

STORE
WHEAT

CULTIVATE
WHEAT

STORE / wheat INTRODUCTION

Paleolithic men and women were hunter-gatherers whose omnivorous diet was, by necessity, highly diversified: young shoots, fruits and berries, roots and bulbs, worms, insects, shellfish, fish, eggs, meat, etc. But when they began to practice agriculture, all human societies greatly reduced the diversity of their diet. But when they began to practice agriculture, all human societies drastically reduced the diversity of their diets. This focus on a limited number of mainly plant-based foods meant that, in normal times, more people could be fed (although it increased the risk of famine in the event of an accident affecting a major crop).

Everywhere, farming communities acquired an essential food, a staple that constituted - and still constitutes in many countries - the basis of the diet for the vast majority of the population. It's worth noting that this essential food, whose nature differs from one region of the world to another, is almost always a plant and, more specifically, a cereal.

Wheat, in its various forms, occupies this position on the European continent (porridges, pancakes, bread), in the Mediterranean basin (couscous, pasta) and in the Middle East (bulgur). Rich in starch, a source of energy essential to the survival and proper functioning of the body, this cereal is of major nutritional importance. What's more, its central role in human life soon extended far beyond the mere function of nourishing the body.

Because it was vital, in the truest sense of the word, for populations becoming sedentary and undergoing strong demographic growth, cereal growing also had profound impacts in social, economic, political, technical, cultural, religious and symbolic terms. In the late 1970s, the historian Fernand Braudel spoke of "civilizations of wheat, maize and rice".

BIRLOUEZ, ÉRIC, 2022. PETITE ET GRANDE HISTOIRE DES CÉRÉALES ET LÉGUMES SECS. .
VERSAILLES: ÉDITIONS QUAE. CARNETS DE SCIENCES. ISBN 978-2-7592-3476-9. 633.1

Les hommes et les femmes du Paléolithique étaient des chasseurs-cueilleurs dont le régime alimentaire, omnivore, était par nécessité très diversifié : jeunes pousses, fruits et baies, racines et bulbes, vers, insectes, coquillages, poissons, œufs, viande, etc. Mais lorsqu'elles se sont mises à pratiquer l'agriculture, toutes les sociétés humaines ont fortement réduit la diversité de leur alimentation. Cette focalisation sur un nombre limité d'aliments, principalement végétaux, permettait, en temps normal, de nourrir davantage de personnes (en revanche, elle accentuait le risque de famine en cas d'accident survenant sur une culture majeure).

Partout, les communautés agricoles se sont dotées d'un aliment essentiel, d'une nourriture de base qui constituait - et constitue encore dans de nombreux pays - le socle du régime alimentaire pour la grande majorité de la population. Fait notable : cet aliment essentiel, dont la nature diffère selon les régions du monde, est presque toujours un végétal et, plus précisément, une céréale.

C'est le blé qui, sous des formes variées, occupe cette place sur le continent européen (bouillies, galettes, pain), dans le bassin méditerranéen (couscous, pâtes) ainsi qu'au Moyen-Orient (boulghour). Riches en amidon, une source d'énergie indispensable à la survie et au bon fonctionnement de l'organisme, cette céréale a une importance majeure sur le plan nutritionnel. En outre, son rôle central dans la vie des hommes s'est très vite étendu bien au-delà de cette seule fonction de nourrir les corps. Parce qu'elle était vitale, au sens propre du mot, pour des populations devenues sédentaires et en forte croissance démographique, la culture des céréales a eu également de profonds impacts en termes sociaux, économiques, politiques, techniques, culturels, religieux ou encore symboliques. A la fin des années 1970, l'historien Fernand Braudel n'hésitait pas à parler de « civilisations du blé, du maïs et du riz ».



Wheat, oat and rye

Ward, A., 2019, *The Encyclopedia of Food.*, 557-558.



Top left : Ancient Grains : Emmer

PENN STATE, COLLEGE OF AGRICULTURAL SCIENCES, Plone site, <https://plantscience.psu.edu/research/projects/grains/heritage-grains/em>

Top right : Ancien Grains : Einkorn

Wild, Prairie Garden Seeds, <https://prairiegardenseeds.ca/products/wild-einkorn>

Bottom : Actual Grains : Wheat

Production, Types, Uses, & Facts." Encyclopædia Britannica, www.britannica.com/plant/wheat.



Ingénieur et Peintre de l'Académie

Agriculture, Labourage.

STORE / wheat

FROM GRAIN TO FLOUR

HARVEST:

Wheat is typically harvested when the moisture content is between 18% and 24%. The moisture content at which harvest begins will depend heavily on the drying system available. Each farmer's goal is harvesting as early as possible provided the grain can be dried safely. Early harvesting is advantageous in double cropping systems and it is possible if moisture content is not below 16%.

DRYING:

Freshly harvested wheat grain should be dried to a moisture content of 14% or less within 48 hours to prevent sprouting and spoilage. It is transported to the closer regional drying center by truck and it is dried by high speed dryers or in-bin equipments.

STORAGE:

The wheat is transported by truck or train to the closer storage center. The factors affecting losses in storage are several and of different nature: handling damage, spillage and moisture stresses and movements from the mechanical and environmental point of view; infestations of bacteria, molds, fungi, insects, rodents and birds; biochemical processes as vitamin loss, fat acidity and natural respiration (and CO₂ emissions). To prevent and minimize the losses in storage, the combination of several controls is applied: biological, chemical sanitation against impurities, insects, mold, predators and parasites; physical control by air conditioning (temperature and humidity control), drying (moisture control), controlled atmosphere (gas concentration control), aeration, heat disinfestation, irrigation; and a proper design of structure protected by weather, rodents and birds.

MILLING:

Swissgranum is the center of distribution of wheat (and cereals) in Switzerland. Today there are 50 industrial mills still working. When the wheat arrives at the center, the milling process starts with a cleaning phase from impurities. Milling consists in the separation of the different components of the kernel and in the consequent sell of them to produce several and divers goods (as oil, whole wheat flour, white flour and others).

MCNEILL, SAM, DOUG OVERHULTS, AND MIKE MONTROSS. 'HARVESTING, DRYING AND STORING WHEAT', N.D.

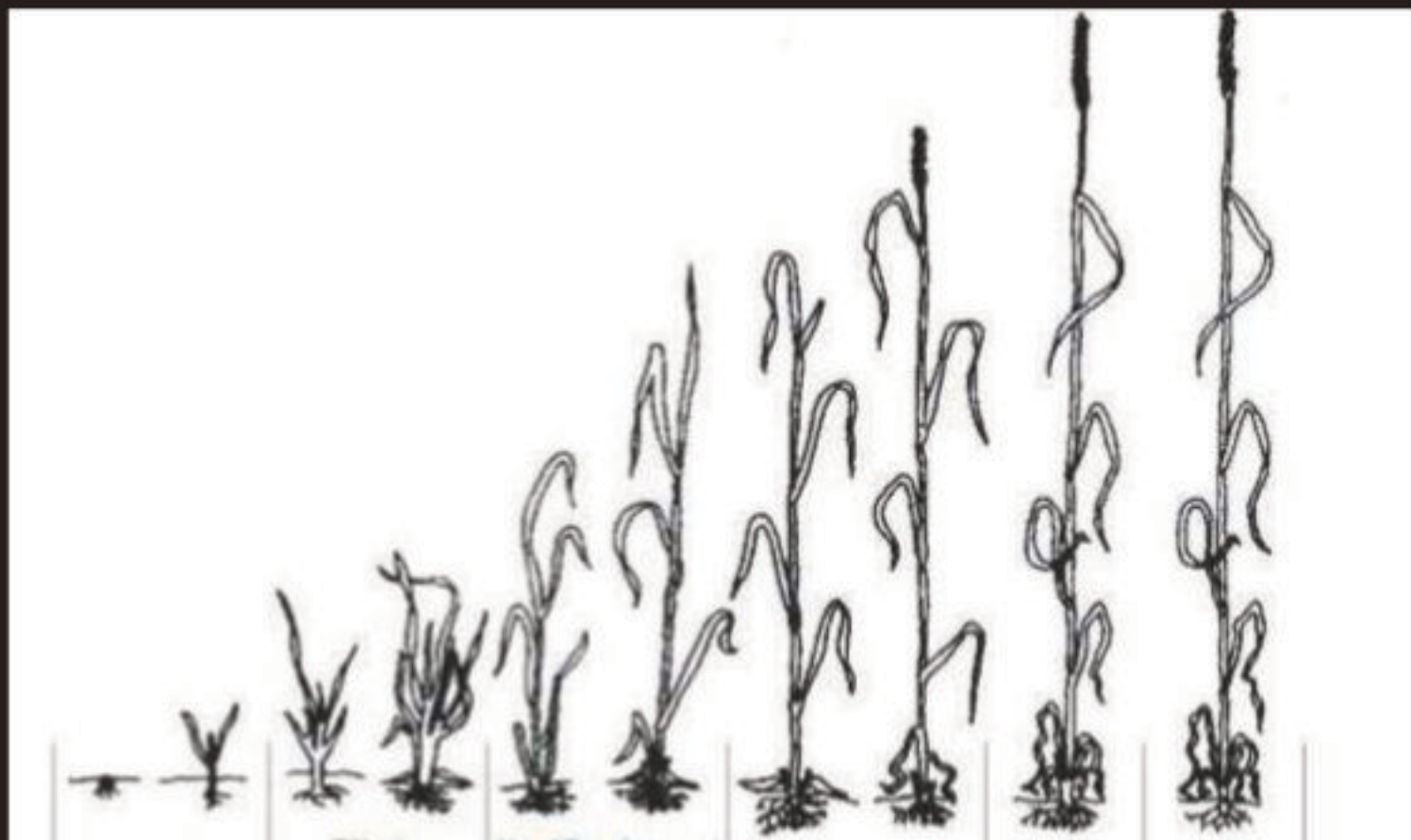
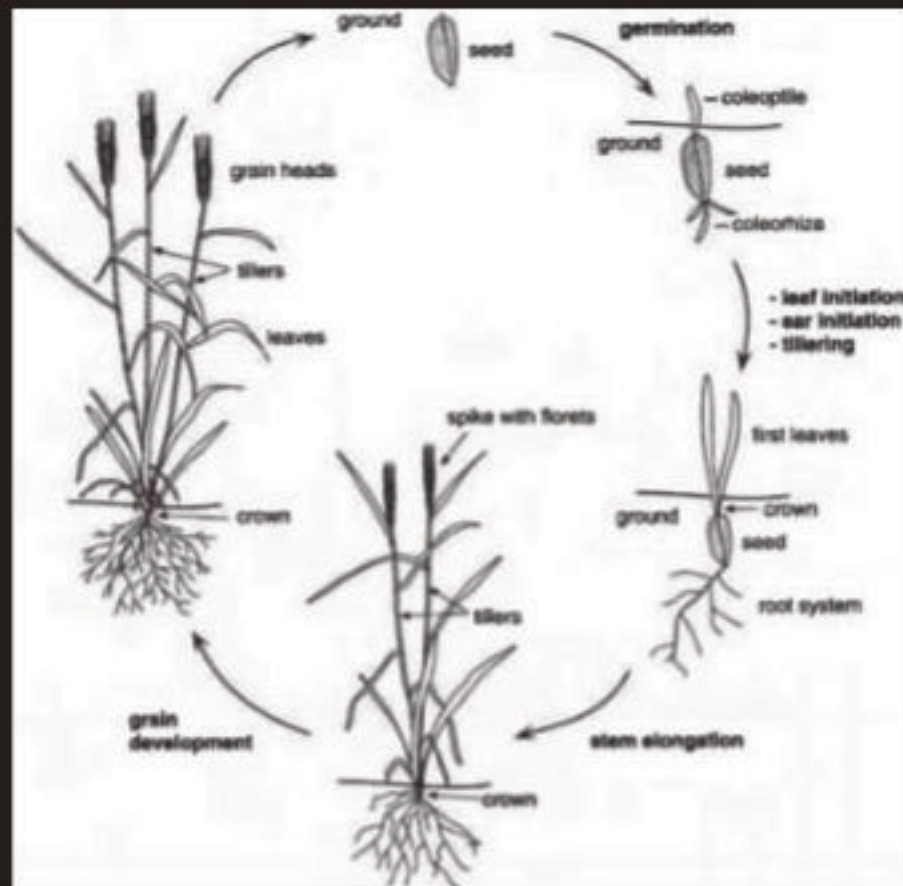
ANDALES, S.C. 'STORAGE OF CEREAL GRAINS'. FAO.ORG. ACCESSED 23 SEPTEMBER 2023. [HTTPS://WWW.FAO.ORG/3/X5048E/X5048E04.HTM](https://www.fao.org/3/X5048E/X5048E04.HTM).

'FMS – FEDERATION DES MEUNIERES SUISSES', 25 SEPTEMBER 2023. [HTTPS://WWW.DSM-FMS.CH/](https://www.dsm-fms.ch/).

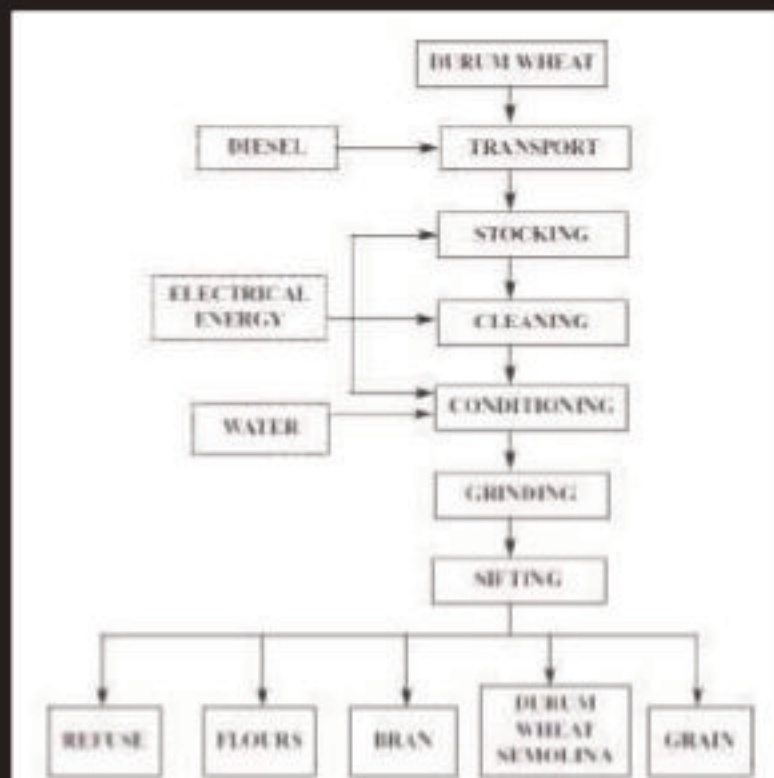
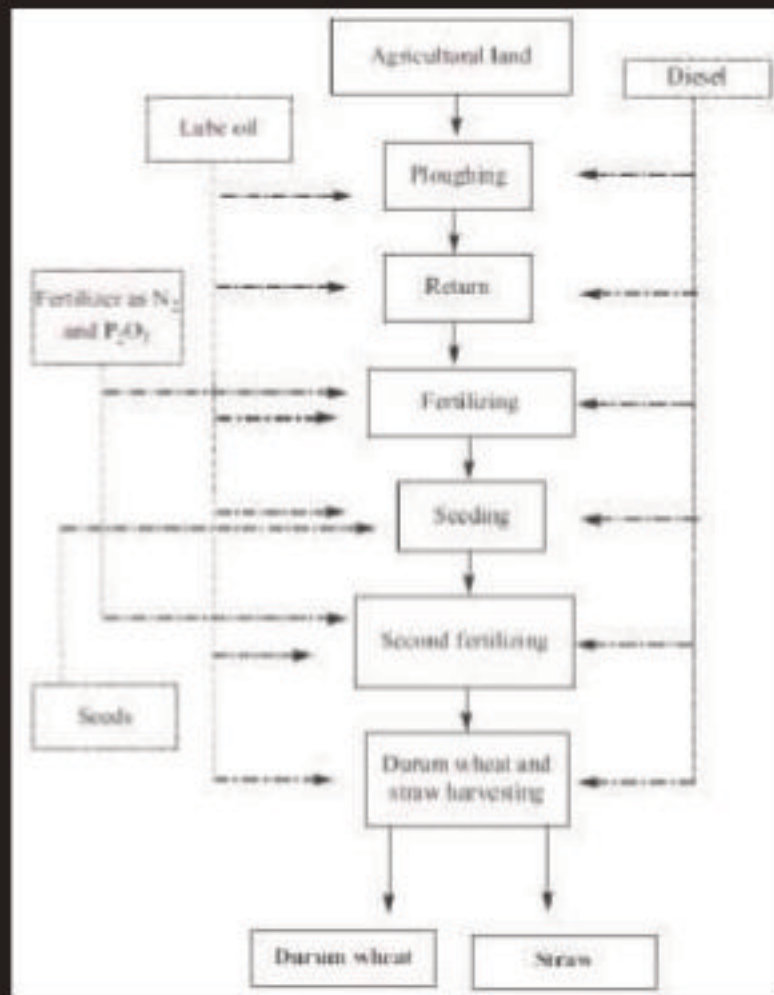
SABELLA, ERIKA, ALESSIO APRILE, CARMINE NEGRO, FRANCESCA NICOLI, ELIANA NUTRICATI, MARZIA VERGINE, ANDREA LUVISI, AND LUIGI DE BELLIS. 'IMPACT OF CLIMATE CHANGE ON DURUM WHEAT YIELD'. AGRONOMY 10, NO. 6 (3 JUNE 2020): 793. [HTTPS://DOI.ORG/10.3390/AGRONOMY10060793](https://doi.org/10.3390/AGRONOMY10060793).



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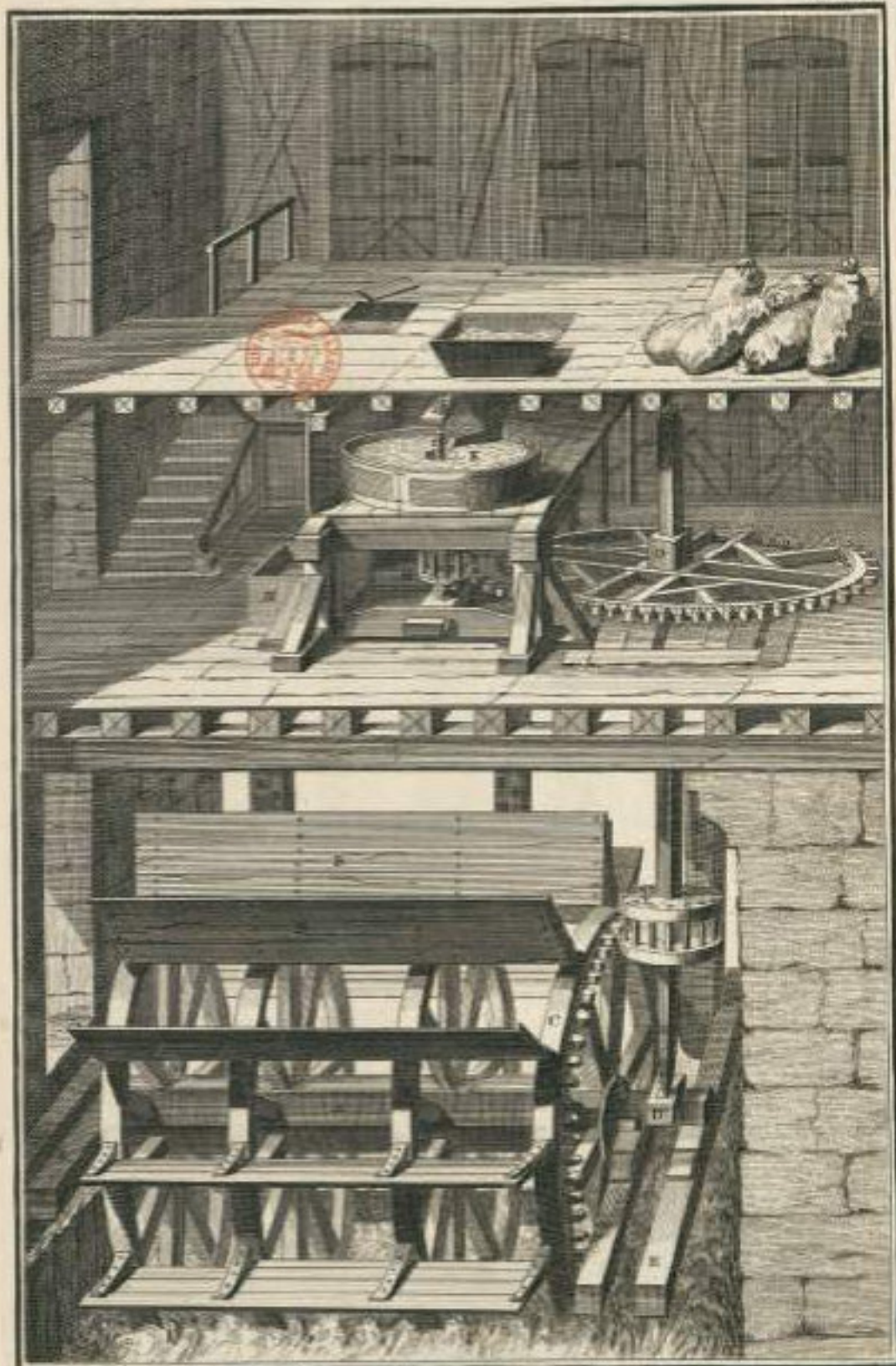
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Diderot Rec.

