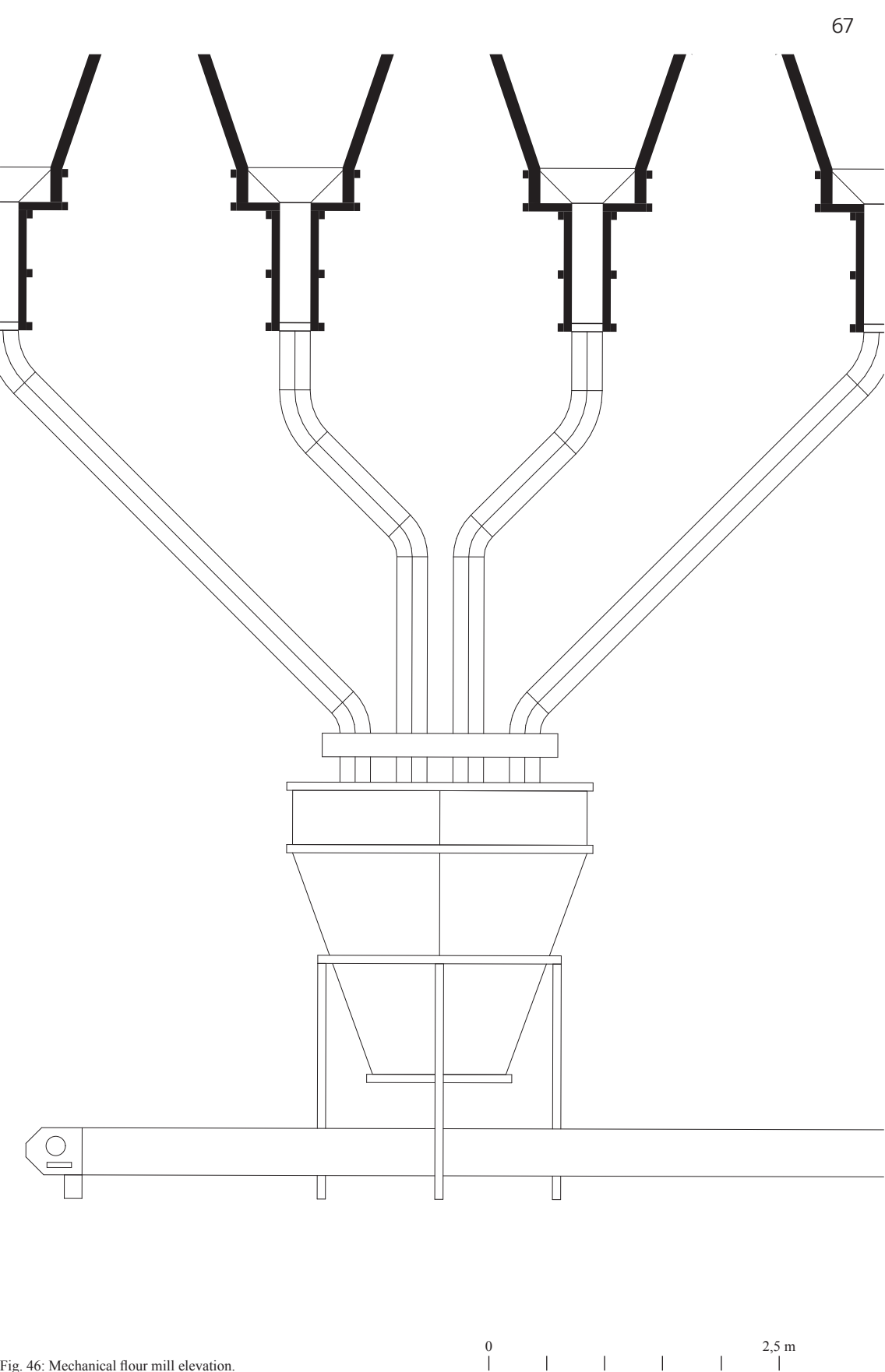


Fig. 46: Mechanical flour mill elevation.

THE PROMISE OF CONTEMPORARY COLLECTIVITY: THE ROLE OF ARCHITECTS

VIEWS ON ECOLOGICAL AND SOCIAL PRODUCTIVE SPACE
WITHOUT GLORIFYING THE PAST

“Building a climate of mutual trust and developing institutional rules adapted to the ecological systems in use is therefore of paramount importance in resolving social dilemmas.”¹⁰⁸

– Elinor Ostrom

¹⁰⁸ Ostrom et al., *Discours de Stockholm*, 88, translated

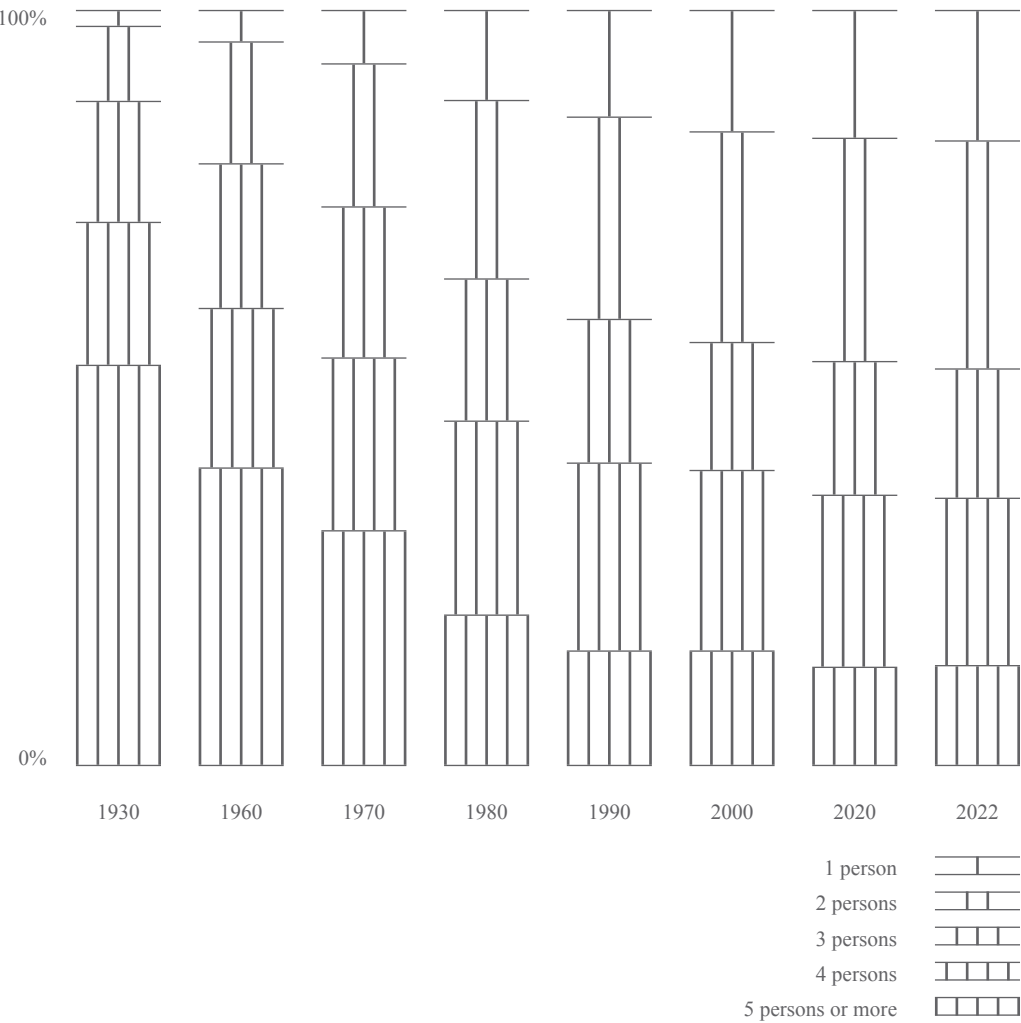


Fig. 48: Evolution of persons in private households by household size, 1930-2022. © FSO 2023
The diminution of people living in large households is even more accentuated and the number of households ratio is completely changed when it is considered that for example the 1 person is doubled compared to 2 persons.

Paradigm shift is without any doubt necessary in our society. Scientists in various sectors are calling for it for decades. The main issue today is probably the climate change we are facing. To overcome this situation, it needs to be met collectively. But as shown earlier, collectivity is fading in a society based on paradigms considering individuals as having little to no value. However, examples can be seen and felt as models to open imaginaries of a contemporary collectivity, even embedded in our modern societies.

Despite the rising individualism in a capitalist economy based on private property and competition, exemplary forms of self-governance recalling traditional economy can still be found. Indeed, Common-Pool Resource Institutions are “*far from being relics of the past*”.¹⁰⁹ Some of them have proven, by their efficiency and longevity, that they can be models. As Elinor Ostrom’s theory has been primarily applied to the context of natural resources management, labour is always in the centre of the CPRIs. Consequently, labour has a remarkable ability to generate collectivity if the context is favourable. The collective approach of labour prevents a social rupture of workers such as the ones Weil depicted in her experience. Appendix II seeks to consider CPRIs abroad larger contexts than just natural resources management, for example, by considering immaterial resources as valid in the conditions of CPRIs.

¹⁰⁹ Nahrath et al., “Gestion des ressources communes en Suisse.”, 50, translated

Individualism in domestic space is clear, as people tend to live in smaller households (cf. Fig. 48). As for productive space, the shift to a capitalist and ultraliberal economy has impacted territory to rely on long-distance freight, coming from huge, centralised factories, making local and smaller productive spaces impossible to maintain. However, in times of crisis, this model is not viable, as war times in Switzerland have shown to necessitate an intervention of the state in favour of small and local enterprises for sustenance.¹¹⁰ It has been corroborated by the recent COVID-19 crisis. Every indicator calls for considering climate change as a similar crisis.

¹¹⁰ Pelet, “Survivre à la révolution industrielle.”, 289

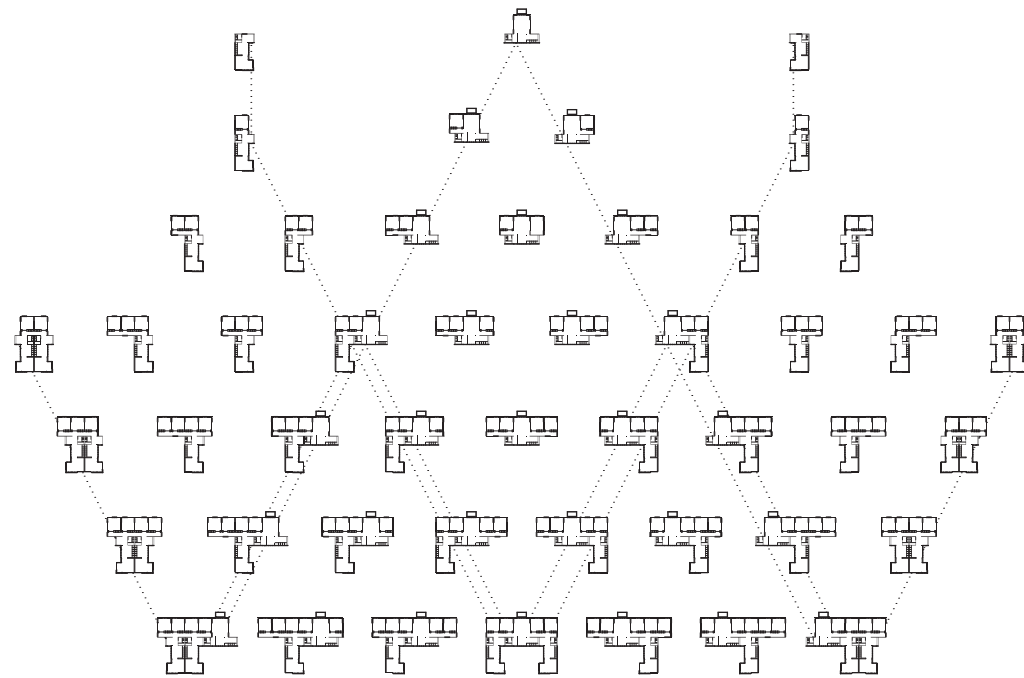


Fig. 49: Adaptability of housing in Helmutstrasse by ADP Architekten, Zürich.