*Agriculture,
Le Batteur en Grange.*

Agriculture, le batteur en grange
Diderot, Denis, et D'Alembert. L'Encyclopédie: recueil de planches, sur les sciences, les arts libéraux, et les arts mécaniques, avec leur explication, 1772



*Agriculture, Économie Rustique,
Moulin à Eau.*

Agriculture, économie rustique, moulin à eau

Diderot, Denis, et D'Alembert. L'Encyclopédie: recueil de planches, sur les sciences, les arts libéraux, et les arts mécaniques, avec leur explication, 1772

STORE / wheat

SPIRITUAL SYMBOLISM

Throughout history, wheat has been linked to a multitude of symbols and cultural contexts. In Greek, Roman, and Egyptian mythologies, deities such as Ceres, Demeter, and Osiris are revered as the patrons of harvest, agriculture, and fertility. These figures are frequently depicted in their iconography holding sheaves of wheat. According to legend, Osiris is credited with sowing the first wheat grain in the Nile delta, further emphasizing the profound link between wheat and the sustenance of human civilization. The significance of wheat extends beyond mythology, as it is mentioned multiple times in the Bible, where it is both recognized as a source of nourishment and revered as a symbol of spiritual sustenance.

In popular culture, wheat and its derived products, such as flour and bread, are often referenced in proverbs and sayings.

Wheat, from the fields to the harvest and the people involved, has been a common source of inspiration for artists. It's not just about capturing the beauty of wheat but also how harvesting is a part of everyday life.

The image of wheat has not only held cultural and historical significance but has also been strategically utilized as a propaganda symbol. Wheat, with its associations of abundance, sustenance, and prosperity, has been employed as a symbol in various propaganda campaigns from different countries. Governments, political movements, and organizations have used images of wheat fields, golden harvests, and freshly baked bread to convey messages of plenty, well-being, and a bright future. This symbolism is meant to evoke a sense of security and stability, reassuring the populace and fostering a sense of unity and hope.

As a key global food source, wheat plays a central role in ensuring food security worldwide. Consequently, it can be wielded as a means of exerting pressure or even as a strategic weapon. Its significance in shaping geopolitical relationships and conflicts is undeniable. Moreover, a shortage of wheat can represent a point of extreme vulnerability.

SCHMIDT, JOËL. DICTIONNAIRE DE LA MYTHOLOGIE GRECQUE ET ROMAINE. PARIS: LAROUSSE, 2017.

BIRLOUEZ, ÉRIC. PETITE ET GRANDE HISTOIRE DES CÉRÉALES ET LÉGUMES SECS. CARNETS DE SCIENCES. VERSAILLES: ÉDITIONS QUAE, 2022.

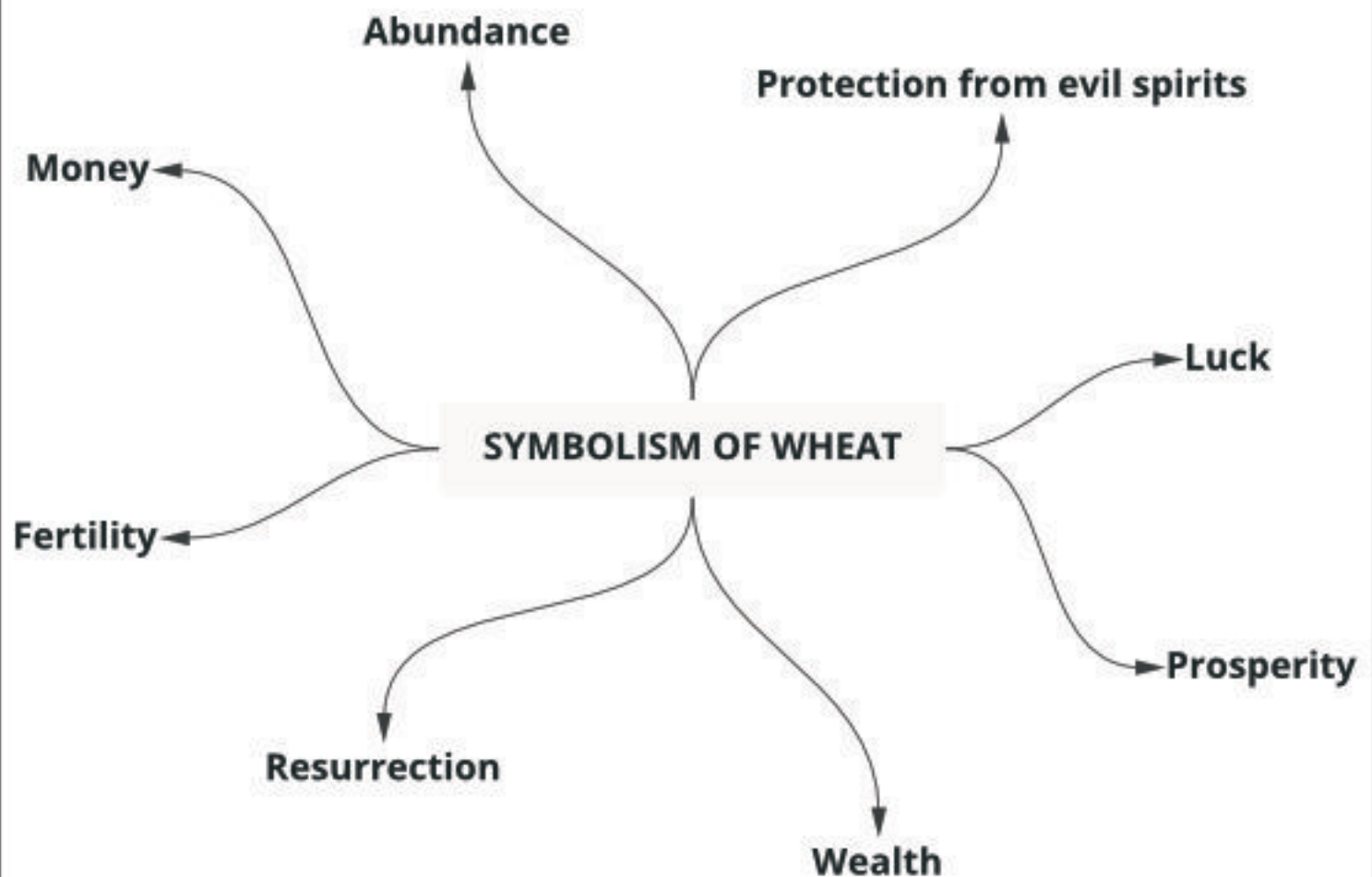
ABIS SÉBASTIEN, « LE BLÉ : GÉOHISTOIRE D'UN GRAIN AU CŒUR DU POUVOIR », GÉOÉCONOMIE, 2015/5 (N° 77), P. 195-215. DOI : 10.3917/GEOEC.077.0195. URL : [HTTPS://WWW.CAIRN.INFO/REVUE-GEOECONOMIE-2015-5-PAGE-195.HTM](https://www.cairn.info/revue-geo-economie-2015-5-page-195.htm)



Top left : Ceres, Jules Romain, 1523, Oil painting on wood, Musée du Louvre, Paris

Top right : Demeter holding sheaf of wheat and Persephone, Unknown, 450 B.C., Attic red figure pottery, Athens

Bottom : Sennedjem and Ineferti harvesting grain, Unknown, 1295-1213 B.C., Painting in an Egyptian tomb, Met Museum of Art



*«He makes peace in your borders; he fills you with the finest of the **wheat**.»* - Psalm 147:14

*«May God give you of the dew of heaven and of the fatness of the earth and plenty of **grain** and wine.»* - Genesis 27:28

*«And that which you sow, you do not sow the body which is to be, but a bare grain, perhaps of **wheat** or of something else. But God gives it a body just as He wished, and to each of the seeds a body of its own.»* - Corinthians 15:37-38

Top : Diagram of the main popular symbolism of wheat

Bottom : Mentions of wheat in the Bible

STORE / wheat

CULTURAL SYMBOLISM

- "Separate the wheat from the chaff": Distinguish between what is good and what is bad
- "To be rolled in the flour": To be taken for a ride
- "It's worth a bite of bread": It's not expensive
- "It doesn't eat bread": It doesn't cost much and may be useful
- "To sell like small breads": Sell easily
- "One can't be in the oven and in the mill": You can't be in two places at once
- "Putting one's hand in the dough" : Take part in a collective project
- "Having bread on the board": To have plenty of work to do
- "It's one's bread-earner": It's your means of subsistence
- "To earn one's bread by the sweat of one's forehead": To do hard work in order to survive
- "To offer bread with butter on it": To make work easier
- "Don't lose a crumb": Leave nothing behind
- "Every day brings its own bread": Daily nourishment
- "Long as a day without bread": Without end
- "Good dough": A person of good character
- "To hug like good bread": To hug with great affection
- "To promise more butter than bread": To make fine promises while forgetting the realities
- "He eats his bread in his pocket": He is stingy
- "Sliced bread has no master": The slice of bread on the table belongs to everyone
- "It's better to run to the loaf than to the doctor: Having too much appetite is better than being ill.
- "Stolen bread awakens the appetite": What is forbidden attracts covetousness

POPULAR SAYINGS AND PROVERBS LITERALLY TRANSLATED FROM FRENCH

- "Séparer le bon grain de l'ivraie" : Distinguer ce qui est bon de ce qui est mauvais*
- "Être roulé dans la farine" : Être abusé*
- "Ça vaut une bouchée de pain" : Ce n'est pas cher*
- "Ça ne mange pas de pain" : Ça ne coûte pas et sera peut-être utile*
- "Vendre comme des petits pains" : Vendre facilement*
- "On ne peut pas être au four et au moulin" : On ne peut être en deux endroits à la fois*
- "Mettre la main à la pâte" : Participer à un travail collectif*
- "Avoir du pain sur la planche" : Avoir du travail en abondance*
- "C'est son gagne-pain" : C'est son moyen de subsistance*
- "Gagner son pain à la sueur de son front" : Exécuter un dur labeur pour survivre*
- "Offrir le pain tout beurré" : Rendre le travail plus aisé*
- "Ne pas en perdre une miette" : Ne rien laisser*
- "Chaque jour amène son pain" : La nourriture quotidienne*
- "Long comme un jour sans pain" : Sans fin*
- "Bonne pâte" : Personne d'heureux caractère*
- "Embrasser comme du bon pain" : Embrasser avec beaucoup d'affection*
- "Promettre plus de beurre que de pain" : Faire de belles promesses en oubliant les réalités*
- "Il mange son pain dans sa poche" : Il est avare*
- "Pain coupé n'a pas de maître" : La tranche de pain sur la table est à tout le monde*
- "Il vaut mieux courir à la miche qu'au médecin" : Avoir trop d'appétit vaut mieux qu'être malade*
- "Pain dérobé réveille l'appétit" : Ce qui est interdit attire les convoitises*



Top : *Piles de blé (fin de l'été)*, Claude Monet, 1891, Oil on canvas, Musée d'Orsay, Paris

Bottom : *Wheatfield with Crows*, Vincent Van Gogh, 1890, Oil on canvas, Van Gogh Museum, Amsterdam



Top : *Les cribleuses de blé*, Gustave Courbet, 1855, Oil on canvas, Musée d'Arts de Nantes

Bottom : *Le Repas des moissonneurs*, Jean-François Millet, 1850, Oil on canvas, Musée d'Orsay, Paris

STORE / wheat

POLITICAL SYMBOLISM

Wheat is the world's most important food crop, and has always been at the heart of history and power struggles. More discreet than oil, less glittering than gold and as uncontroversial as uranium, it is not a raw material like any other. It is a vital product, the cultivation of which has quite simply transformed the physical, demographic and political landscape of the planet. Without wheat, there is no security. For a country, owning wheat means controlling its stability and, if it exports part of its harvest, holding a major strategic advantage for its international influence. Conversely, not having enough wheat to meet domestic needs is already revealing a weakness and a point of great vulnerability.

ABIS SÉBASTIEN, « LE BLÉ : GÉOHISTOIRE D'UN GRAIN AU CŒUR DU POUVOIR », GÉOÉCONOMIE, 2015/5 (N° 77), P. 195-215. DOI : 10.3917/GEOEC.077.0195. URL : [HTTPS://WWW.CAIRN.INFO/REVUE-GEOECONOMIE-2015-5-PAGE-195.HTM](https://www.cairn.info/revue-gеоeconomie-2015-5-page-195.htm)

Production-phare de la sécurité alimentaire mondiale, le blé se situe depuis toujours au coeur de l'Histoire et des jeux de puissance. Plus discret que le pétrole, moins brillant que l'or et nullement controversé comme l'uranium, il n'est pas une matière première comme une autre. Il s'agit d'un produit vital, dont la culture a tout simplement transformé le paysage physique, démographique et politique de la planète. Sans blé, point de sécurité. Pour un État, en posséder, c'est contrôler sa stabilité et détenir un atout stratégique majeur pour son influence internationale s'il exporte une partie de ses récoltes. À l'inverse, manquer de blé face à ses besoins domestiques, c'est déjà révéler une faiblesse et dévoiler un point de forte vulnérabilité.



Top left : *Semez du blé, c'est de l'or pour la France*, Ville de Paris, French propaganda, 1918

Top right : *Plan Marshall, Exposition agricole*, Ministère de l'agriculture, French propaganda, 1948

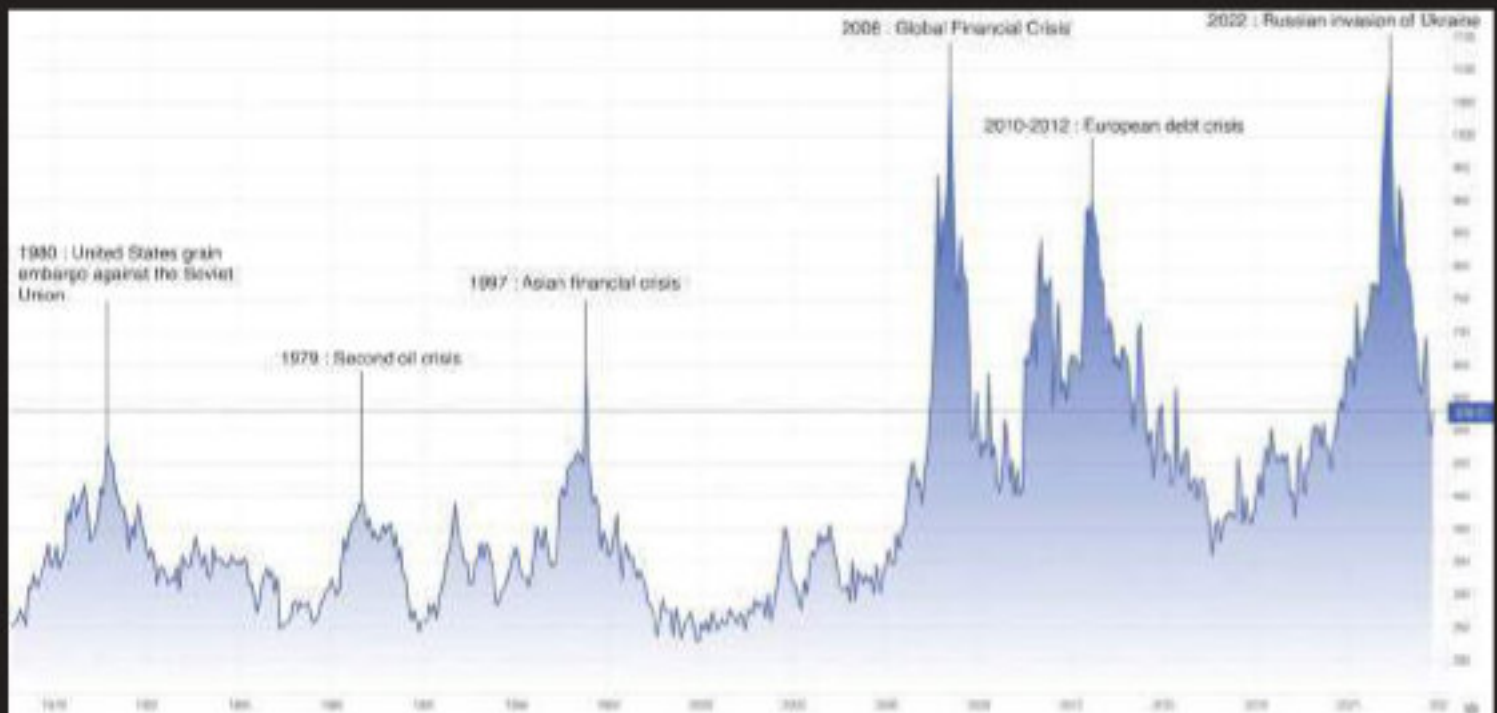
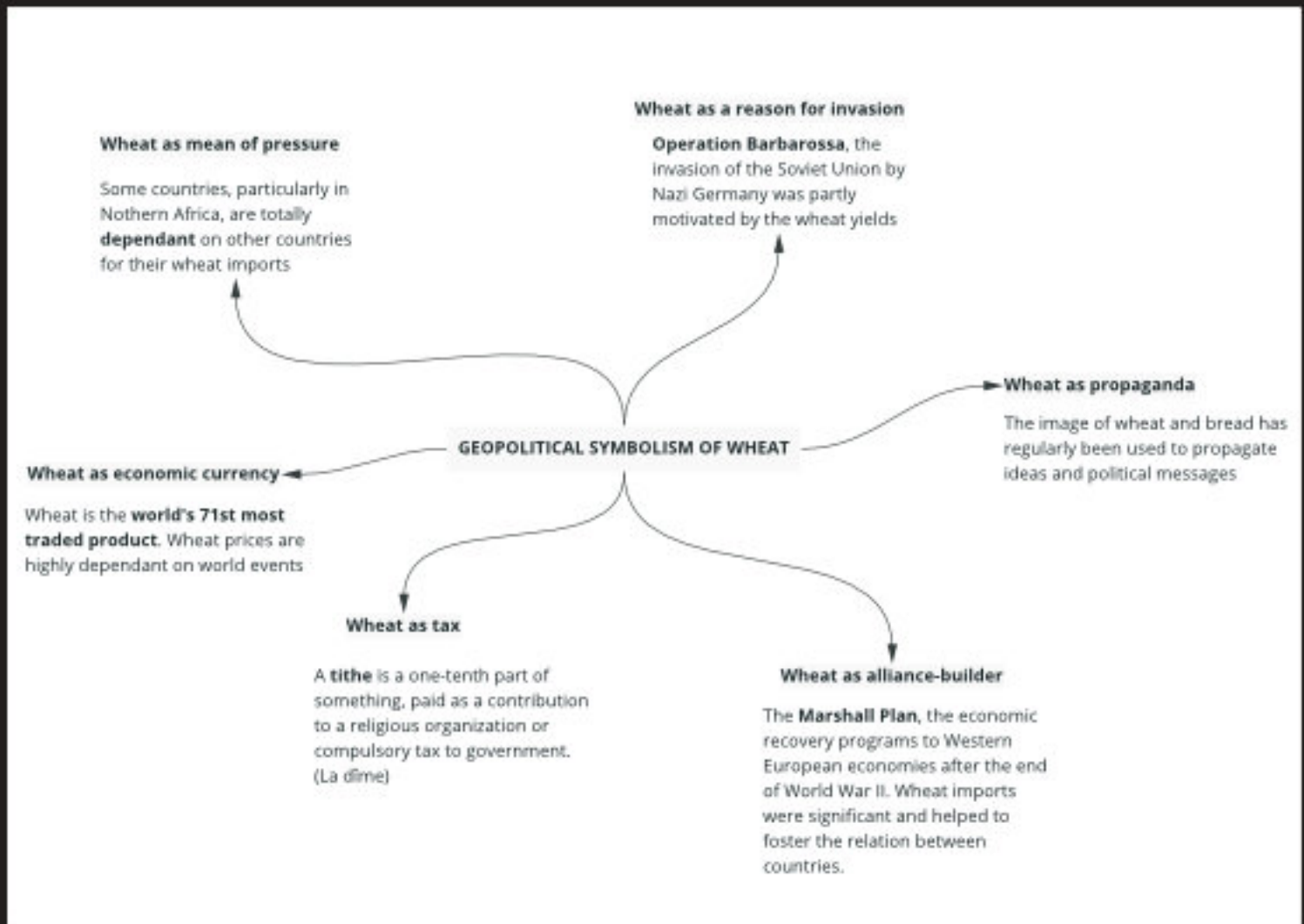
Bottom : *Will you help the women of France?*, United States Food Administration, American propaganda, 1918



Top : *Increasing the yield is the main goal*, Soviet propaganda, 1952

Bottom left : *Farmers of Siberia - More Bread to the Soviet Country !*, Soviet propaganda, 1946

Bottom right : *Caricature of Putin*, Ryan Johnson, The Washington Post, 2022



Top : Diagram of geopolitical symbolism of wheat

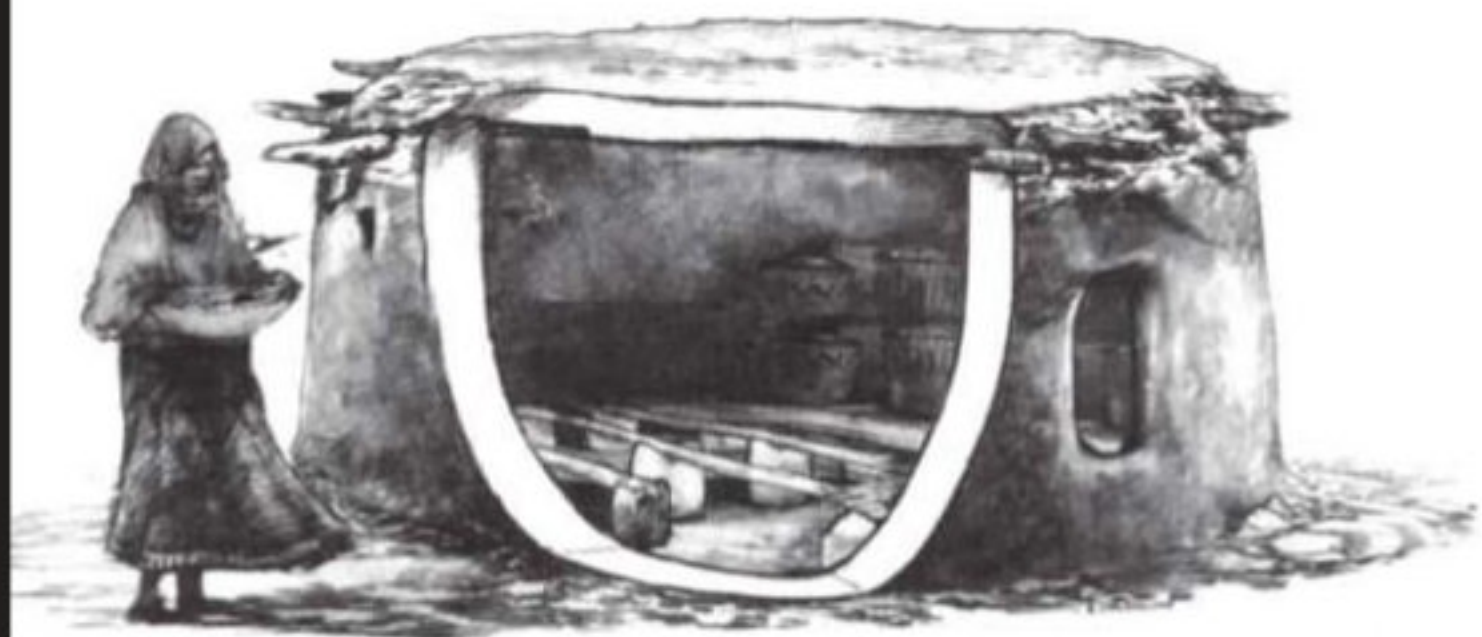
Bottom : Wheat price fluctuations since 1977, Trading economics

STORE / wheat

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Granary in predomesticated context, Drah', Jordan, 11'300 BC - 11'175 BC
KUIJT, Ian and FINLAYSON, Bill, 2009. Evidence for food storage and
predomestication granaries 11,000 years ago in the Jordan Valley. *Proceedings
of the National Academy of Sciences*, 7 July 2009. Vol. 106, no. 27, p. 10966–
10970. DOI 10.1073/pnas.0812764106.

STORE / wheat (5;08<0;@

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Ventilated Above-Ground Granaries !

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Underground Grain Storage :

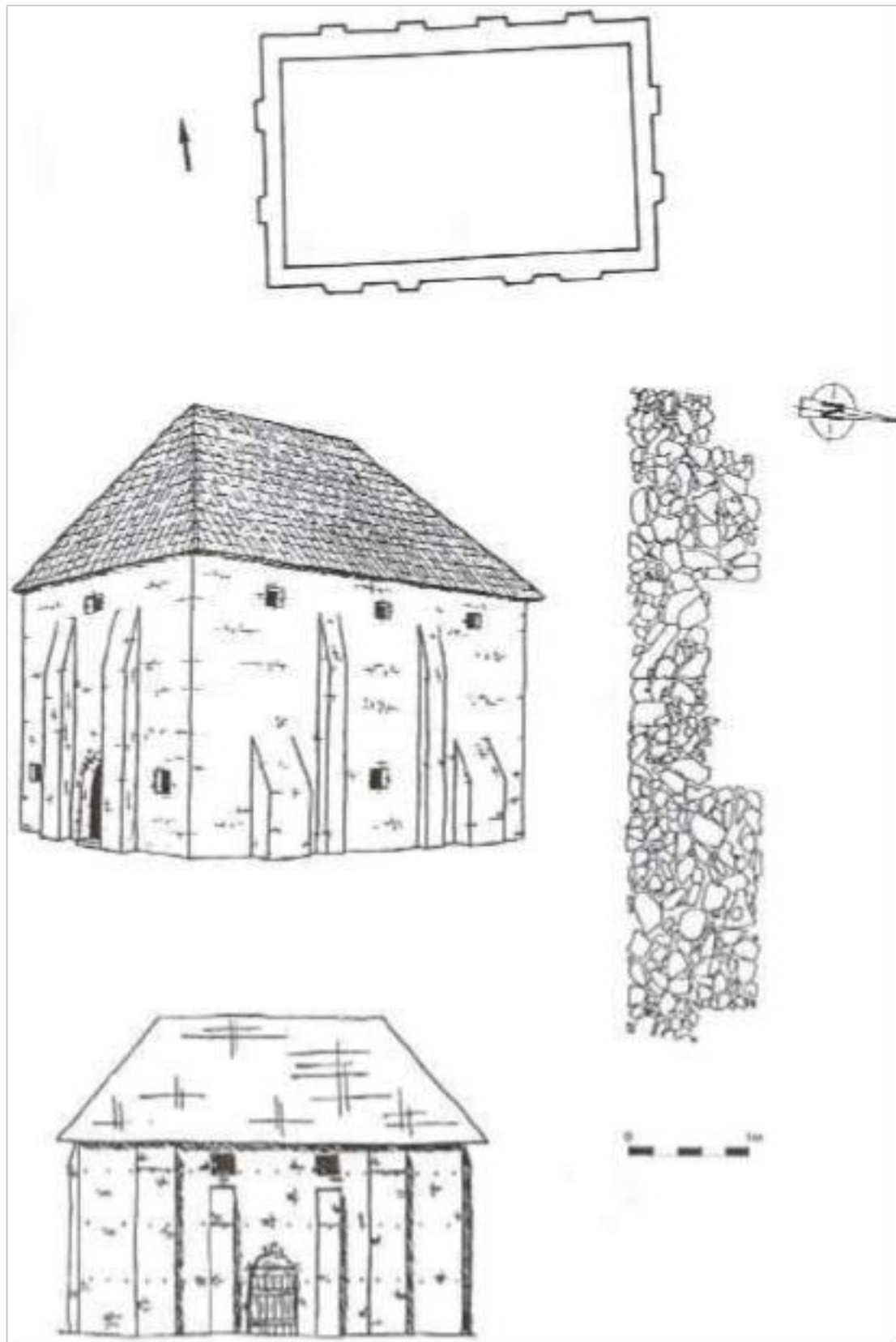
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Dolium, Villa Regina, Region of Napoli, Italia, 40 BC
ALMARE, 2002. Dolia for storing wine in the ancient roman Villa Rustica in Boscoreale in Italy. Online. September 2002.
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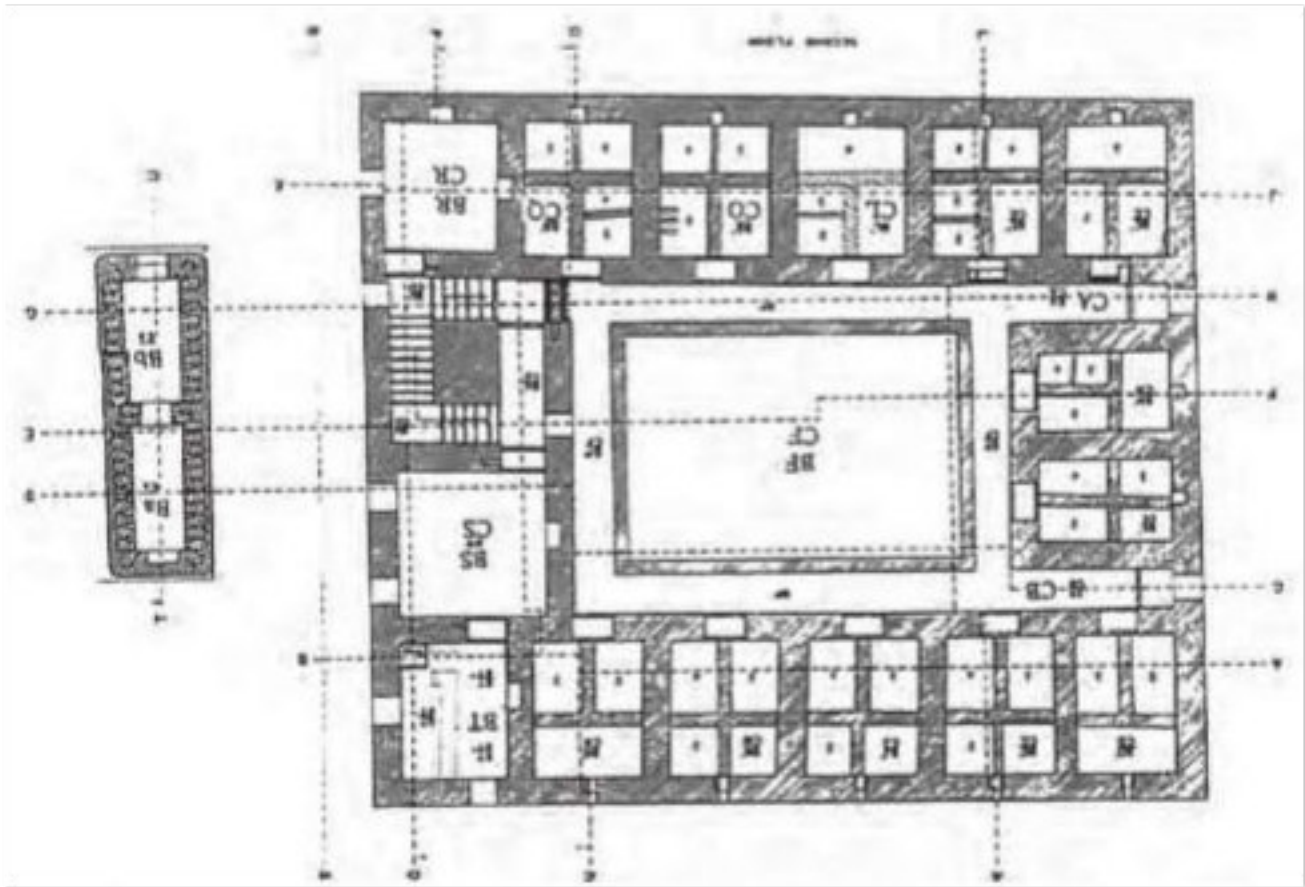
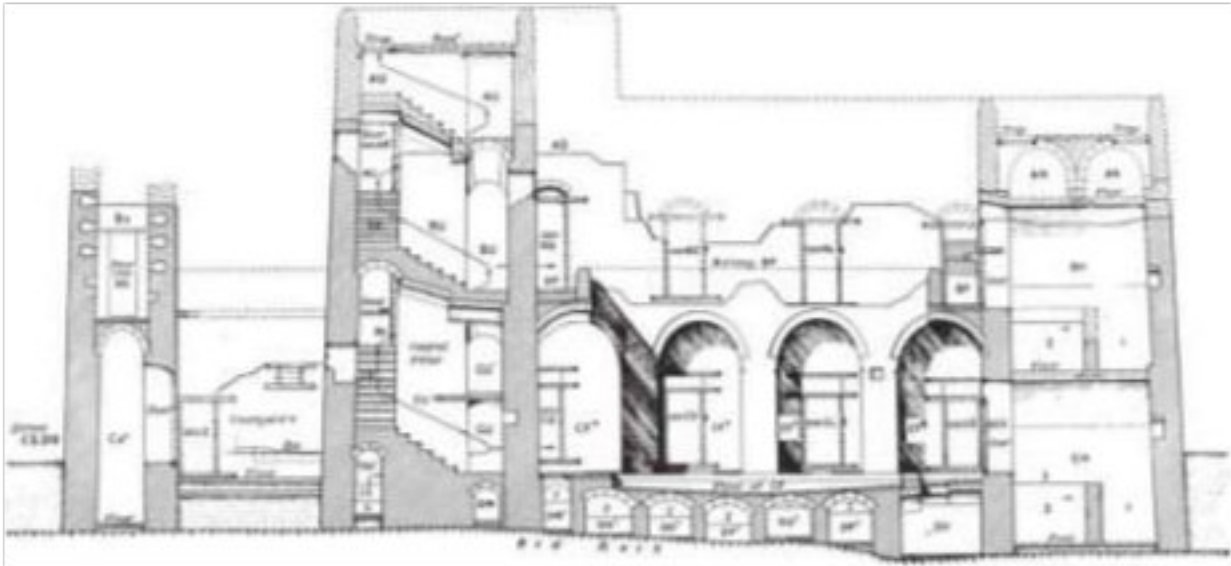


Roman Granary, Northern Gaul, about 100 BC

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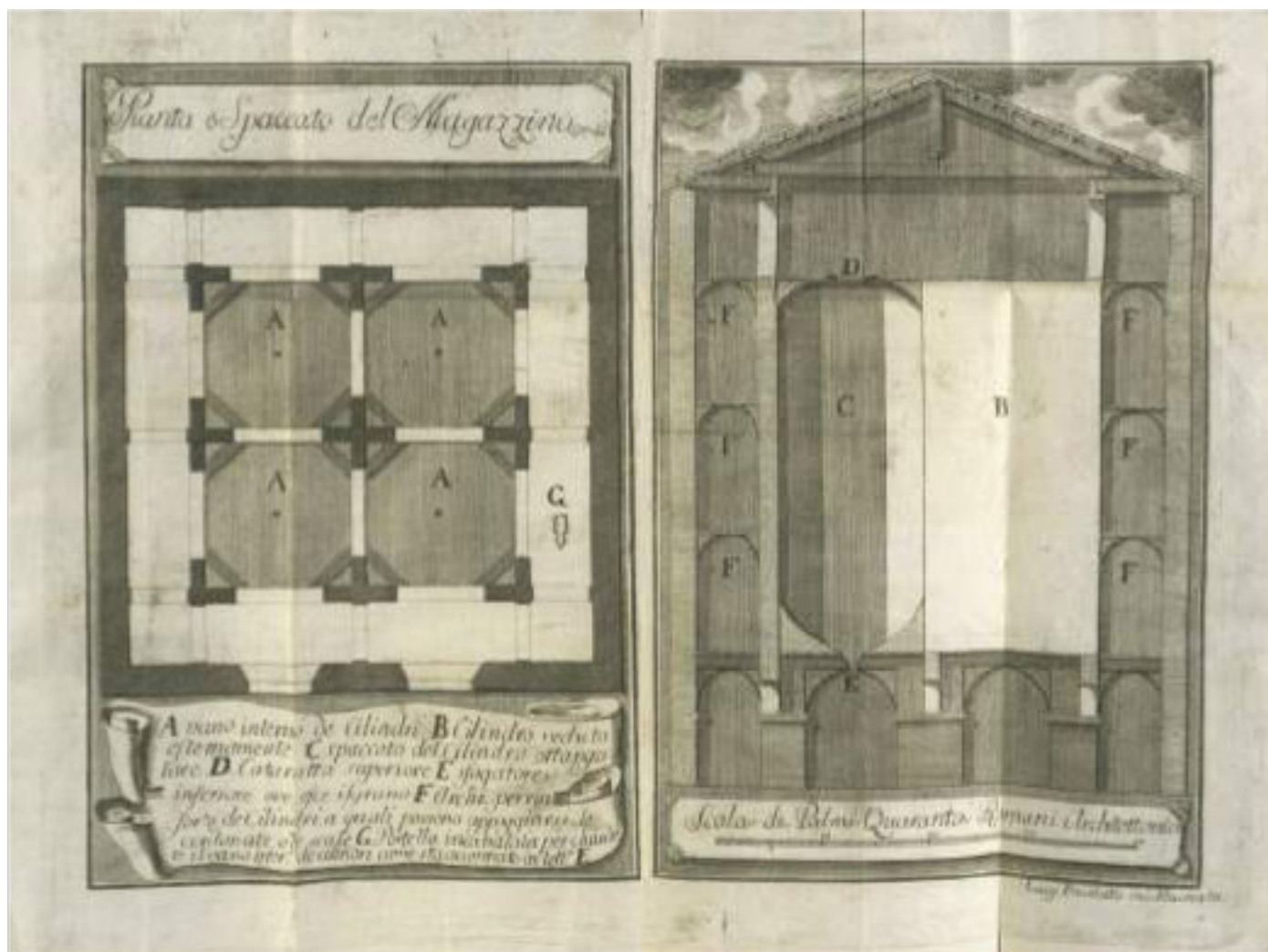
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THE ENLIGHTENMENT

From Antiquity to the end of the modern era, grain storage methods remained more or less the same, with no technical innovations that would significantly alter storage management practices. However, the 18th century, and especially the second half of the century, marked a turning point, as thoughts, writings and debates on the subject multiplied, within the more general framework of the development of economic thought in Europe and the questioning of the regulations that had organized urban supplies for centuries.