Bringing new common domestic, urban, or productive space may accentuate a generalised form of collectivity. The urban commons such as squares, shared gardens, or industrial wastelands managed by citizens, are at “*the dawn of the rebirth of a new municipalism, which nourishes the renewal of citizenship*”.¹¹¹

¹¹¹ Ostrom et al., *Discours de Stockholm*, 25, translated

Although the link of architecture with the theory of Elinor Ostrom is clear, the question of the role of architects is less so. But in the cited references, a few leads are given. When individuals interact repetitively, they obtain experience to elaborate better answers, thus approaching optimal results.¹¹² Architects can then contribute by engaging with self-governed communities, gaining repetitive first-hand experiences, and sharing this knowledge to inspire collective solutions. However, particular attention must be paid to act by giving examples to open imaginaries of users, maybe to give advice, but never to impose. Indeed, empirical situations have shown that when researchers or public sector representatives impose new rules to a community with the idea of helping them, the collective problems have been less or even not resolved.¹¹³ Other research studies corroborate that participants cooperated less voluntarily when regulations were externally imposed, even though results should have been theoretically better.¹¹⁴

¹¹² Ibid, 80

¹¹³ Ibid, 54-55

¹¹⁴ Ibid, 70

Elinor Ostrom concluded for Common-Pool Resource Institutions, the type of governance is not important, rather it is that actors consider the rules fair and legitimate.¹¹⁵ Maybe it is similar for architecture: the space is not important, rather it is the collective designing and usage of it. The adaptability of the project in Helmutstrasse is one good example, as inhabitants can increase or decrease their apartment’s size with the collaboration of neighbours. Additionally, promoting local architecture, constructed by and with local actors, contributes to the sustainability and identity of the built environment.

¹¹⁵ Ibid, 77



Fig. 50: Hydraulic saw and mill restored for the community in Sarreyer. © Jean-Marc Biner

To conclude, the role of architects in the necessary paradigm shift is to act as facilitators and advisors rather than imposing expertise. Only this way we may obtain a form of collectivity in architecture and thus promote a collective way of living in domestic, productive, and urban spaces. This role should be approached with humility, recognising the talents of individuals, the experience of communities, and the innovative potential within materials and labour. Contributing in this way to a more inclusive, sustainable, and collective built environment.

GLOSSARY

Banalities

Rights of a lord, particularly of an economic monopoly. On communal goods and chesaux. Applicable for example on mills, inns, forges, bread ovens, presses and in localities on public bathes, bakeries, butchers, and tanneries. The lord could create banalities and oblige his serfs to use their services and ban any concurrency.¹¹³

Cens

Fee owed by a tenant to the owner of the land. Payable in nature or money. Takes part in the landed seigneurial rent system. Subsisted in the Plateau region until the abolition of the feudal royalties in the 19th century.¹¹⁴

Chesaux

In an urban context, a plot of land on which is built a house. In countryside, the plot contains the house but also the rural annexes and eventually a part of the farmlands of the household.¹¹⁵

Émine

Old measure for cereals typically corresponding to 1-3.5 liters. It was used to measure grains and remunerate millers.¹¹⁶

Manse

Agricultural estate owned by a lord and exploited by a farmer family, under tenure.¹¹⁷

Raccard

Also known as “mazot”, the raccards are wooden structures designed for storage. They are supported by four pillars, each capped with “mushrooms” – circular stones – to prevent rodents from accessing the provisions. Usually used as communal storage, partitions divide the space into multiple private compartments.¹¹⁸

¹¹³ Dubler, “Banalités.”

¹¹⁴ Grüninger, “Cens.”

¹¹⁵ Dubuis and Gerber, “Chesaux.”

¹¹⁶ Dubler, “Émine.”

¹¹⁷ Grüninger, “Manse.”

¹¹⁸ Wyss, “Le Mazot Ou Le Raccard.”

Seigneurial reserve

Agricultural estate owned by a lord and exploited by himself.¹¹⁹

Tenure

Right of use on a land granted by a lord to a tenant for a determined time. In exchange of a cens (fee). The tenant of a tenure is a com-moner (farmer, craftsman, bourgeois).¹²⁰

¹¹⁹ Leonhard, “Réserve seigneuriale.”

¹²⁰ Dubler, “Tenure.”

BIBLIOGRAPHY

- Antonietti, Thomas. "Consortages," February 2022. https://www.lebendige-traditionen.ch/dam/tradition/fr/dokumente/tradition/vs/geteilschaften_imwallis.pdf.download.pdf/les_consortages_envalais.pdf.
- Badoux, Corentin. "Silos Helvétiques : Le Potentiel d'un Patrimoine," 2019.
- Bourdon, Valentin. *Les occurrences du commun: vers de nouvelles homogénéités urbaines*. VuesDense. Genève: MétisPresses, 2021.
- Calle, Sophie. *L'Erouv de Jérusalem*. Arles: Actes Sud, 2002.
- Cardenas, Juan Camilo, and Rajiv Sethi. "Elinor Ostrom : Par-Delà La Tragédie Des Communs." Translated by Arianne Dorval, October 11, 2016. <https://laviedesidees.fr/Elinor-Ostrom-par-dela-la-tragedie-des-communs>.
- Citizen Jane: Battle for the City*, 2016.
- Confédération Suisse. *Code civil suisse: [du 10 décembre 1907 (état le 1er janvier 2019)]*. Berne: Chancellerie fédérale, 2019.
- . *Code des obligations: [du 30 mars 1911 (état le 1er juillet 2021)]*. Berne: Chancellerie fédérale, 2021.
- Coop. "Historique : Coop, Une Entreprise En Mouvementt," January 2021.
- . "Rapport 2022 : Entreprises de Production," 2022.
- Declève, Bernard, Marine Declève, Vincent Kaufmann, Aniss M. Mezoued, and Chloé Salembier. *La ville en communs: récits d'urbanisme*. Genève: MétisPresses, 2022.
- Delvaux, Maxime, and CENTRAL office for architecture and urbanism, eds. *Virtuous Situations from the Industrial Past and Some Ideas for the "climatic Metropolis" to Come: Cases of Brussels and Paris = Situations Vertueuses Du Passé Industriel et Quelques Idées Pour La Métropole Climatique à Venir: Les Cas de Bruxelles et Paris = Deugdelijke Situaties Uit Het Industriële Verleden En Een Aantal Ideeën Voor de Klimaatmetropool van de Toekomst: Brussel En Parijs*. Sint-Amandsberg: Art Paper Editions, 2019.
- Delz, Sascha, Rainer Hehl, and Patricia Ventura, eds. *Housing the Co-Op: A Micro-Political Manifesto*. 2nd edition. Berlin: Ruby Press, 2022.
- Dubler, Anne-Marie. "Ban et juridiction." In *Dictionnaire Historique de la Suisse*, January 7, 2014. <https://hls-dhs-dss.ch/fr/articles/013697/2014-01-07/>.
- . "Banalités." In *Dictionnaire Historique de La Suisse*, translated by Ursula Gaillard, February 12, 2008. <https://hls-dhs-dss.ch/fr/articles/013731/2008-02-12/>.

- . "Meunerie." In *Dictionnaire Historique de la Suisse*, translated by Pierre-G. Martin, November 26, 2009. <https://hls-dhs-dss.ch/fr/articles/013992/2009-11-26/>.
- . "Moulins." In *Dictionnaire Historique de la Suisse*, translated by Laurent Auberson, May 31, 2012. <https://hls-dhs-dss.ch/fr/articles/013884/2012-05-31/>.
- . "Propriété." In *Dictionnaire Historique de la Suisse*, translated by Laurent Auberson, August 20, 2012. <https://hls-dhs-dss.ch/fr/articles/008971/2012-08-20/>.
- . "Tenure." In *Dictionnaire Historique de La Suisse*, translated by Pierre-G. Martin, February 10, 2012. <https://hls-dhs-dss.ch/fr/articles/008974/2012-02-10/>.
- . "Émine." In *Dictionnaire Historique de La Suisse*, translated by André Naon, January 22, 2008. <https://hls-dhs-dss.ch/fr/articles/027485/2008-01-22/>.
- Dubuis, Pierre, and Roland Gerber. "Chesaux." In *Dictionnaire Historique de la Suisse*, May 21, 2007. <https://hls-dhs-dss.ch/fr/articles/007874/2007-05-21/>.
- Esprit de Pays Dordogne-Périgord. "La charte de coutumes des bastides." Accessed October 26, 2023. <http://espritdepays.com/patrimoines-en-perigord/patrimoine-bati-du-perigord/les-bastides-du-perigord/charte-de-coutumes-des-bastides>.
- Fellmann, Rudolf. "Structures agraires." In *Dictionnaire Historique de la Suisse*, translated by Pierre-G. Martin, January 21, 2015. <https://hls-dhs-dss.ch/fr/articles/013699/2015-01-21/>.
- Ferrez, Willy, Paul-Louis Pelet, Camille Ançay, Jean-Marc Biner, and Alexandre May. "Scie et Moulins de Sarreyer." Sion, June 30, 1990. <https://sarreyer.ch/images/docs/brochure.pdf>.
- Final Warning: Limits to Growth*, 2015. <https://www.youtube.com/watch?v=kz9wjJmkmc&t=1750s>.
- Forel, François. *Chartes Communales Du Pays de Vaud: Dès l'an 1214 à l'an 1527*. Georges Bridel Éditeur. Lausanne, 1872.
- "FSPC - Principes et activités." Accessed January 13, 2024. <https://www.sgpv.ch/principes-et-activites/>.
- GIEC. "Réchauffement planétaire de 1,5 °C," 2019, 110.
- Graeber, David, and David Wengrow. *Au Commencement Était : Une Nouvelle Histoire de l'humanité*. Translated by Élise Roy. Paris: Les liens qui libèrent, 2023.
- Grüniger, Sebastian. "Cens." In *Dictionnaire Historique de La Suisse*, translated by Walter Weideli, February 26, 2007. <https://hls-dhs-dss.ch/fr/articles/013712/2007-02-26/>.