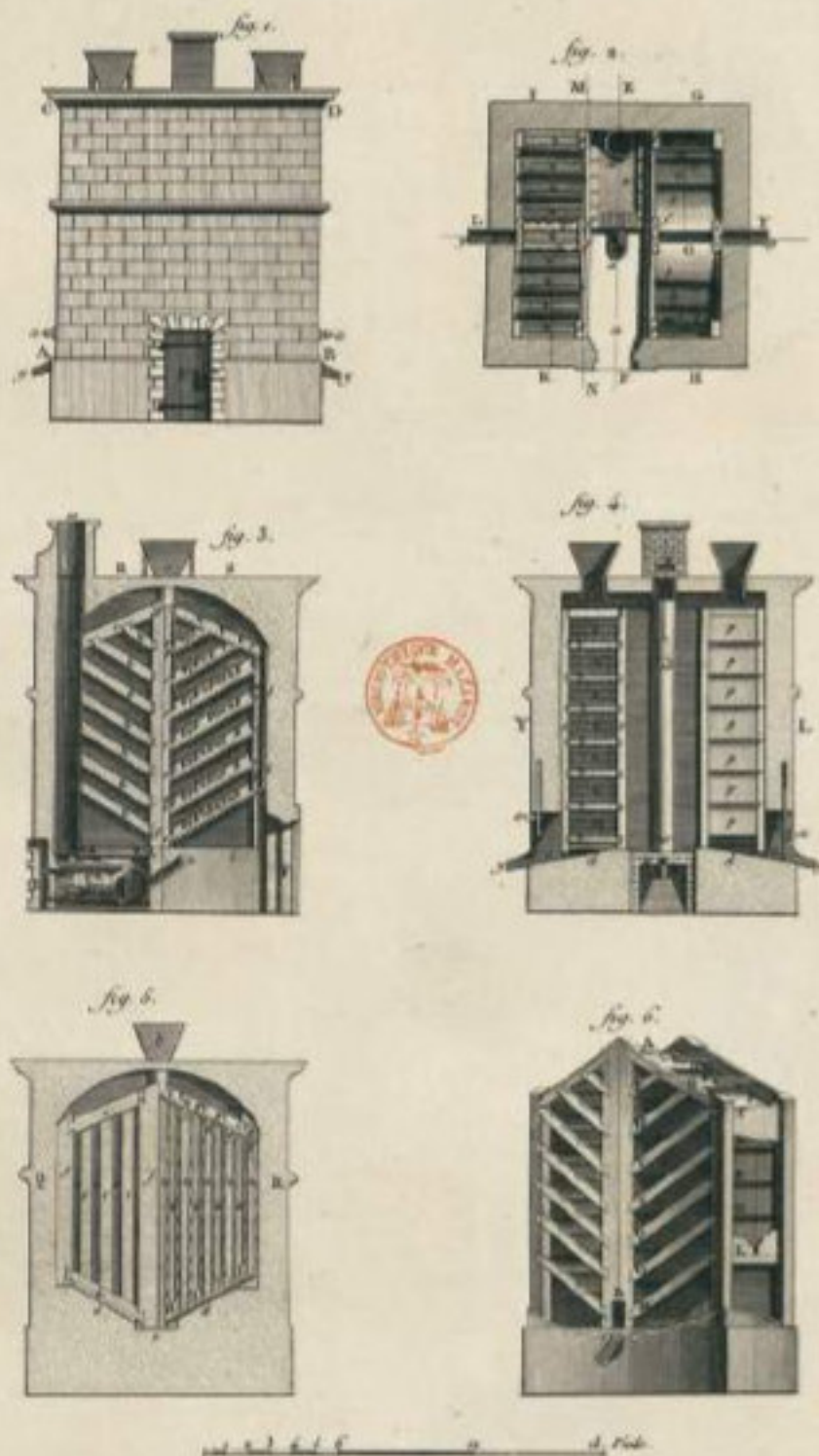
GERACI, GIOVANNI AND MARIN, BRIGITTE, 2022. STOCKAGE ET TECHNIQUES DE CONSERVATION DES GRAINS. IN: VIRLOUVET, CATHERINE (ED.), ENTREPÔTS ET TRAFICS ANNONAIRES EN MÉDITERRANÉE. ONLINE. ROME: PUBLICATIONS DE L'ÉCOLE FRANÇAISE DE ROME. P. 83-136. COLLECTION DE L'ÉCOLE FRANÇAISE DE ROME. [ACCESSED 27 SEPTEMBER 2023]. ISBN 978-2-7283-1247-4.

De l'Antiquité à la fin de l'époque moderne, les modalités de conservation du grain restent sensiblement les mêmes, sans innovation technique susceptible de modifier considérablement les pratiques de gestion des réserves. Cependant, le XVIII^e siècle, et surtout la seconde moitié du siècle, marque un certain tournant dans la mesure où se multiplient alors les réflexions, les écrits, les débats sur ce sujet, dans le cadre plus général du développement de la pensée économique en Europe et de la remise en question des réglementations annonaires qui avaient organisé depuis des siècles les approvisionnements urbains.



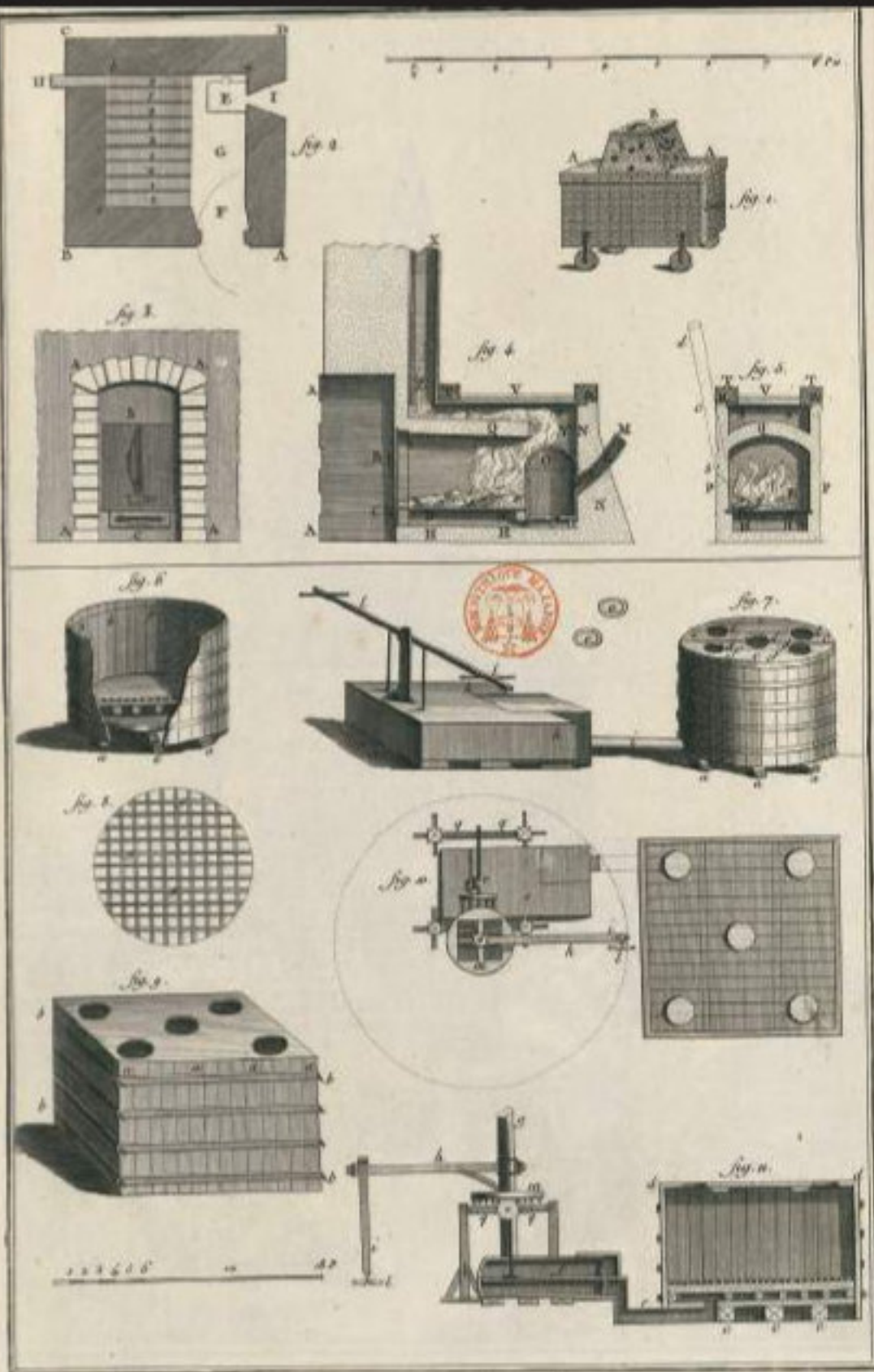
Off-ground granary, (unbuilt)

CACHERANO, Giambattista, 1783. Della conservazione del grano e della costruzione e forma de' magazzini o granaj. . dalle stampe di Luigi Chiappini, e Antonio Cortesi.



OEconomie Rustique, Conservation des Grains.

Economie rustique, conservation du grain
 Diderot, Denis, et D'Alembert. L'Encyclopédie: recueil de planches, sur les
 sciences, les arts libéraux, et les arts mécaniques, avec leur explication, 1772



Economie Rustique,
Conservation des Grains.

Economie rustique, conservation du grain

Diderot, Denis, et D'Alembert. L'Encyclopédie: recueil de planches, sur les sciences, les arts libéraux, et les arts mécaniques, avec leur explication, 1772

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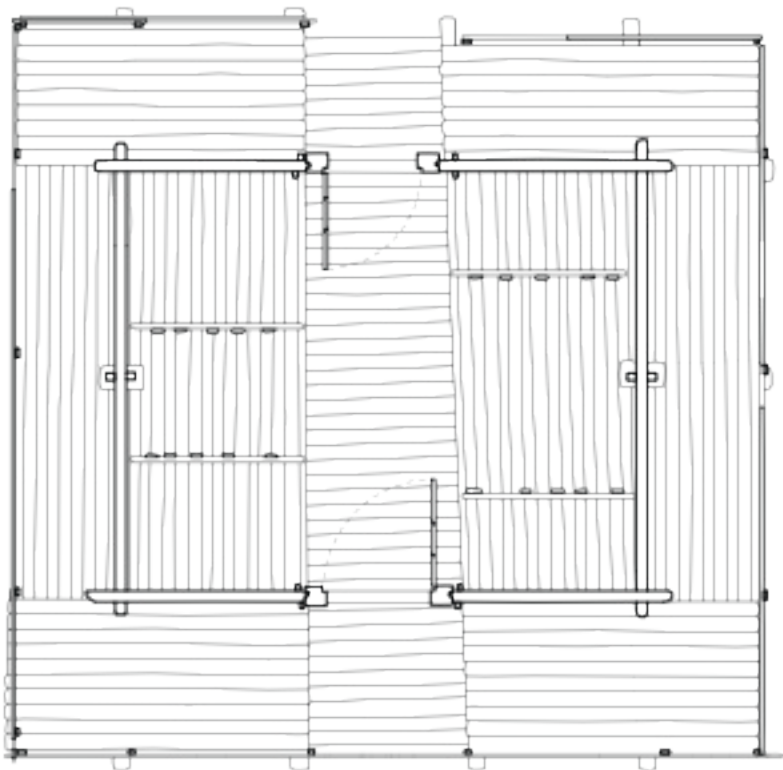
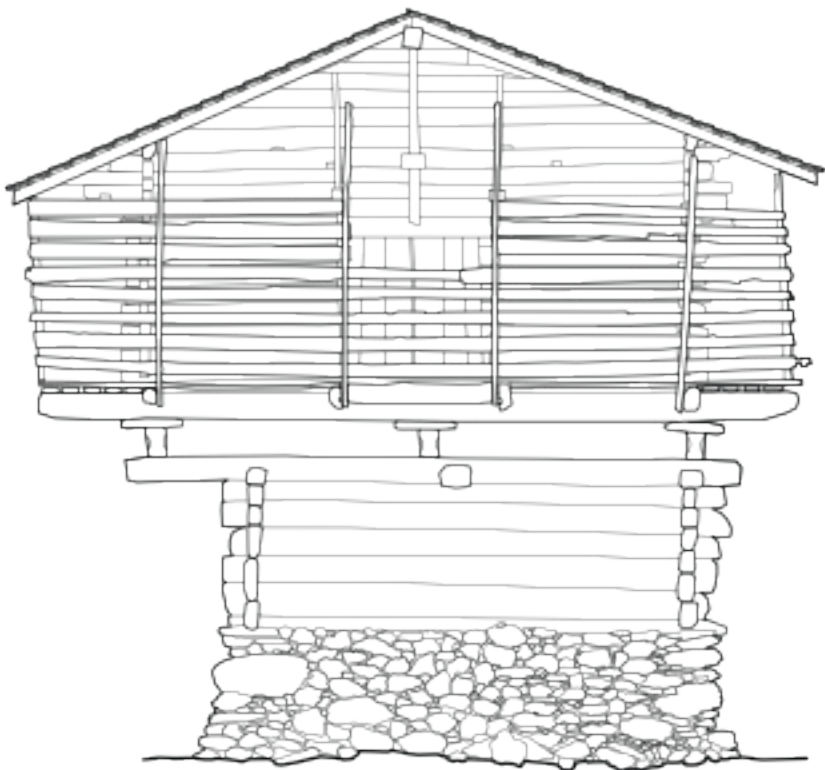
Afin de protéger cet environnement de la visite des petits rongeurs, la 'boîte' constituée de madriers est posée sur des piles en bois plus ou moins fines selon les usages propres à chaque vallée. La médiation entre la 'boîte' et les piles se fait à l'aide d'épaisses et larges pierres schisteuses, comme la lauze, qui réceptionnent les charges verticales en partie absorbées, en outre, par une fine planchette de bois positionnée à l'interface entre la 'boîte' et chaque pierre. Ces mêmes pierres sont utilisées pour les transitions ultimes : celle entre sol et bâtiment et celle entre bâtiment et ciel.



Raccard, Isérables

BRAGHERI, Nicola and GIROMINI, Patrick (eds.), 2017. Raccards, greniers et granges-écuries, réflexions sur le bâti rural valaisan. . Lausanne: Repro.

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Granary, St-Luc

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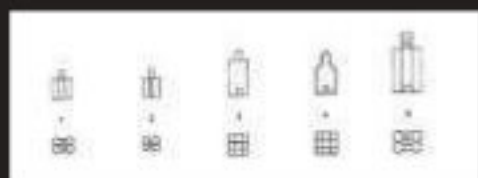
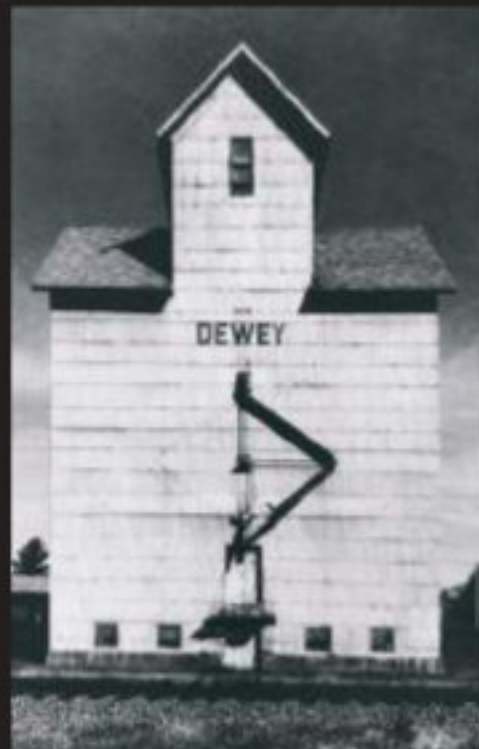
STORE / wheat RURAL ELEVATOR

To those who travel the great highways of the Midwest, silos appear like cathedrals, and in fact they are the cathedrals of our times. Their materials impose the rhythms of this book – wood, brick, tile, steel, concrete – and they mark the passage of time, the slow evolution of a collective work.

The rural elevator, standing anywhere from seven to eleven stories tall, is the most conspicuous structure on the Great Plains. It towers above the average town building of one or two stories and clearly marks the location of each town from miles away. In more densely populated areas elevators and towns are spaced approximately six miles apart, along railroad lines, providing a regular vertical rhythm on the otherwise flat midwestern horizon.

The common wood elevator (...) was prone to grain dust explosions from poorly lubricated machinery and to fire from sparks flying off passing trains. This problem led to brief experimentations with bricks, tile, and steel during the first two decades of this century, all of which were finally rejected around 1915 in favor of concrete.

MAHAR-KEPLINGER, LISA. GRAIN ELEVATORS. NEW YORK: PRINCETON ARCHITECTURAL PRESS, 1993.



Top left : Wooden elevator, 1880

Top middle : Brick elevator, 1890

Top right : Steel elevator, 1897

Bottom left : Tile elevator, 1900

Bottom middle : Concrete elevator, 1915

Bottom right : 1. Rural tile elevator 2. Rural steel elevator 3. Rural brick elevator 4.

Rural wood elevator 5. Rural concrete elevator

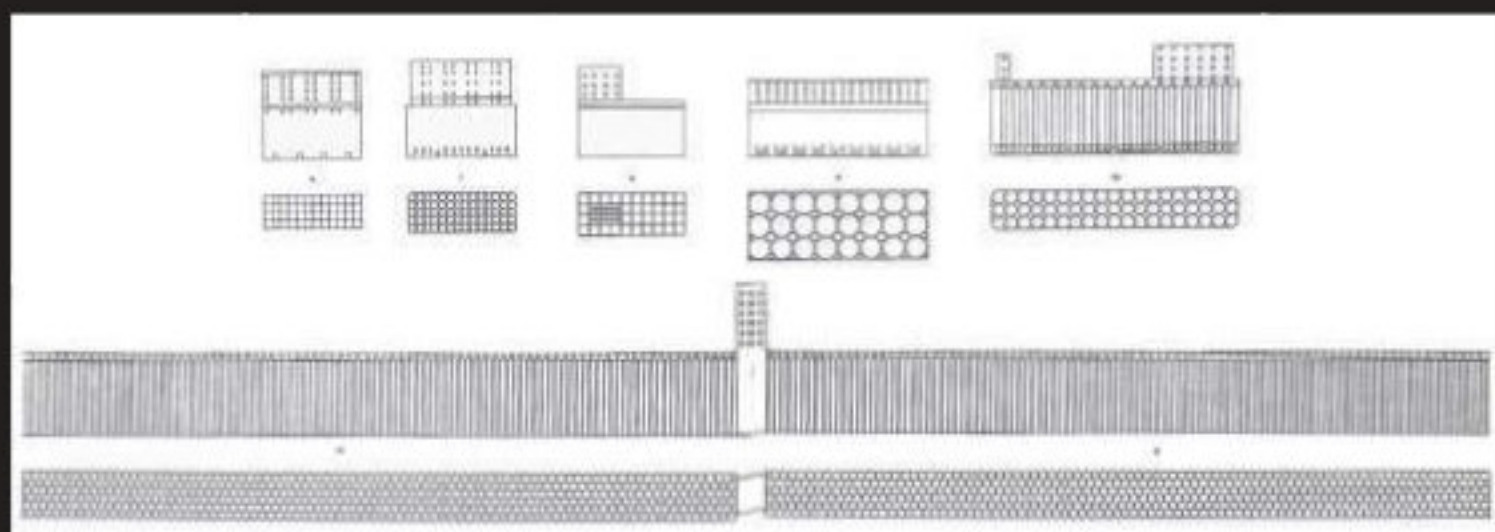
Mahar-Keplinger, Lisa. Grain Elevators. New York: Princeton architectural press, 1993.

STORE / wheat URBAN ELEVATOR

The urban elevator is larger and more mechanically sophisticated than the rural elevator and was the type most admired by European architects at the turn of the century. These buildings are monumental, a single bin may be large enough to store the annual produce of a hundred farms. Their function is to receive grain from the smaller rural elevators and store it until it can be sold to processors. Most of these elevators also have the capacity to sort and clean grain.

Urban elevators are positioned near railroad centers or waterways but are rarely an integral part of their urban landscape. Placed on the edge of the city, they have little effect on its organization unlike their rural counterpart which defines the structure of the town and is the center of its activity.

MAHAR-KEPLINGER, LISA. GRAIN ELEVATORS. NEW YORK: PRINCETON ARCHITECTURAL PRESS, 1993.



Top left : Wooden elevator, 1894

Top right : Tile elevator, 1901

Middle left : Concrete elevator, 1922

Middle right : Tile elevator, 1901

Bottom : 6. Urban wood elevator 7. Urban tile elevator 8. Urban brick elevator 9.

Urban steel elevator 10. Urban concrete elevator 11. Urban concrete elevator

Mahar-Keplinger, Lisa. Grain Elevators. New York: Princeton architectural press, 1993.

STORE / wheat MODERNISM

Volume and surface are the elements through which architecture manifests itself. Volume and surface are determined by the plan. The plan is the generator. Too bad for those who lack imagination!

First reminder: volume:

Architecture is the skillful, correct and magnificent interplay of volumes assembled under light. Our eyes are made to see shapes under light; shadows and light reveal shapes; cubes, cones, spheres, cylinders or pyramids are the great primary shapes that light reveals well; the image is clear and tangible to us, without ambiguity. That's why they're beautiful shapes, the most beautiful shapes. Everyone agrees on this, the child, the savage and the metaphysician. It's the very condition of the plastic arts.

LE CORBUSIER. VERS UNE ARCHITECTURE. ED. 1977, REVUE. COLLECTION DE « L'ESPRIT NOUVEAU ». PARIS: ARTHAUD, 1977.

Le volume et la surface sont les éléments par quoi se manifeste l'architecture. Le volume et la surface sont déterminés par le plan. C'est le plan qui est le générateur. Tant pis pour ceux à qui manque l'imagination !