- . “Manse.” In *Dictionnaire Historique de la Suisse*, translated by Lucienne Hubler, January 15, 2008. <https://hls-dhs-dss.ch/fr/articles/025975/2008-01-15/>.
- . “Régime Domanial.” In *Dictionnaire Historique de La Suisse*, translated by Pierre-G. Martin, March 10, 2005. <https://hls-dhs-dss.ch/fr/articles/013700/2005-03-10/#:~:text=On%20appelle%20régime%20domanial%20le,dépendait%20le%20groupe%20des%20tenanciers>.
- Hardin, Garrett. “The Tragedy of the Commons.” *American Association for the Advancement of Science*, Science, 162, no. 3859 (December 13, 1968): 1243–48.
- Jacobs, Jane. *The Death and Life of Great American Cities*. Vintage Books ed. New York: Vintage Books, 1992.
- Le Dilemme Du Prisonnier | Voyages Au Pays Des Maths | ARTE*, 2021. <https://www.youtube.com/watch?v=G9ER5bLxQEU>.
- Leonhard, Martin. “Biens communaux.” In *Dictionnaire Historique de la Suisse*, translated by Françoise Senger, May 17, 2001. <https://hls-dhs-dss.ch/fr/articles/013704/2001-05-17/>.
- . “Réserve seigneuriale.” In *Dictionnaire Historique de la Suisse*, translated by Monique Baud-Wartmann, March 23, 2011. <https://hls-dhs-dss.ch/fr/articles/025974/2011-03-23/>.
- Loudaoui, Tifawt. “Greniers Collectifs : Anti Atlas Marocain,” November 11, 2019. https://issuu.com/t.loudaoui/docs/grenier_collectifs_.
- Mariani-Pasche, Véronique, and Franz Xaver Bischof. “Confréries.” In *Dictionnaire Historique de La Suisse*, translated by Pierre-G. Martin, February 3, 2011. <https://hls-dhs-dss.ch/fr/articles/046924/2011-02-03/>.
- Mazur, Laurie Ann, ed. *Beyond the Numbers: A Reader on Population, Consumption, and the Environment*. Washington, D.C: Island Press, 1994.
- MétéoSuisse. “Changement climatique mondial – état actuel des connaissances.” Accessed January 7, 2024. <https://www.meteosuisse.admin.ch/climat/changement-climatique/changement-climatique-mondial-etat-actuel-des-connaissances.html>.
- Meunié, Jacques. “Les greniers collectifs au Maroc.” *Journal de la Société des Africanistes* 14, no. 1 (1944): 1–16. <https://doi.org/10.3406/jafr.1944.2553>.
- Moser, Christian. “Des moulins de Saint-Luc à l’usine hydroélectrique de Vissoie : À la découverte du patrimoine hydraulique valaisan,” October 2010.
- Moser, Peter. Politique agricole, politique semencière et amélioration génétique en Suisse de 1860 à 2002. Baden: Hier + Jetzt, 2003.

- Nahrath, Stéphane, and Christian Bréthaut. “Entre Imbrication, Instrumentalisation et Infusion : Le Rôle Des Consortages de Bisses et Des Bourgeoisies Dans Les Politiques de Gestion de l’eau à Crans-Montana,” 2011.
- . “La coordination entre régimes institutionnels de ressources comme condition d’une gestion durable des ressources touristiques alpines: Le cas de Crans-Montana (Suisse).” *Revue de géographie alpine*, no. 104–3 (December 12, 2016). <https://doi.org/10.4000/rga.3327>.
- Nahrath, Stéphane, Jean-David Gerber, Peter Knoepfel, and Christian Bréthaut. “Gestion des ressources communes en Suisse : le rôle des institutions de gestion communautaire dans les politiques environnementales et d’aménagement du territoire.” *Natures Sciences Sociétés* 20, no. 1 (January 2012): 39–51. <https://doi.org/10.1051/nss/2011134>.
- Naji, Salima. *Architectures du bien commun: pour une éthique de la préservation*. VuesDensemble. Genève: MētisPresses, 2019.
- . “Igudārs et Zāwyas: Les entrepôts de la baraka, réseaux du sacré et patrimonialisation des sociétés amazighes de l’Atlas et du Maroc présaharien,” n.d.
- OFS. “Évolution des Surfaces d’habitat et d’infrastructure,” July 2019. <https://www.bfs.admin.ch/bfsstatic/dam/assets/9207487/master>.
- . “Personnes en ménages privés selon la taille du ménage - 1930-2022.” Office fédéral de la statistique, October 5, 2023. <https://www.bfs.admin.ch/asset/fr/27965852>.
- Orsi, Fabienne. “Elinor Ostrom et les faisceaux de droits : l’ouverture d’un nouvel espace pour penser la propriété commune.” *Revue de la régulation*, no. 14 (December 12, 2013). <https://doi.org/10.4000/regulation.10471>.
- Ostrom, Elinor. *Governing the Commons: The Evolution of Institutions for Collective Action*. The Political Economy of Institutions and Decisions. Cambridge ; New York: Cambridge University Press, 1990.
- . “Reformulating the Commons.” *Swiss Political Science Review* 6, no. 1 (March 2000): 29–52. <https://doi.org/10.1002/j.1662-6370.2000.tb00285.x>.
- Ostrom, Elinor, and Laurent Baechler. *Gouvernance des biens communs: pour une nouvelle approche des ressources naturelles*. Planète en jeu. Bruxelles [Paris]: De Boeck, 2010.
- Ostrom, Elinor, Benjamin Coriat, Jay Demazière, and Hervé Le Crosnier. *Discours de Stockholm: en réception du Nobel d’économie 2009 au delà des marchés et des états, la gouvernance polycentrique des systèmes économiques complexes*. Interventions, III. Caen: C&F éditions, 2020.

- Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989.
- Pelet, Paul-Louis, and Ariane Mirabdolbaghi. “L’inventaire Des Usines Hydrauliques Traditionnelles Du Valais,” 1997.
- Ponsonnet, Maïa, and Céline Travési, eds. *Les conceptions de la propriété foncière à l’épreuve des revendications autochtones : possession, propriété et leurs avatars*. pacific-credo Publications, 2015. <https://doi.org/10.4000/books.pacific.309>.
- Probst, Stefanie. “En train vers la minoterie de Zurich.” *SBB Cargo Blog* (blog), September 30, 2022. <https://blog.sbbcargo.com/fr/en-train-vers-la-minoterie-de-zurich/>.
- Rendueles, César, Joan Subirats Humet, and Alain Ambrosi. *La cité en communs: des biens communs au municipalisme*. Interventions, II. Caen: C&F éditions, 2019.
- Reynaert, François. *La grande histoire du monde*. Paris: Fayard, 2016.
- Rodrik, Philippe. “Le groupe vaudois Minoteries SA redoute Coop.” *24 heures*, September 26, 2018. <https://www.24heures.ch/le-groupe-vaudois-minoteries-sa-redoute-coop-124348262043>.
- Rousseau, Jean-Jacques, Heidi Barré-Mérand, and Bertrand Leclair. *Discours sur l’origine et les fondements de l’inégalité parmi les hommes*. Paris: Gallimard, 2006.
- Sauerländer, Dominik. “Systèmes cultureux.” In *Dictionnaire Historique de la Suisse*, translated by Pierre-G. Martin, January 29, 2005. <https://hls-dhs-dss.ch/fr/articles/013853/2015-01-29/>.
- Schluchter, André. “Zones agraires.” In *Dictionnaire Historique de la Suisse*, translated by Monique Baud-Wartmann, May 4, 2015. <https://hls-dhs-dss.ch/fr/articles/013930/2015-05-04/>.
- Schnyder, Albert. “Assolement.” In *Dictionnaire Historique de La Suisse*, translated by Pierre-G. Martin, February 5, 2014. <https://hls-dhs-dss.ch/fr/articles/013702/2014-02-05/>.
- Simon-Muscheid, Katharina. “Corporations.” In *Dictionnaire Historique de La Suisse*, translated by Pierre-G. Martin, February 3, 2015. <https://hls-dhs-dss.ch/fr/articles/013729/2015-02-03/>.
- Simon-Muscheid, Katharina, and Albert Tanner. “Bourgeoisie.” In *Dictionnaire Historique de la Suisse*, translated by Pierre-G. Martin, October 9, 2006. <https://hls-dhs-dss.ch/articles/016379/2006-10-09/>.
- Stadler, Hans. “Communauté.” In *Dictionnaire Historique de La Suisse*, translated by Ursula Gaillard, February 17, 2015. <https://hls-dhs-dss.ch/fr/articles/008970/2015-02-17/>.

- Stiegler, Bernard, and Ariel Kyrrou. *L’emploi est mort, vive le travail ! entretien avec Ariel Kyrrou*. Les petits livres, n° 87. Paris: Éditions Mille et une nuits, 2015.
- “Suisse : 1. Mai (0040-5) | MEMOBASE de Memoriav.” Accessed January 13, 2024. https://memobase.ch/fr/object/bar-001-CJS_0040-5_d?term=labeur&filter%5Baccess%5D%5B0%5D=1~En%20ligne&position=3.
- Swissmill. “Croissance Continue - Swissmill – Die Schweizer Getreidemühle.” Accessed January 13, 2024. <https://www.swissmill.ch/croissance-continue>.
- . “Dynamisme à Tous Les Niveaux - Swissmill – Die Schweizer Getreidemühle.” Accessed January 13, 2024. <https://www.swissmill.ch/dynamisme-a-tous-les-niveaux>.
- . “Flux de Marchandises, Moyens de Transport et Innovations - Swissmill – Die Schweizer Getreidemühle.” Accessed January 13, 2024. <https://www.swissmill.ch/flux-de-marchandises-moyens-de-transport-et-innovations>.
- . “Histoire - Swissmill – Die Schweizer Getreidemühle.” Accessed January 13, 2024. <https://www.swissmill.ch/histoire>.
- . “Portrait de La Minoterie - Swissmill – Die Schweizer Getreidemühle.” Accessed January 13, 2024. <https://www.swissmill.ch/portrait-de-la-minoterie>.
- “The Milling of Flour - Wonders of World Engineering.” Accessed January 13, 2024. <https://wondersofworldengineering.com/flour.html>.
- Triki, Hamid, and Alain Dovifat. *Medersa de Marrakech*. Aix-en-Provence: Édisud, 1999.
- Weibel, Thomas. “Ban.” In *Dictionnaire Historique de La Suisse*, translated by Anne Sandoz Dutoit, July 28, 2016. <https://hls-dhs-dss.ch/fr/articles/030197/2016-07-28/>.
- Weil, Simone. *Conditions premières d’un travail non servile*. Carnets de l’Herne. Paris: l’Herne, 2014.
- Wyss, Marianne. “Le Mazot Ou Le Raccard.” *The Swiss Spectator*, May 20, 2021. <https://www.swiss-spectator.ch/fr/nederlands-de-mazot-of-raccard/>.
- Yamamoto, Riken. “Public/Private: Concerning the Concept of Threshold’.” *Interstices* 10 (n.d.): 127–31.
- Zangger, Alfred. “Seigneurie foncière.” In *Dictionnaire Historique de la Suisse*, translated by Lucienne Hubler, October 1, 2013. <https://hls-dhs-dss.ch/fr/articles/008973/2013-10-01/#:~:text=La%20seigneurie%20foncière%20réunissait%20le,qui%20exploitaient%20le%20domaine%20utile>.