Premier rappel : le volume :

L'architecture est le jeu savant, correct et magnifique des volumes assemblés sous la lumière. Nos yeux sont faits pour voir les formes sous la lumière ; les ombres et les clairs révèlent les formes ; les cubes, les cônes, les sphères, les cylindres ou les pyramides sont les grandes formes primaires que la lumière révèle bien ; l'image nous en est nette et tangible, sans ambiguïté. C'est pour cela que ce sont de belles formes, les plus belles formes. Tout le monde est d'accord en cela, l'enfant, le sauvage et le métaphysicien. C'est la condition même des arts plastiques.

que le fait brutal n'est pas autre chose que la matérialisation, le symbole de l'idée possible. Le fait brutal n'est passible d'idées que par l'ordre qu'on y projette. Les émotions que suscite l'architecture émanent de conditions physiques inéluctables, irréfutables, oubliées aujourd'hui.

Le volume et la surface sont les éléments par quoi se manifeste l'architecture. Le volume et la surface sont déterminés par le plan. C'est le plan qui est le générateur. Tant pis pour ceux à qui manque l'imagination!

PREMIER RAPPEL : LE VOLUME

L'architecture est le jeu savant, correct et magnifique des volumes assemblés sous la lumière. Nos yeux sont faits pour voir les formes sous la lumière; les ombres et les clairs révèlent les formes; les cubes, les cônes, les sphères, les cylindres ou les pyramides sont les grandes formes primaires que la lumière révèle bien; l'image nous en est nette et tangible, sans ambiguïté. C'est pour cela que ce sont *de belles formes, les plus belles formes*. Tout le monde est d'accord en cela, l'enfant, le sauvage et le métaphysicien. C'est la condition même des arts plastiques.

L'architecture égyptienne, grecque ou romaine est une archi-



Le Corbusier. Vers une architecture. Ed. 1977, Revue. Collection de « l'esprit nouveau ». Paris: Arthaud, 1977.

STORE / wheat MODERNISM

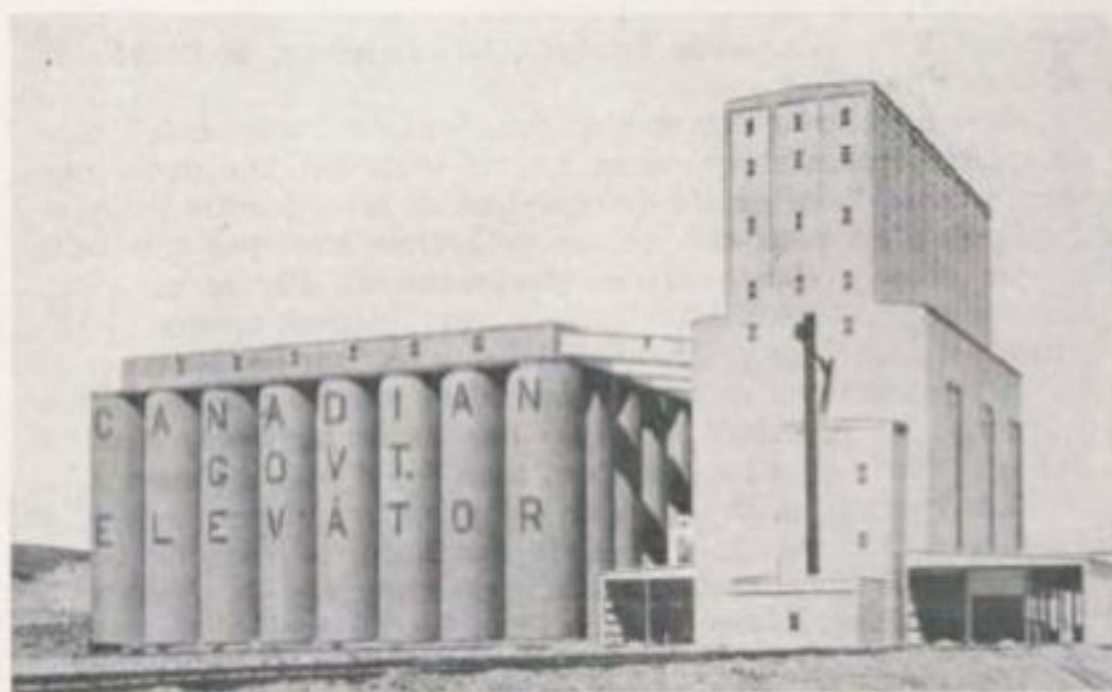
Not pursuing an architectural idea, but simply guided by the effects of calculation (derived from the principles that govern our universe) and the design of a viable organ, today's engineers make use of primary elements and, coordinating them according to rules, provoke architectural emotions in us, making human work resonate with universal order.

Here are American silos and factories, the magnificent beginnings of the new age. American engineers crush dying architecture with their calculations.

LE CORBUSIER, VERS UNE ARCHITECTURE. ED. 1977, REVUE. COLLECTION DE « L'ESPRIT NOUVEAU ». PARIS: ARTHAUD, 1977.

Ne poursuivant pas une idée architecturale, mais simplement guidés par les effets du calcul (dérivés des principes qui gèrent notre univers) et la conception d'un organe viable, les ingénieurs d'aujourd'hui font emploi des éléments primaires et, les coordonnant suivant des règles, provoquant en nous des émotions architecturales, faisant ainsi résonner l'œuvre humaine avec l'ordre universel.

Voici des silos et des usines américaines, magnifiques prémices du nouveau temps. Les ingénieurs américains écrasent de leurs calculs l'architecture agonisante.



n'ont pas acquis la conception des volumes primaires. On ne leur a jamais appris cela à l'École des Beaux-Arts.

Ne poursuivant pas une idée architecturale, mais simplement guidés par les effets du calcul (dérivés des principes qui gèrent notre univers) et la conception d'un organe viable, les INGÉNIEURS d'aujourd'hui font emploi des éléments primaires et, les coordonnant suivant des règles, provoquant en nous des émotions architecturales, faisant ainsi résonner l'œuvre humaine avec l'ordre universel.

Voici des silos et des usines américaines, magnifiques PRÉMICES du nouveau temps. LES INGÉNIEURS AMÉRICAINS ÉCRASENT DE LEURS CALCULS L'ARCHITECTURE AGONISANTE.

STORE / wheat

SIDE EXPERIMENT

The aim of the side experiment is twofold. On the one hand, if the main experiment is successful, we want to prove that wheat conservation is not feasible under all conditions. On the other hand, if the main experiment fails, we will use the side experiment as a basis for developing a hypothesis to improve the granary.

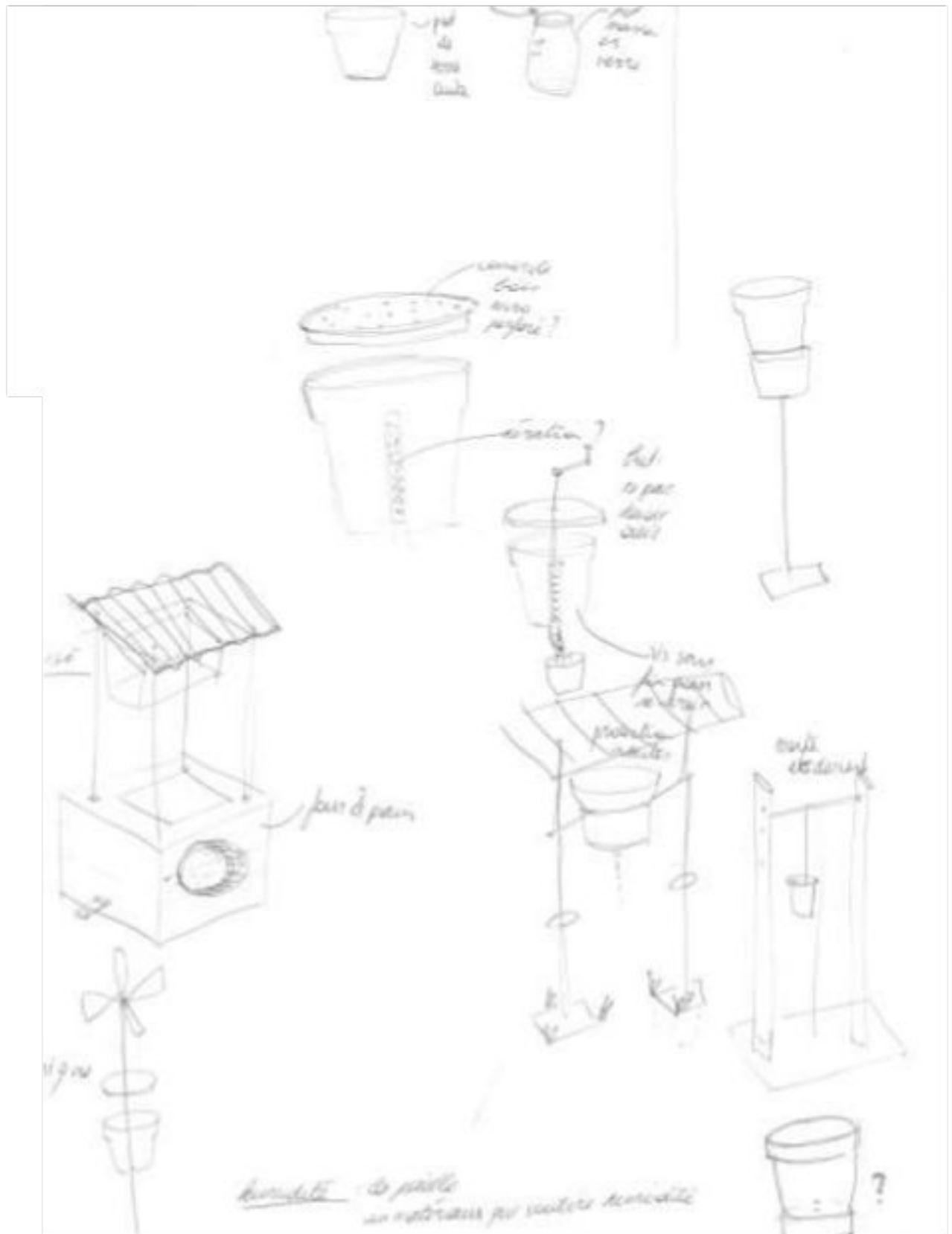
To carry out the experiment, we set up containers of different materials and properties, all protected from rain and sun, that are inspired by the data we gathered during our research.

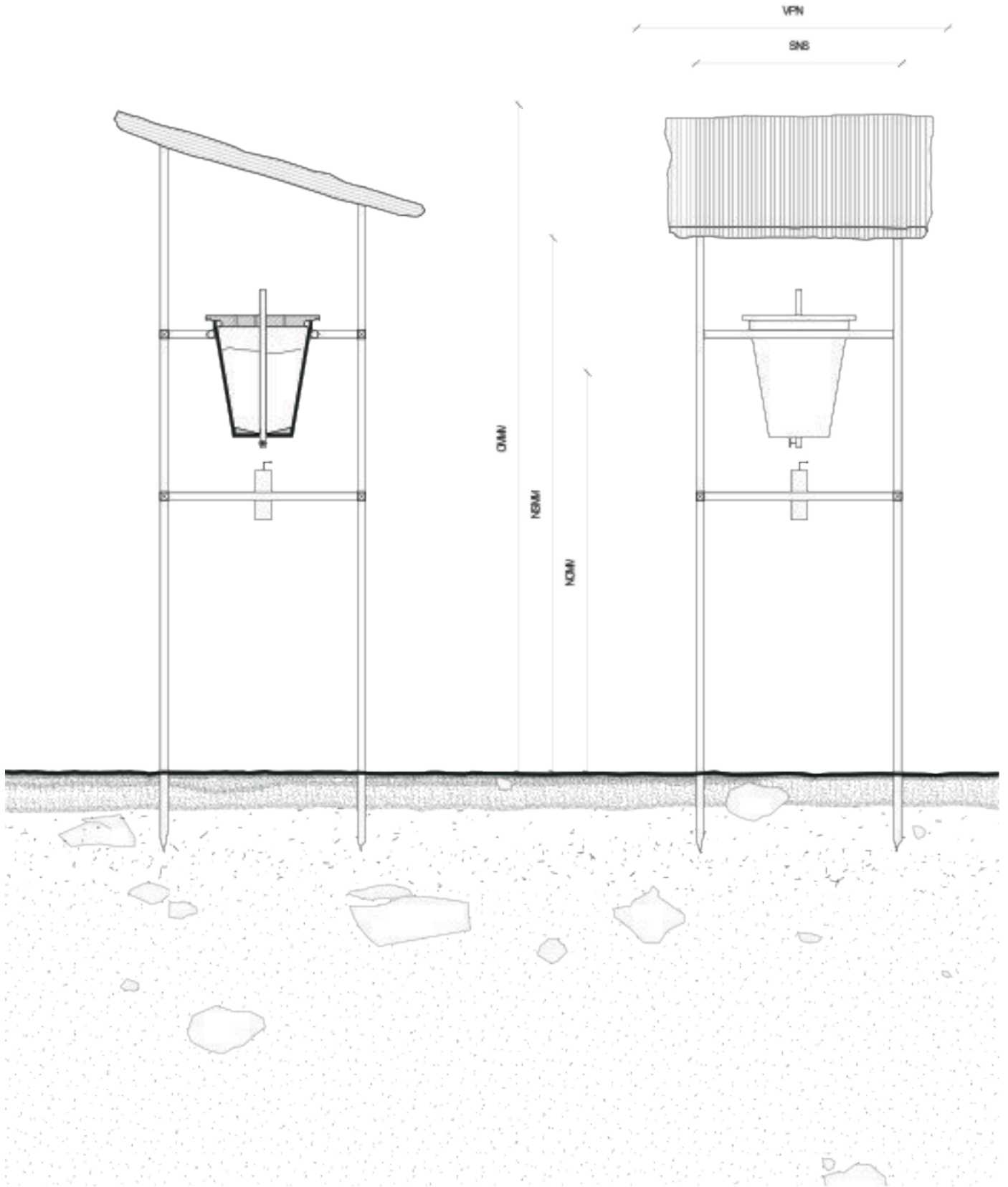
- a glass container for oxygen-free storage
- a terracotta container for preservation in a breathable container
- a basket for storage in a ventilated container
- an open container to test possible variations due to rodents and humidity

To monitor the experiment, we regularly weigh the containers and their contents, in order to measure the level of moisture absorbed, since we have no other easy way of measuring moisture in the grain.

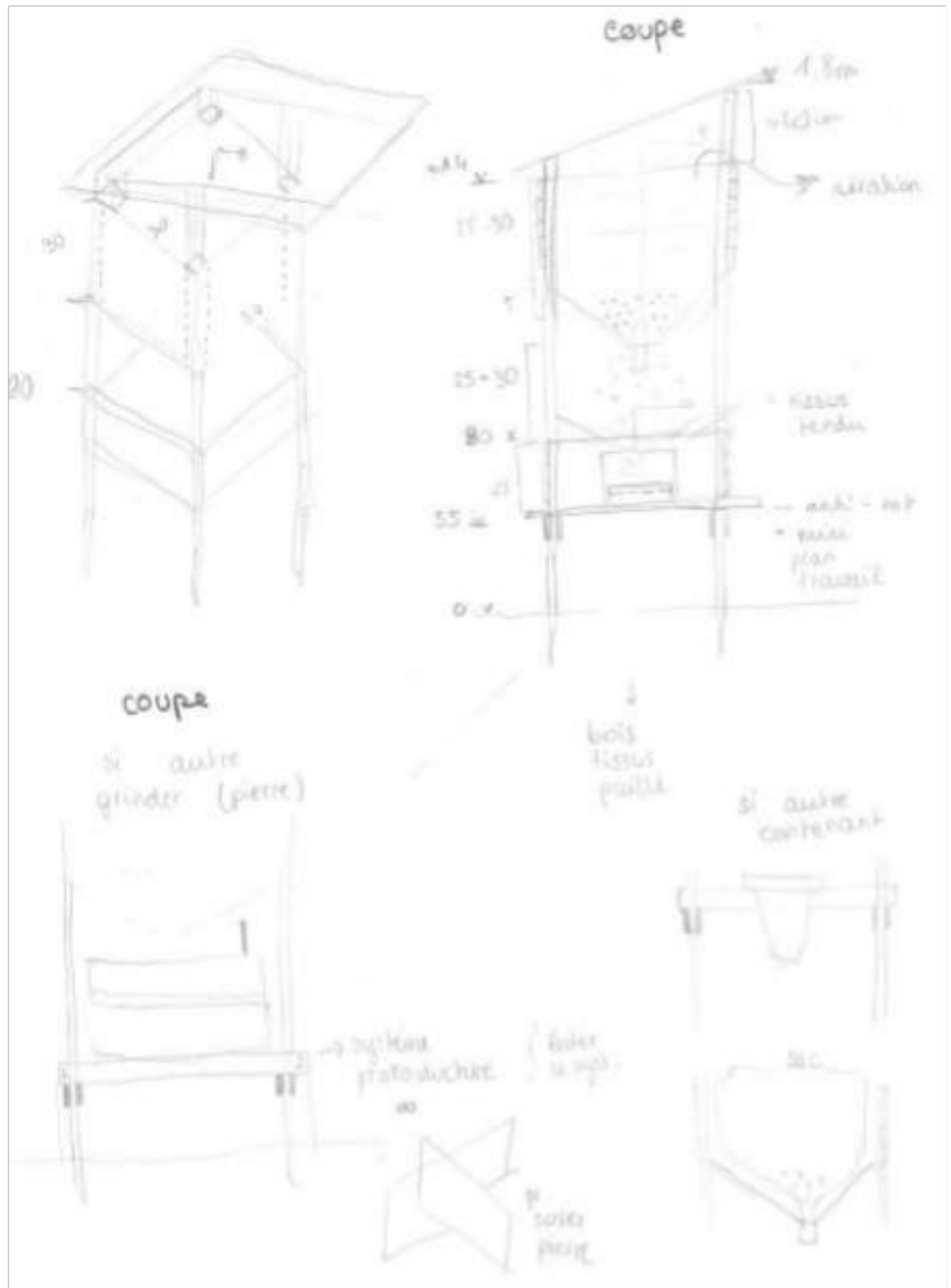


STORE / wheat PROCESS





STORE / wheat PROCESS



STORE / wheat STORAGE PROPOSAL

Our 1:1 model reproduces the storage conditions required for wheat grains. Moreover, the conception of its structure clearly expresses the storage requirements and recounts part of the transformation process of a grain becoming flour. The model is designed and built with re-used materials.

Route of a grain through the model :

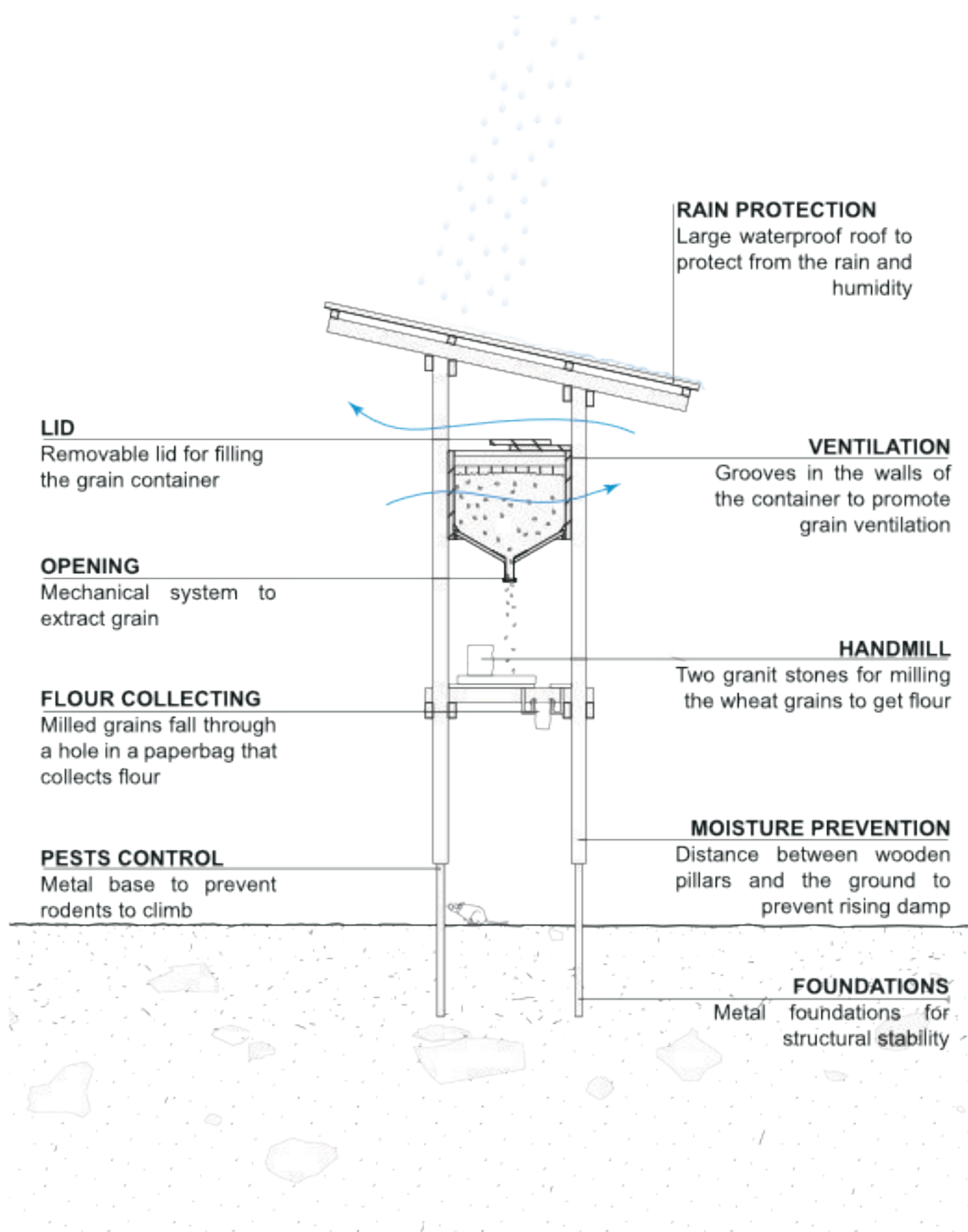
In this period of the year, the wheat has already been harvested and the grains have been dried. Considering this, the grains only need proper storage and our model proposes the best conditions to ensure their long-term conservation.

Four posts support a wooden box containing the grains and a large roof that protects it from the rain. In order to be properly stored, the grains need to have a constant moisture content. To control this and to prevent accumulation of humidity and temperature, regular grooves on the walls enable a constant air circulation within the container.

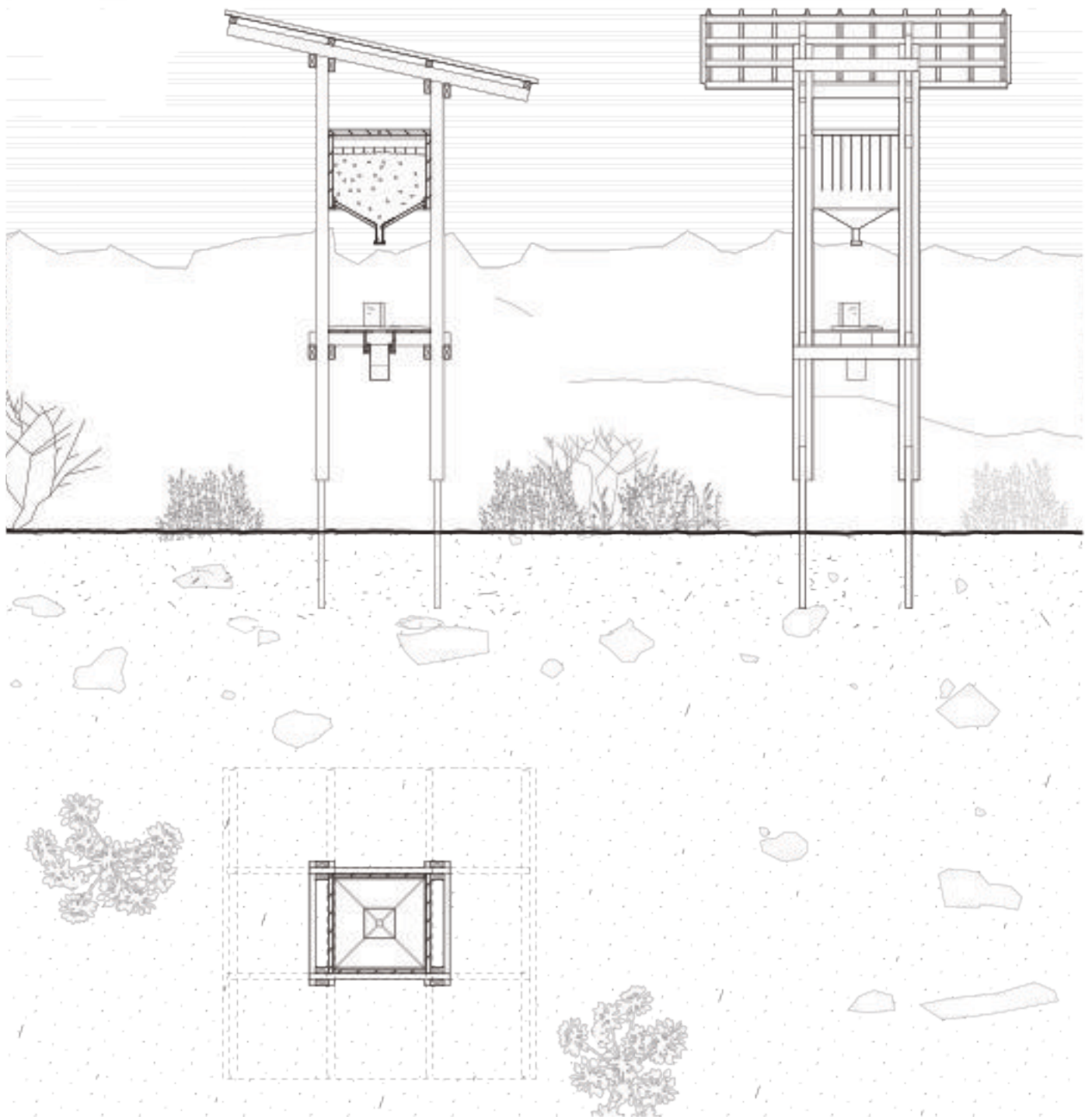
Both the conception and materiality of the foundations prevent from rising damp and rodent intrusion. Thanks to a mechanical system, it is possible to take out the grain gradually, according to the needs, without emptying the whole container.

In order to produce consumable goods, such as sourdough and bread, the grains need to be milled into flour. Various techniques exist for milling, including friction between stones and modern mechanical mills of different sizes. The use of stones is an ancestral technique, based on a very simple movement. Despite the simplicity of the gesture, during the experimental process we dealt with several parameters that made challenging the use of it for our scope.

Since the beginning of silo's construction, grain storage has acquired a significant political and economic value in the society. These monumental structures centralized the power control over the cereals and made inaccessible and hidden, both practically and aesthetically, the storage processes to people. Our design restitutes the former domestic scale to this action, showcasing the functioning of storage in a clear way, while respecting all the necessary requirements.



STORE / wheat STORAGE PROPOSAL



PLAN, SECTION AND ELEVATION 1:20



STORAGE PROPOSAL ON SITE



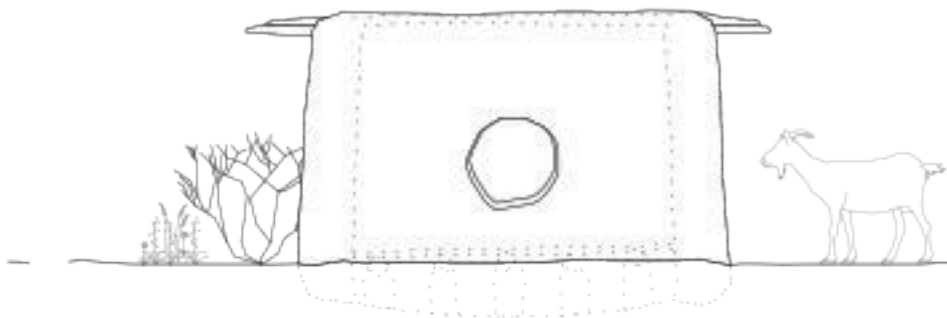
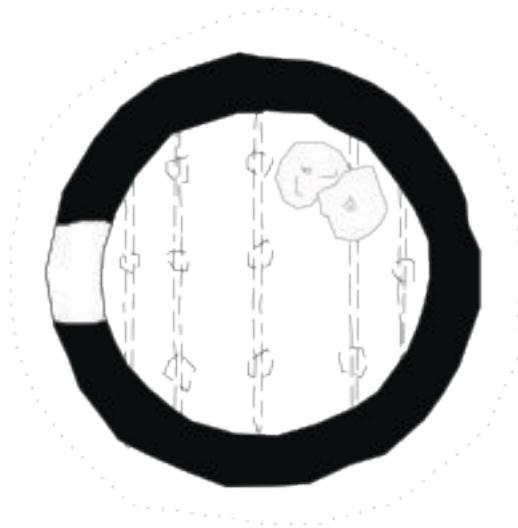
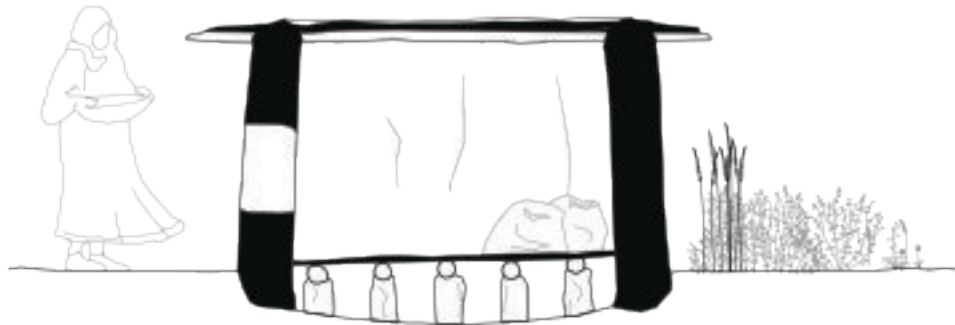
STORAGE PROPOSAL ON SITE

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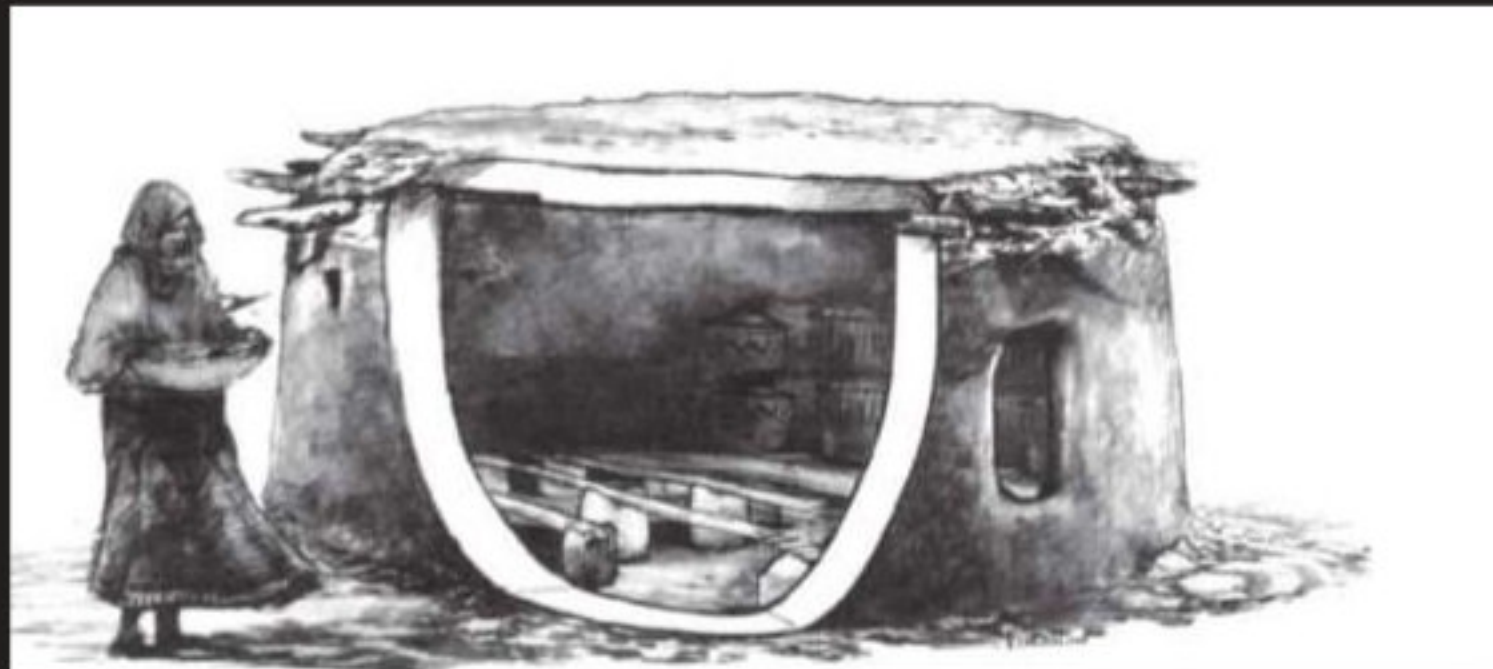
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STORE / wheat COLLECT



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GRANARY, DHRA', JORDAN, 11'300 BC - 11'175 BC
REDRAWN FROM : KUIJT, IAN AND FINLAYSON, BILL, 2009. EVIDENCE FOR
FOOD STORAGE AND PREDOMESTICATION GRANARIES 11,000 YEARS AGO
IN THE JORDAN VALLEY. PROCEEDINGS OF THE NATIONAL ACADEMY OF
SCIENCES. 7 JULY 2009. VOL. 106, NO. 27, P. 10966-10970.



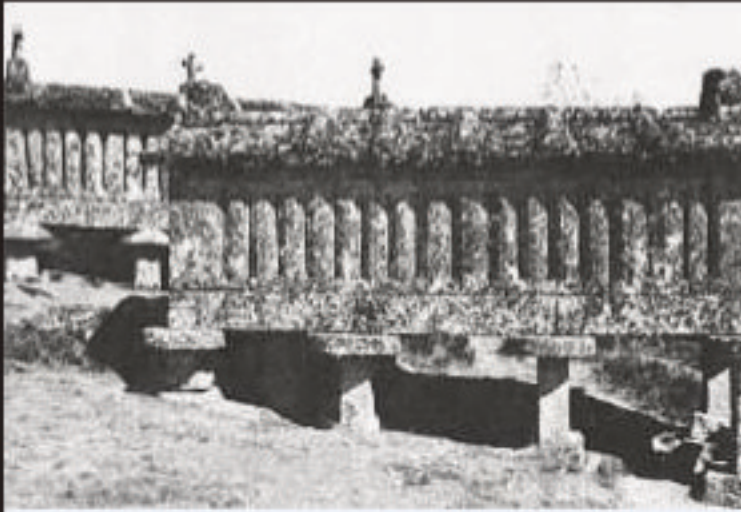
Granary, Dhra', Jordan, 11'300 BC - 11'175 BC

KUIJT, Ian and FINLAYSON, Bill, 2009. Evidence for food storage and predomestication granaries 11,000 years ago in the Jordan Valley. *Proceedings of the National Academy of Sciences*. 7 July 2009. Vol. 106, no. 27, p. 10966–10970.

STORE / wheat COLLECT

;he out^HrK HWWeHrHUJeoMthe+oriJteTWleJoTTeTorHteZ the JoTTuUit`»Z MreeKoTMroTthe oIK
tribal constitution, which now seems to have returned. At the same time, with the granary-monument,
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L'aspect extérieur du temple dorique commémore la liberté de la communauté de l'ancienne constitution tribale qui semble alors revenue. En même temps, avec le grenier-monument, le démos se constitue une image de sa nouvelle unité, qu'il fabrique à l'image de l'ancienne, mais en lui donnant une échelle monumentale inédite jusqu'alors.[...] Lorsque les Grecs inventèrent le périptère, le modèle du grenier tribal devait encore leur être familier. L'édification d'un symbole monumental sous la forme d'un grenier représentant l'ensemble du démos peut très bien avoir remplacé les nombreux greniers des petites tribus, et marqué une étape dans la disparition de l'économie tribale, comme les cultes ont souvent pour fonction de se substituer dialectiquement à des rites plus anciens.



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STORE / wheat COLLECT

In Mesopotamia, grain was king, or, to put it more accurately, grain made kings

"Whoever has silver, whoever has jewels, whoever has cattle, whoever has sheep shall take a seat at the gate of whoever has grain, and pass his time there" Sumerian text known as the Debate between Sheep and Grain.

In the most fundamental sense, then, grain was valued because it could be consumed – in the process providing nutrition, pleasure, and intoxication. Grain could also, however, be exchanged. As a low-value, bulk commodity that was always in demand but was also widely available, grain provided a convenient medium for accomplishing small-scale, local transactions.

[...]

Only the gods could guarantee abundance and prosperity in the land, and there was no clearer sign of divine favor than the oft-repeated image of grain thriving in the fields and piled up in the storehouses. On the other hand, the absence of grain was an equally clear sign that the gods had retracted or, perhaps, transferred their favor, a situation that demanded the offering of prayers and sacrifices. As representatives of the gods, kings bore ultimate responsibility for ensuring agricultural abundance, and they did not hesitate to draw attention to their successes. Of course, this meant that they were also to blame when crops failed and storehouses were empty – though they were less enthusiastic about pointing this out.

[...]

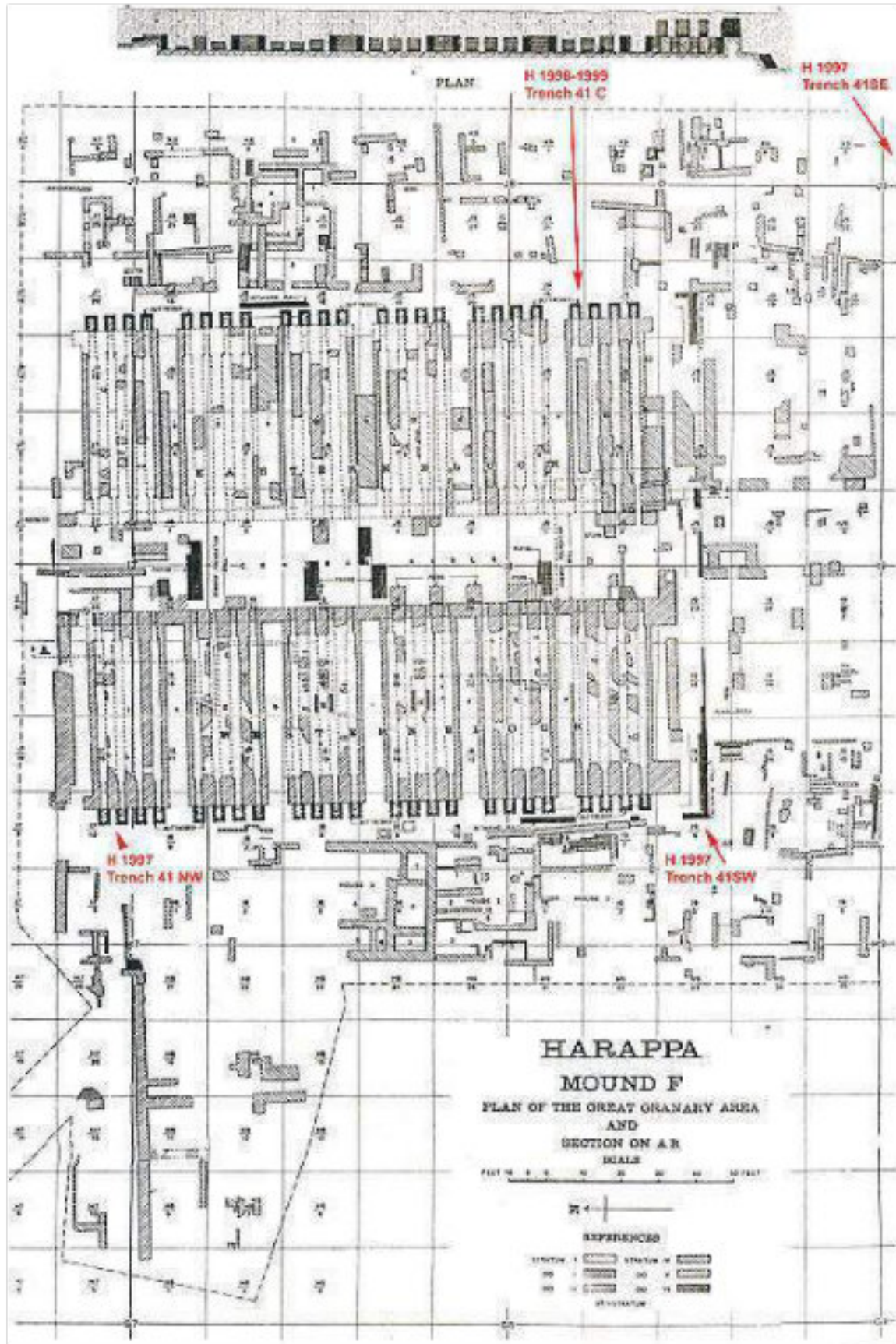
According to Childe, surplus agricultural goods were collected from the peasants – who scraped by at the "bare subsistence" level – and concentrated in the hands of a "tiny ruling class." The temple granary was the primary locus and the primary symbol of this concentration of wealth and power and it is common to see centralized storage facilities as the material manifestation of this power.