TABLE OF ILLUSTRATIONS

- Fig. 1 cover Beebe windmill in Bridgehampton, New York, USA. Elevation. Redrawn by the author from:
© Wall Artifact
Fine Art America. “Beebe Windmill - Elevations - Bridgehampton, NY - circa 1820 by Wall Artifact.” Accessed January 12, 2024. <https://fineartamerica.com/featured/beebe-windmill-elevations-bridgehampton-ny-circa-1820-wall-artifact.html>.
- Fig. 2 4th cover Beebe windmill in Bridgehampton, New York, USA. Mechanical section. Redrawn by the author from:
© Wall Artifact
Pixels. “Beebe Windmill - Section - Bridgehampton, NY - circa 1820 #2 Poster by Wall Artifact.” Accessed January 12, 2024. <https://pixels.com/featured/2-beebe-windmill-section-bridgehampton-ny-circa-1820-wall-artifact.html?product=poster>.
- Fig. 3 p.10 Drawing in *L’Usage du Monde*, travel literature book .
© Thierry Vernet
Bouvier, Nicolas. *L’Usage du Monde*, Genève: Droz, 1963, p.40.
- Fig. 4 p.14 Police protecting the mining installations in Lützerath, Germany, from activists.
© Andrew Bear
Rowell, Andy. “Police Use ‘Shocking’ Level of Violence to Quash Activists Opposing Europe’s Largest Coal Mine.” Oil Change International (blog), January 17, 2023. <https://priceofoil.org/2023/01/17/police-use-shocking-level-of-violence-to-quash-activists-opposing-europes-largest-coal-mine/>.
- Fig. 5 p.14 The authors of *Limits to Growth* in 1972.
© Rauner Library
L’Obs. “Dennis l’a dirigé, Donella l’a rédigé : le rapport Meadows, 50 ans et toutes ses dents,” June 25, 2022. <https://www.nouvelobs.com/ecologie/20220625.OBS60156/dennis-l-a-dirige-donella-l-a-redige-le-rapport-meadows-50-ans-et-toutes-ses-dents.html>.
- Fig. 6 p.18 Working at Ford factory.
© The Henry Ford Museum
“Working at Ford’s Factory | American Experience | Official Site | PBS.” <https://www.pbs.org/wgbh/americanexperience/features/-gallery-henryford/>.
- Fig. 7 p.20 The opening scene of *Modern Times* by Charlie Chaplin.
© Roy Export S.A.S.
Chaplin, Charlie. *Modern Times*. United Artists, 1936.

- Fig. 8 p.22 Simone Weil.
Badie, Louisette. “Simone Weil, La philosophie grecque, un sujet de réflexion et un exemple de vie.” Revue Acropolis (blog), February 27, 2020. <https://revue-acropolis.com/simone-weil-la-philosophie-grecque-un-sujet-de-reflexion-et-un-exemple-de-vie/>.
- Fig. 9 p.22 Elinor Ostrom.
Ulla Montan © Nobelfoundation
NobelPrize.org. “The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009.” <https://www.nobelprize.org/prizes/economic-sciences/2009/ostrom/facts/>.
- Fig. 10 p.22 David Wengrow & David Graeber.
© Kalpesh Lathigra
“David Graeber & David Wengrow.” <https://artreview.com/artist/david-graeber-david-wengrow/?year=2021>.
- Fig. 11 p.22 Jane Jacobs.
Elliott Erwitt © Magnum and John J. Burns Library, Boston College
Gopnik, Adam. “Jane Jacobs’s Street Smarts.” The New Yorker, September 19, 2016. <https://www.newyorker.com/magazine/2016/09/26/jane-jacobs-street-smarts>.
- Fig. 12 p.26 Prisoner’s dilemma.
Redrawn by the author from:
Ostrom, Elinor, and Laurent Baechler. *Gouvernance des biens communs: pour une nouvelle approche des ressources naturelles*. Planète en jeu. Bruxelles [Paris]: De Boeck, 2010, p.16.
with the values from:
Le Dilemme Du Prisonnier | Voyages Au Pays Des Maths | ARTE, 2021. <https://www.youtube.com/watch?v=G9ER5bLxQEU>.
- Fig. 13 p.26 John von Neumann and Oskar Morgenstern wanted to redesign world’s economy based on rational behaviours.
von Neumann, John, and Oskar Morgenstern. *Theory of Games and Economic Behavior*. Princeton: Princeton University Press, 1944.
- Fig. 14 p.28 Four types of goods.
Redrawn and modified by the author from:
Ostrom, Elinor, Benjamin Coriat, Jay Demazière, and Hervé Le Crosnier. *Discours de Stockholm: en réception du Nobel d’économie 2009 au delà des marchés et des états, la gouvernance polycentrique des systèmes économiques complexes*. Interventions, III. Caen: C&F éditions, 2020, p.47.

- Fig. 15 p.30 Where Different Types of Rules Enter Action Situations.
Redrawn by the author from:
Ostrom, Elinor, Benjamin Coriat, Jay Demazière, and Hervé Le Crosnier.
Discours de Stockholm: en réception du Nobel d'économie 2009 au delà des marchés et des états, la gouvernance polycentrique des systèmes économiques complexes. Interventions, III. Caen: C&F éditions, 2020, p.53.
- Fig. 16 p.38 Components of a vertical wheel mill in Sarreyer.
© Jean-Marc Biner
"Une mécanique ingénieuse."
Ferrez, Willy, Paul-Louis Pelet, Camille Ançay, Jean-Marc Biner, and Alexandre May. "Scie et Moulins de Sarreyer." Sion, June 30, 1990, p.13.
<https://sarreyer.ch/images/docs/brochure.pdf>.
- Fig. 17 p.42 Le four du Village (The Village oven).
© Pierre-Marie Epiney / © Yannik Plomb
"Le four du village," March 7, 2023.
<https://notrehistoire.ch/entries/zaY2V5znYvd>.
- Fig. 18 p.42 Wheat to flour.
Drawn by the author.
- Fig. 19 p.44 Liddes mills, 1984.
@ Fibbi
Pelet, Paul-Louis. "Survivre à la révolution industrielle : L'exemple des moulins de Liddes (Valais)," 1989, p.341.
- Fig. 20 p.44 The miller, 1989.
© Jean-Marc Biner
"Théo Lattion dans son moulin."
Pelet, Paul-Louis. "Survivre à la révolution industrielle : L'exemple des moulins de Liddes (Valais)," 1989, p.354.
- Fig. 21 p.46 Swissmill factory, Sihlquai Zürich, Switzerland.
© Thomas Hussel, BAZ
Hussel, Thomas. "Posten 7: Stadtmühle / Swissmill - Stadt Zürich," 2017.
https://www.stadt-zuerich.ch/hbd/de/index/staedtebau/archaeo_denkmal/denkmal/denkmalstage/etd-2020-entdecken/7-swissmill.html.
- Fig. 22 p.46 Swissmill employees in front of the machinery.
"Swissmill." <https://www.stadtderukunft.ch/companies/swissmill/>.
- Fig. 23 p.48 Freight traffic flow in millions tons per year by road.
Redrawn by the author from:
© FSO, Federal Statistical Office
Statistique, Office fédéral de la. "Flux du trafic marchandises (Suisse) | Carte."
Office fédéral de la statistique, August 17, 2017.
<https://www.bfs.admin.ch/asset/fr/3222234>.