[...]

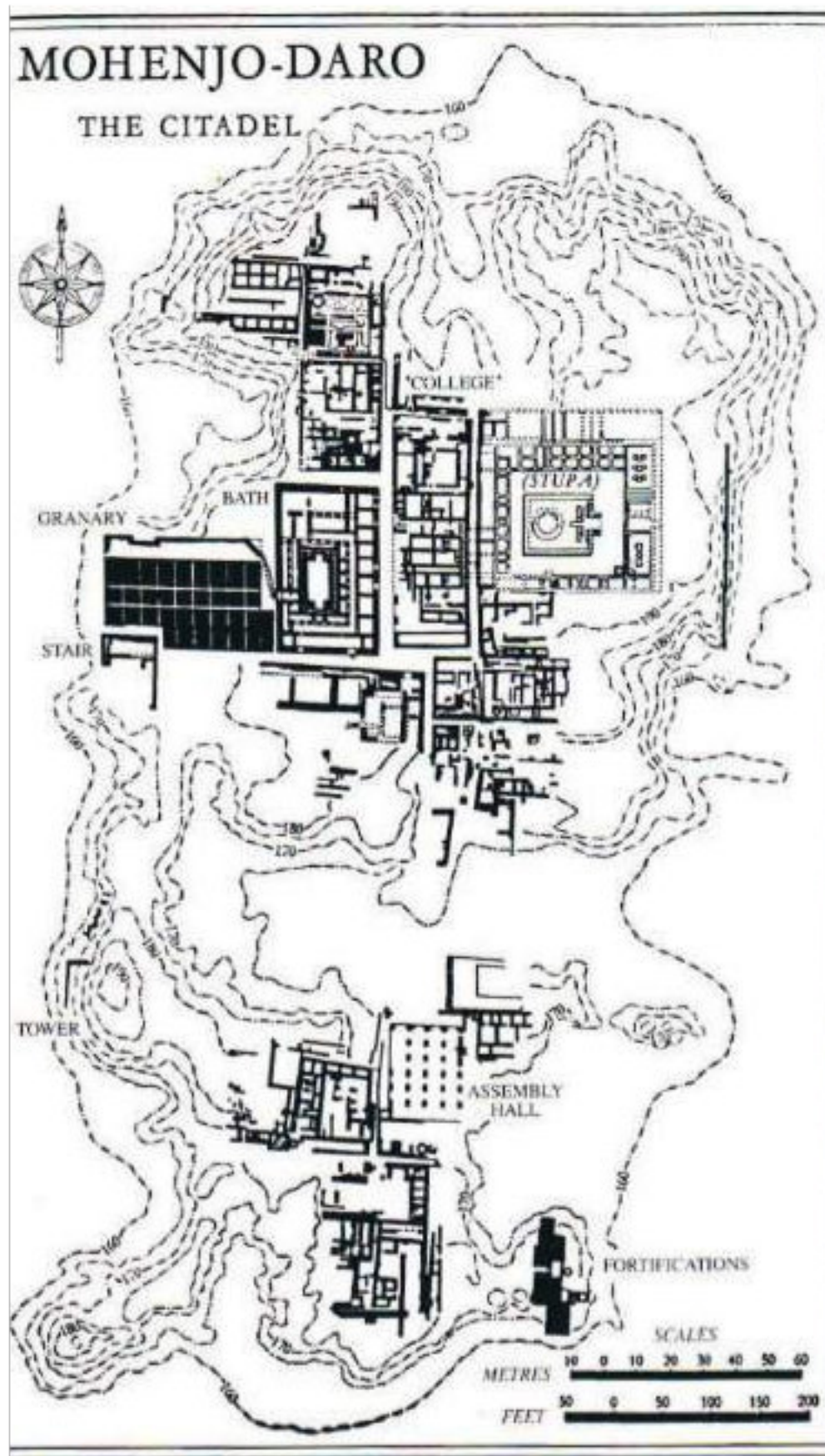
Mesopotamia was one of the classic examples of an economy dominated by redistribution [...] It also means recognizing that transactions involving grain were often politically charged and were often directly tied up in the reproduction of power asymmetries and economic inequalities. I see no reason, however, that use of the term gastropolitics should necessarily imply only contexts of conflict, competition, domination, and coercion. To the contrary, the politics of food was also – and often at the same time – about sharing, mutual aid, the fostering of community, and the cementing of social bonds.

SEWELL PAULETTE, TATE. 'GRAIN STORAGE AND THE MORAL ECONOMY IN MESOPOTAMIA (3000–2000 BC)'. THE FACULTY OF THE DIVISION OF THE HUMANITIES IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY, THE UNIVERSITY OF CHICAGO, 2015.

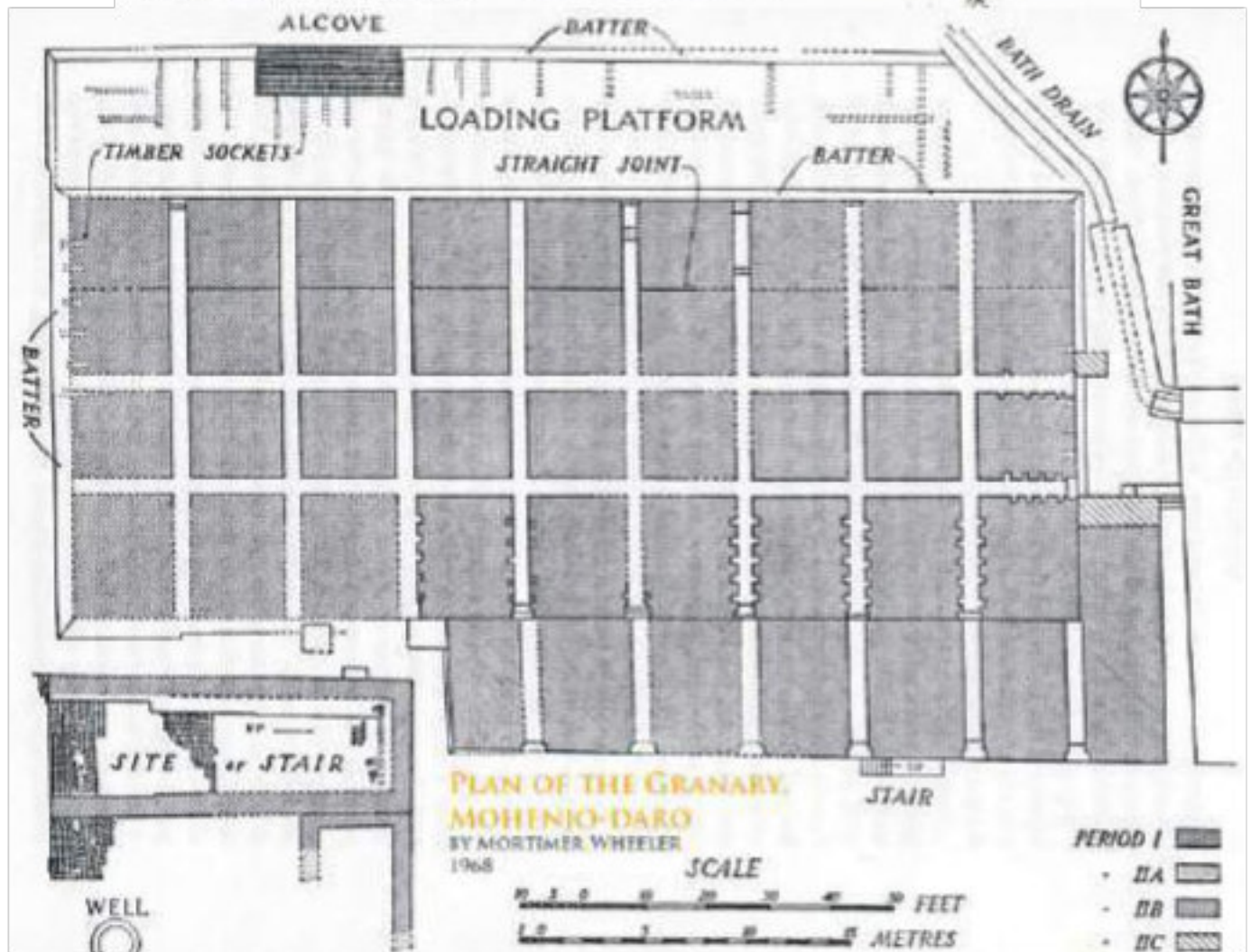
STORE / wheat COLLECT



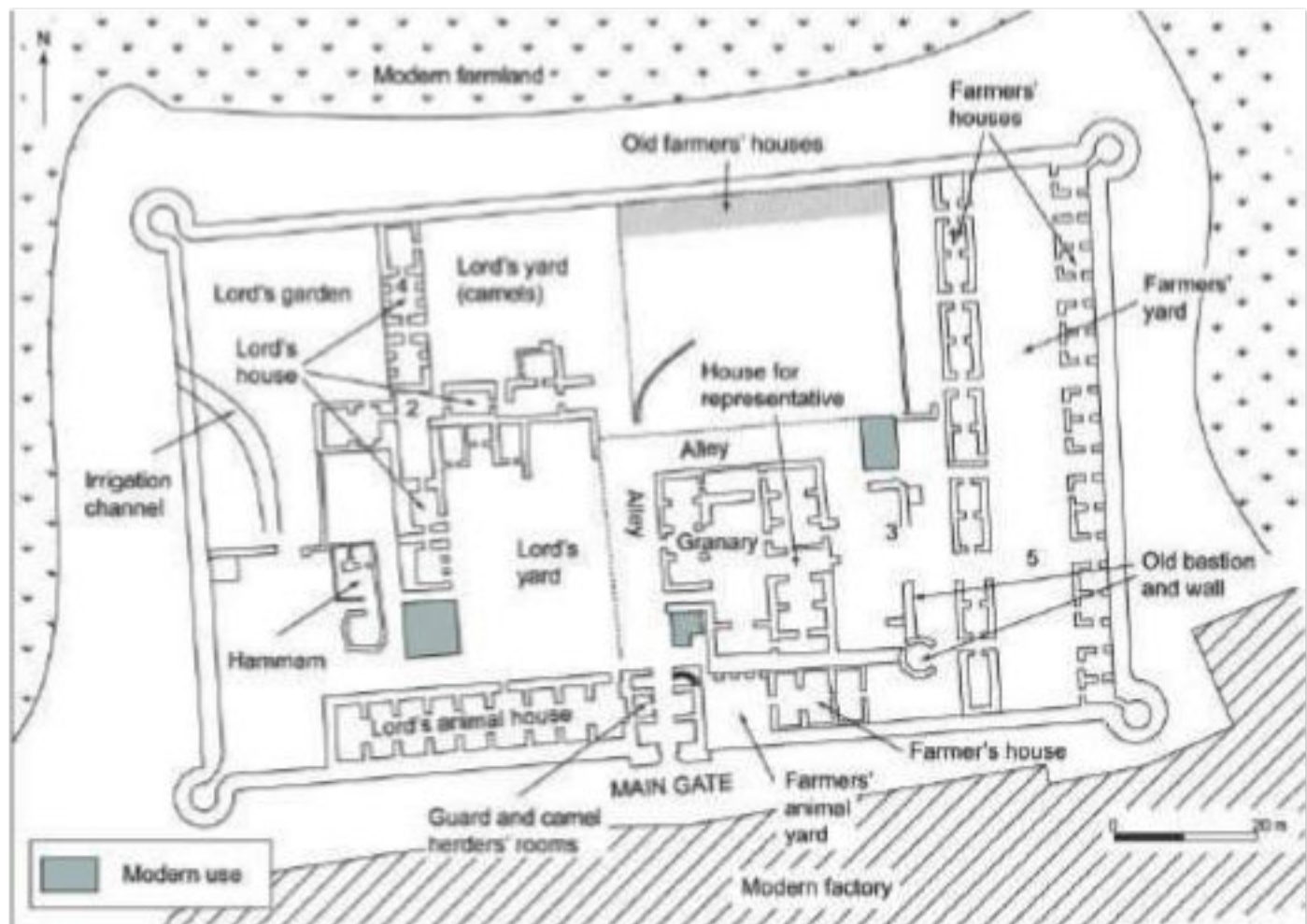
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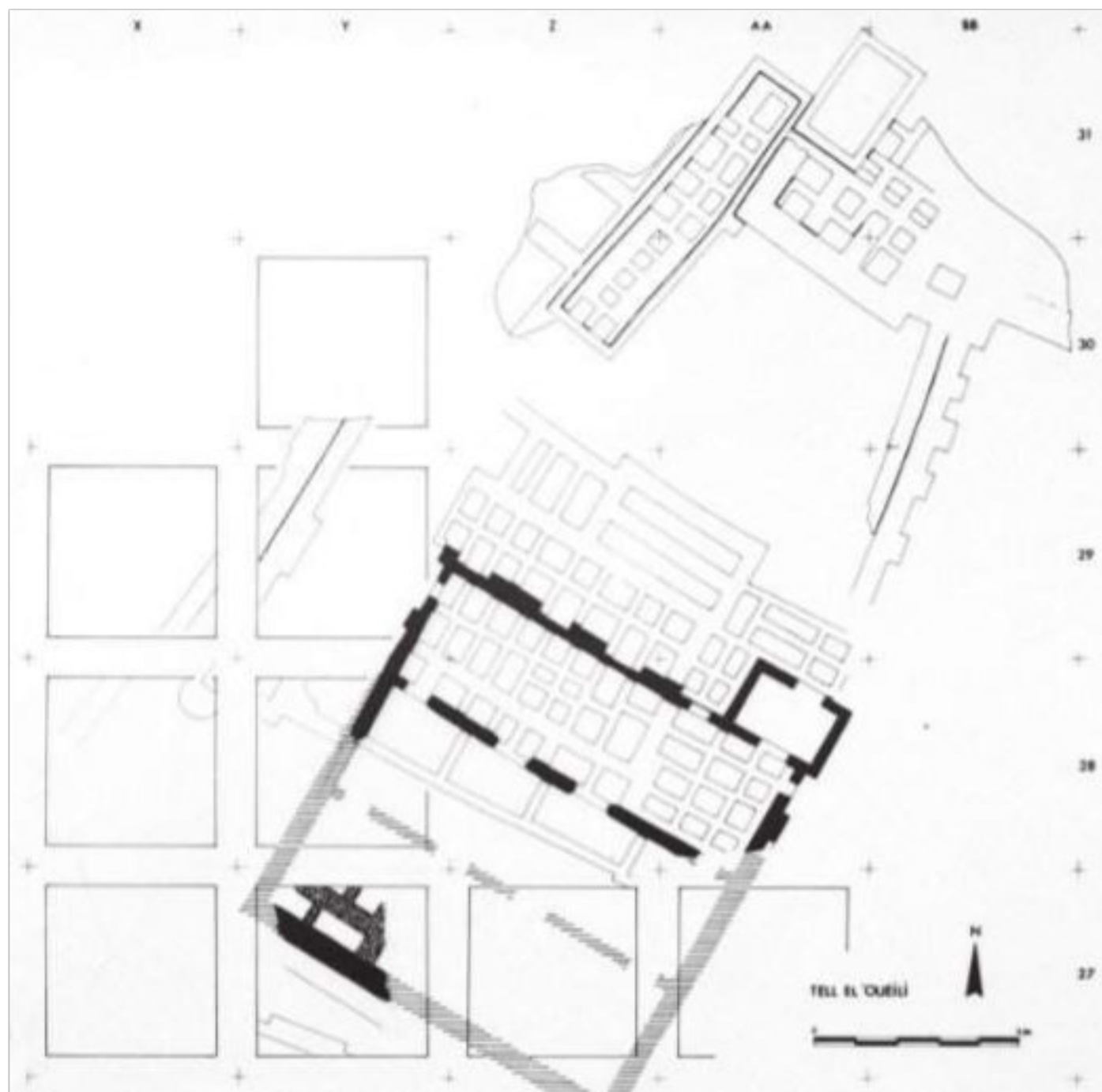


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STORE / wheat COLLECT



IRAK, TELL EL-'OUEILI, DHI QAR, ARCHEOLOGIC SITE OF A VILLAGE AND ITS
GRANARY,
'L'APPARITION DE L'ARCHITECTURE MONUMENTALE | LARSA'. [HTTPS://
ARCHEOLOGIE.CULTURE.GOUV.FR/LARSA/FR/LAPPARITION-DE-
LARCHITECTURE-MONUMENTALE?LANGUAGE_CONTENT_ENTITY=AR.](https://archeologie.culture.gouv.fr/LARSA/fr/lapparition-de-larchitecture-monumentale?language_content_entity=ar)

STORE / wheat COLLECT

The Kassena know a myth about the origin of evil: In the past, people lived in peace. Hunger, thirst, sickness and death did not exist. God was at hand above men. All they had to do was reach out and help themselves, as if they were cutting meat as they wished. One day, an old woman was pounding her millet. She threw her pestle into the air and struck God with the unkind words: "Withdraw, go away so that I can pound my millet". God rose up, and no hand could reach him again. This myth presents us with a perfect original world, but the fault of this old woman leads to misfortune: hunger, disease, suffering and finally death.

[...]

Added to this is the millet granary for storing the millet on the cob. In Kasséna tradition, women are strictly forbidden to go down into the granary to get millet. This is for reasons of honor. According to Abat Dan Casimir Nassara, at the time, men thought that when a woman had access to the attic, the day she realized that there weren't enough reserves in the attic, she could go and live with her parents. For this purpose, either the son or the husband descends into the attic. It's only when the woman is a widow that she's allowed access to the attic to stock up.

LE PEUPLE KASSENA

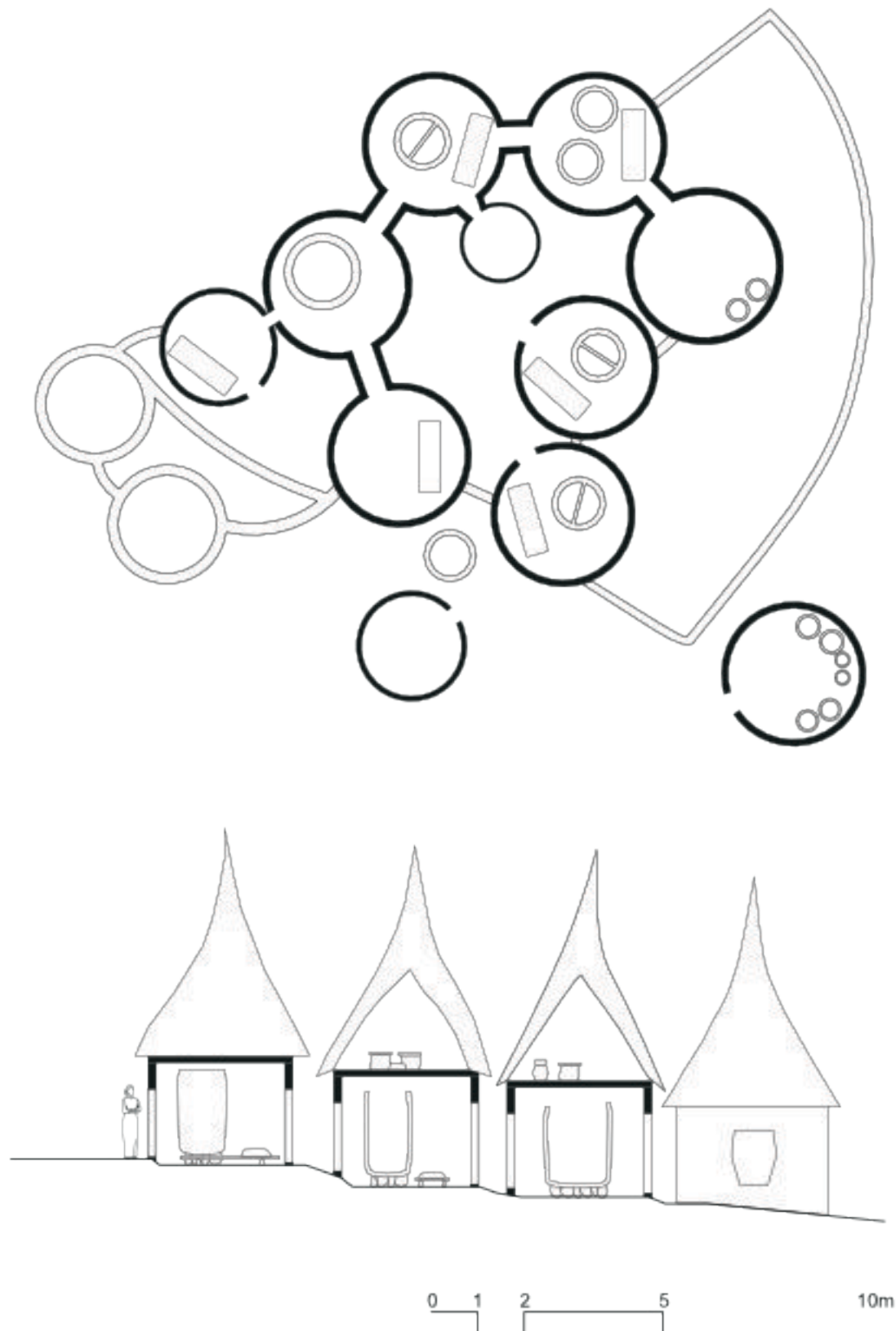
[HTTPS://INFOWAKAT.NET/VILLAGE-KASSENA-SITE-TOURISTIQUE-TRES-ATTRAYANT/](https://infowakat.net/village-kassena-site-touristique-tres-attractif/)

Les Kassena connaissent un mythe de l'origine du mal : Autrefois, les hommes vivaient en paix. La faim, la soif, la maladie et la mort n'existaient pas. Dieu se trouvait à portée de main au-dessus des hommes. Ils n'avaient qu'à tendre la main pour se servir, comme on coupe de la viande selon son désir. Un jour, une vieille femme pilait son mil. Elle lança son pilon en l'air et frappa Dieu en lui proférant des paroles méchantes : « Retire-toi, va-t-en pour que je puisse piler mon mil ». Dieu s'éleva et aucune main ne pût plus l'atteindre. Ce mythe nous présente un monde original parfait, mais la faute de cette vieille femme, entraîne des malheurs : la faim, des maladies, de la souffrance et finalement la mort.