- Fig. 24 p.48 Freight traffic flow in millions tons per year by rail.
Redrawn by the author from:
© FSO, Federal Statistical Office
Statistique, Office fédéral de la. "Flux du trafic marchandises (Suisse) | Carte."
Office fédéral de la statistique, August 17, 2017.
<https://www.bfs.admin.ch/asset/fr/3222234>.
- Fig. 25 p.52 Liddes plan. Scale 1/50'000.
Drawn by the author, with data extracted from:
Federal Office of Topography Swisstopo
- Fig. 26 p.53 Zürich plan. Scale 1/50'000.
Drawn by the author, with data extracted from:
Federal Office of Topography Swisstopo
- Fig. 27 p.54 Glarey mills section. Scale 1/1'500.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. "Survivre à la révolution industrielle : L'exemple des moulins de Liddes (Valais)," 1989, p.252-253.
- Fig. 28 p.54 Glarey mills plan. Scale 1/1'500.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. "Survivre à la révolution industrielle : L'exemple des moulins de Liddes (Valais)," 1989, p.252-253.
- Fig. 29 p.55 Swissmill factory elevation. Scale 1/1'500.
Redrawn by the author from:
© Harder Haas Partner, Eglisau
BauNetz. "Kornhaus Zürich | Beton | Industrie/Gewerbe | Baunetz_Wissen."
Baunetz Wissen. <https://www.baunetzwissen.de/beton/objekte/industrie-gewerbe/kornhaus-zuerich-4929382>.
- Fig. 30 p.55 Swissmill factory plan. Scale 1/1'500.
Drawn by the author, with data extracted from:
Federal Office of Topography Swisstopo
- Fig. 31 p.58 Liddes raccard south elevation. Scale 1/200.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. "Survivre à la révolution industrielle : L'exemple des moulins de Liddes (Valais)," 1989, p.263.

- Fig. 32 p.58 Liddes raccard plan. Scale 1/200.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.263.
- Fig. 33 p.59 Swissmill tower section. Scale 1/200 & 1/1000.
Redrawn by the author from:
© Harder Haas Partner, Elisau
“Kornhaus Swissmill - Projets d’architecture - Batidoc.Ch.”
<https://www.batidoc.ch/projet/kornhaus-swissmill/567291?s=1&p=29&d=c&cy=CH&pos=1147>.
- Fig. 34 p.59 Swissmill tower 9th floor plan. Scale 1/1000.
Redrawn by the author from:
© Harder Haas Partner, Elisau
“Kornhaus Swissmill - Projets d’architecture - Batidoc.Ch.”
<https://www.batidoc.ch/projet/kornhaus-swissmill/567291?s=1&p=29&d=c&cy=CH&pos=1147>.
- Fig. 35 p.60 Manual pulley system elevation. Scale 1/50.
Redrawn by the author.
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.263.
- Fig. 36 p.60 Manual pulley system plan. Scale 1/50.
Drawn by the author, with the informations based on:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.263.
- Fig. 37 p.61 Mechanical grain elevator elevation. Scale 1/50 & 1/250.
Redrawn by the author from:
© Harder Haas Partner, Elisau
“Kornhaus Swissmill - Projets d’architecture - Batidoc.Ch.”
<https://www.batidoc.ch/projet/kornhaus-swissmill/567291?s=1&p=29&d=c&cy=CH&pos=1147>.
- Fig. 38 p.61 Mechanical grain elevator plan. Scale 1/250.
Redrawn by the author from:
© Harder Haas Partner, Elisau
“Kornhaus Swissmill - Projets d’architecture - Batidoc.Ch.”
<https://www.batidoc.ch/projet/kornhaus-swissmill/567291?s=1&p=29&d=c&cy=CH&pos=1147>.

- Fig. 39 p.64 Mill section. Scale 1/200.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.271.
- Fig. 40 p.64 Mill plan. Scale 1/200.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.271.
- Fig. 41 p.65 Mill section. Scale 1/200 & 1/500.
Drawn by the author with the available informations.
- Fig. 42 p.65 Mill plan. Scale 1/500.
Drawn by the author with the available informations.
- Fig. 43 p.66 Flour mill front section. Scale 1/50.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.275.
- Fig. 44 p.66 Flour mill ground floor plan. Scale 1/50.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.274.
- Fig. 45 p.66 Flour mill basement plan. Scale 1/50.
Redrawn by the author from:
© Archéotech
Pelet, Paul-Louis. “Survivre à la révolution industrielle : L’exemple des moulins de Liddes (Valais),” 1989, p.274.
- Fig. 46 p.67 Mechanical flour mill elevation. Scale 1/50 & 1/150.
Drawn by the author with the available informations.
- Fig. 47 p.67 Mechanical flour mill plan. Scale 1/150.
Drawn by the author with the available informations.
- Fig. 48 p.70 Evolution of persons in private households by household size, 1930-2022.
© FSO 2023
Redrawn by the author from:
OFS. “Personnes en ménages privés selon la taille du ménage - 1930-2022.”
Office fédéral de la statistique, October 5, 2023.
<https://www.bfs.admin.ch/asset/fr/27965852>.

- Fig. 49 p.72 Adaptability of housing in Helmutstrasse by ADP Architekten, Zürich.
Drawn by the author.
- Fig. 50 p.74 Hydraulic saw and mill restored for the community in Sarreyer.
© Jean-Marc Biner
Ferrez, Willy, Paul-Louis Pelet, Camille Ançay, Jean-Marc Biner, and
Alexandre May. “Scie et Moulins de Sarreyer.” Sion, June 30, 1990, p.27.
<https://sarreyer.ch/images/docs/brochure.pdf>.