[...]

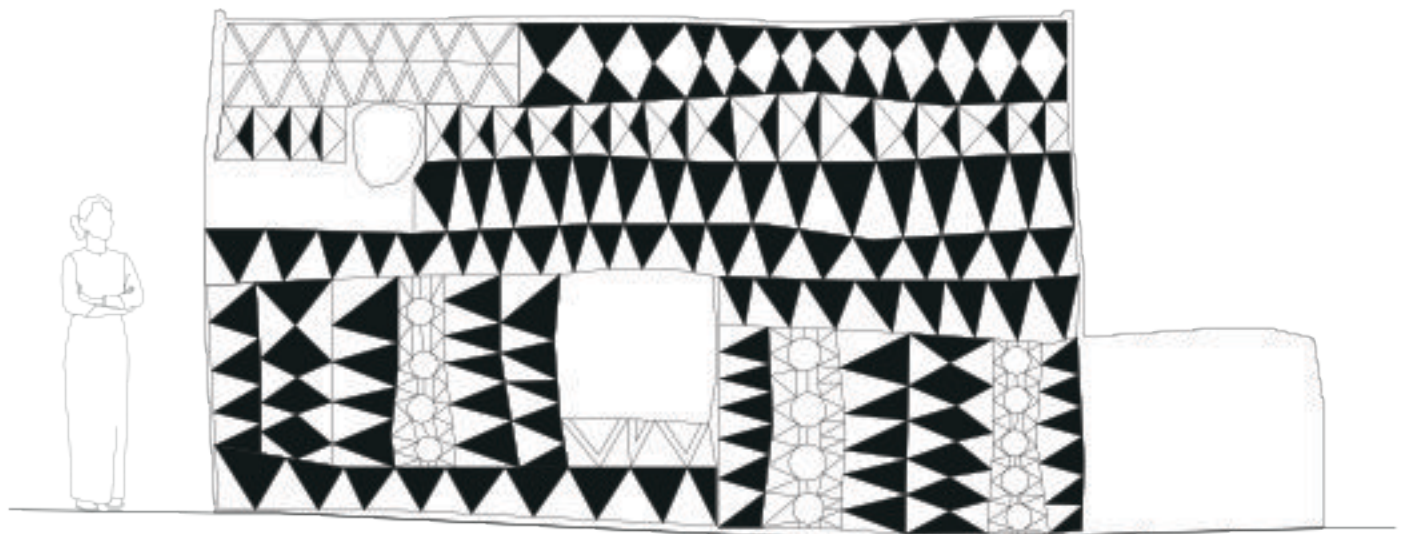
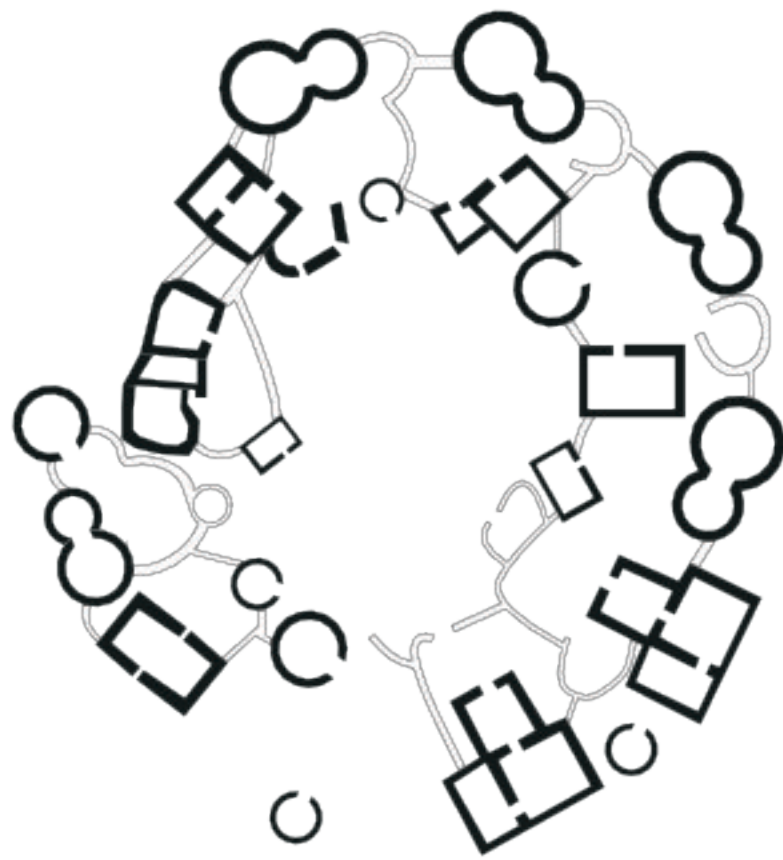
A cela s'ajoute le grenier à mil pour la conservation du mil en épis. Dans la tradition Kasséna, il est formellement interdit à la femme de descendre dans le grenier pour prendre du mil. Et ce, pour raison d'honneur. Des propos d'Abat Dan Casimir Nassara, à l'époque, les hommes pensaient que lorsque la femme a accès au grenier, le jour qu'elle constaterait qu'il n'y a pas assez de réserves dans le grenier, pourrait s'en aller chez ses parents. A cet effet, c'est soit le fils, soit le mari qui descend dans le grenier. C'est lorsque la femme est veuve qu'elle a l'autorisation d'y accéder pour s'approvisionner.

STORE / wheat COLLECT



CAMEROON, CHAD, NIGERIA, GUIZIGA PEOPLE: HOUSING WITH WOMEN
AND MEN GRANARIES INSIDE THEIR OWN BEDROOM AND GRANARY OF
THE HEAD OF THE HOUSEHOLD OUTSIDE HIS BEDROOM
REDRAWN FROM : SEIGNOBOS, CHRISTIAN. IN DES MONDES OUBLIÉS :
CARNETS D'AFRIQUE, 39-83. HORS COLLECTION. MARSEILLE: IRD
ÉDITIONS, 2018.

STORE / wheat COLLECT

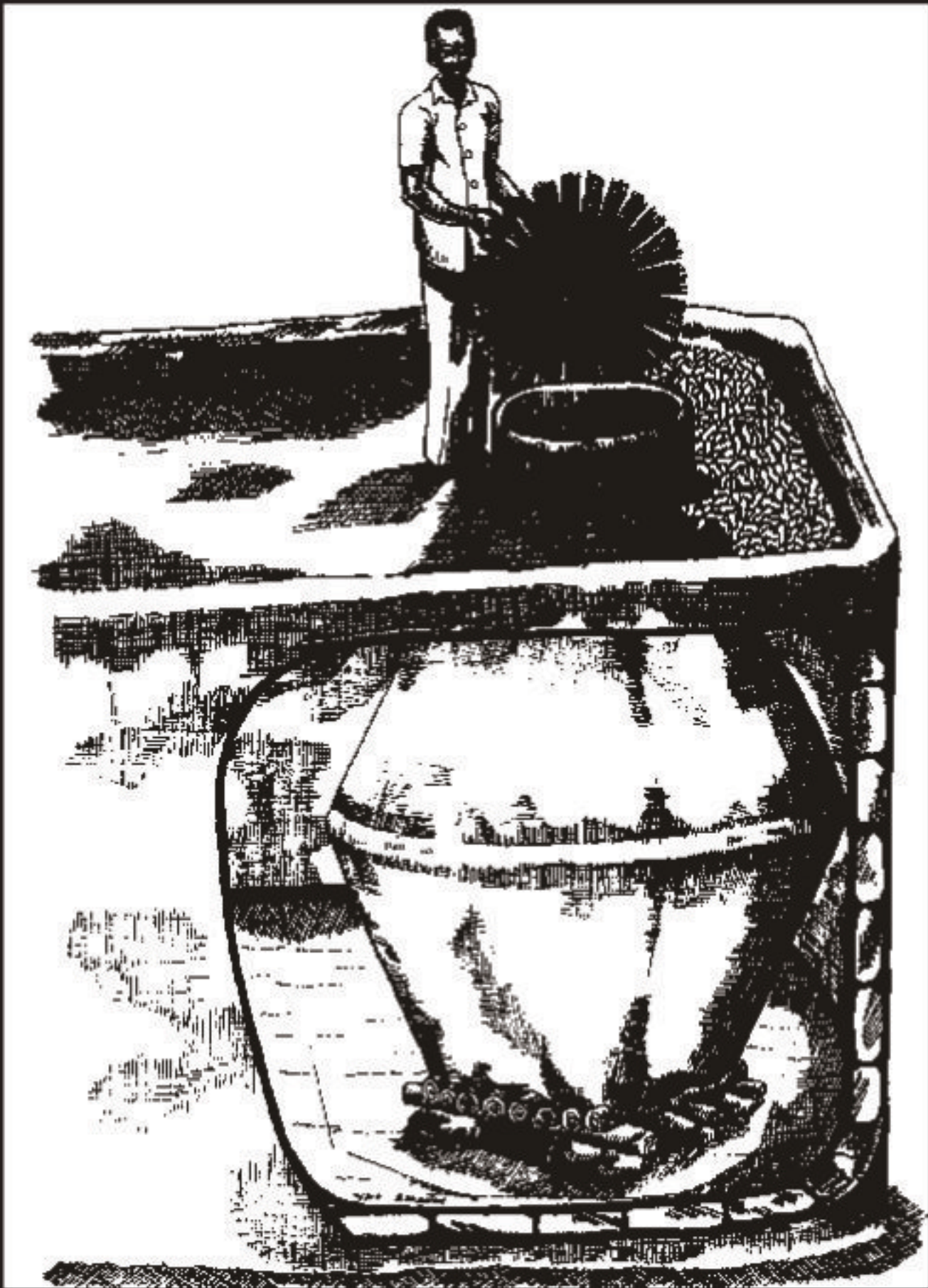


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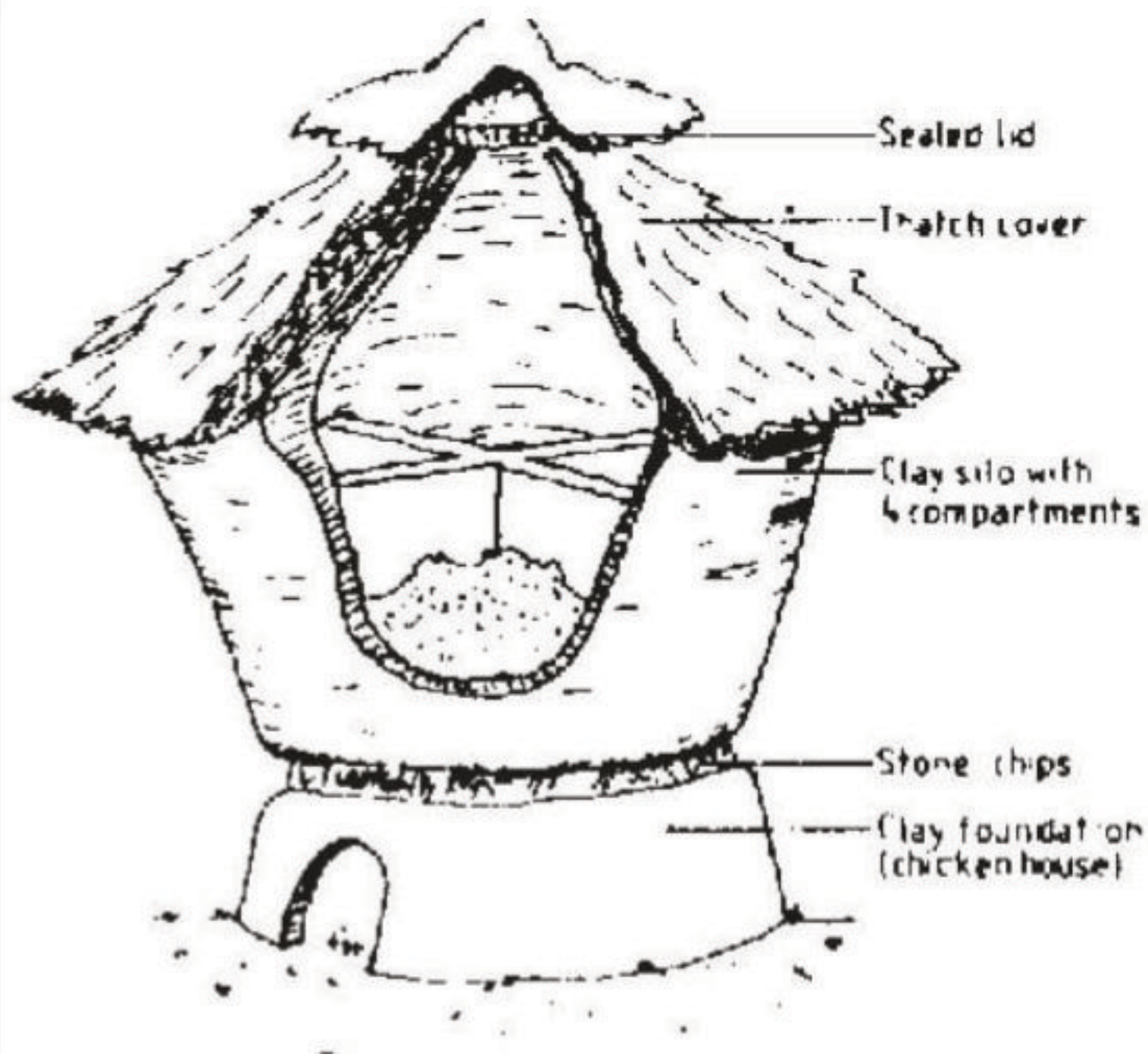
BURKINA FASO, KASSENA PEOPLE, TIEBELE: DIFFERENT STYLES OF
HOUSING ACCORDING TO PEOPLE MARITAL STATUT, SINGLE, MARRIED,
WIDOW
REDRAWN FROM : PROGRAMME SOLIDARITÉ EAU, [HTTPS://WWW.PSEAU.
ORG/OUTILS/OUVRAGES/CSQ_EDUQUER_A_L_ENVIRONNEMENT_EN_VUE_
DU_DEVELOPPEMENT_DURABLE_2011.PDF](https://www.pseau.org/outils/ouvrages/csq_eduquer_a_l_environnement_en_vue_du_developpement_durable_2011.pdf)



jurRIUH -HZov 2HZZiUH7eoWlev ;itltt! KijereUt Zi'leZ oMhouZiUNHJJorkKIUNto
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Burkina Faso, dagari people: underground wheat storage
<https://www.fao.org/3/x5023f/x5023F04.HTM>



jurRIUH -HZov 2HZZtUH7eoWlev jltltt! KiJereUt Zi'leZ oMhouZiUNHJJorkiUNto
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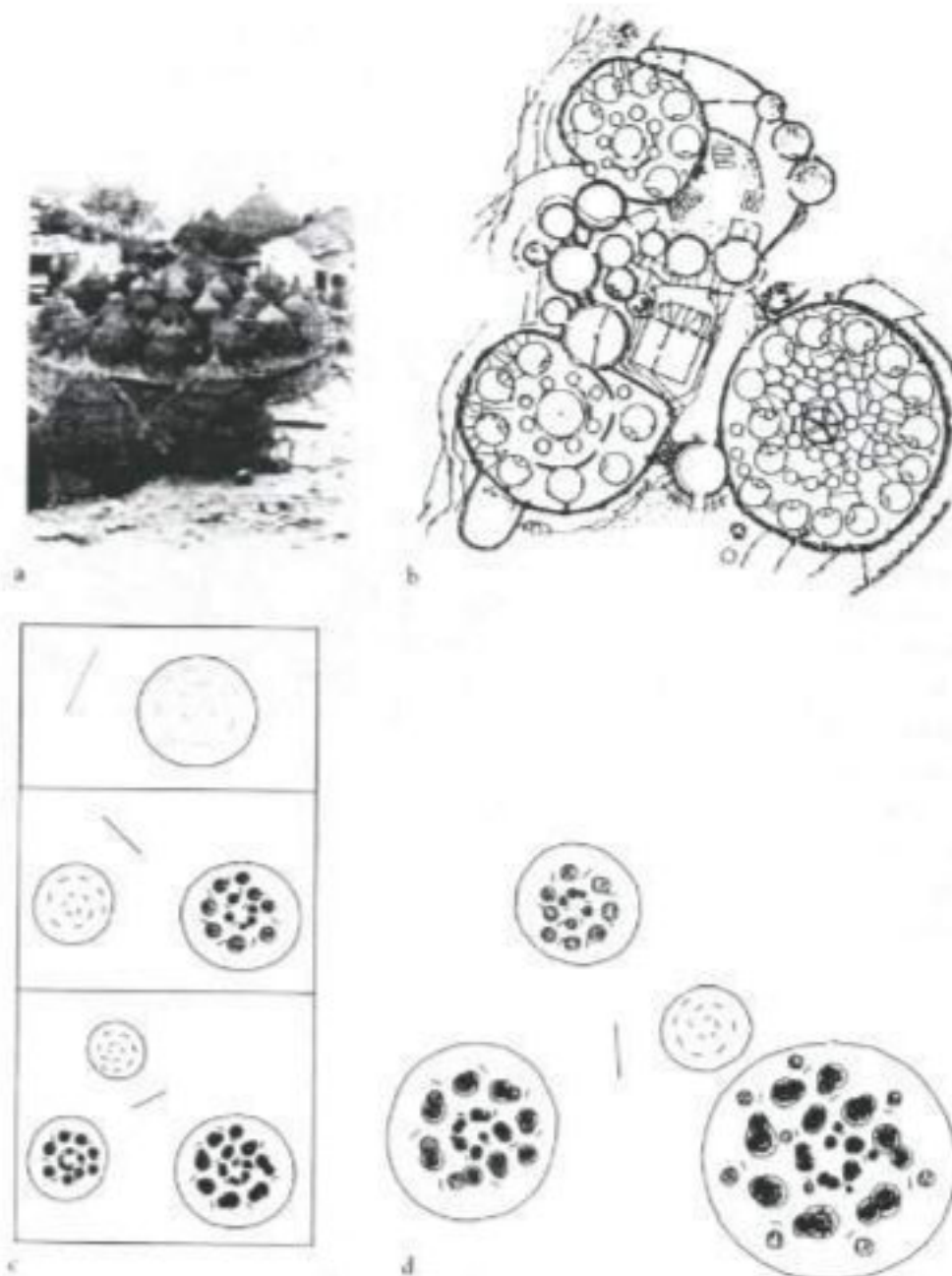
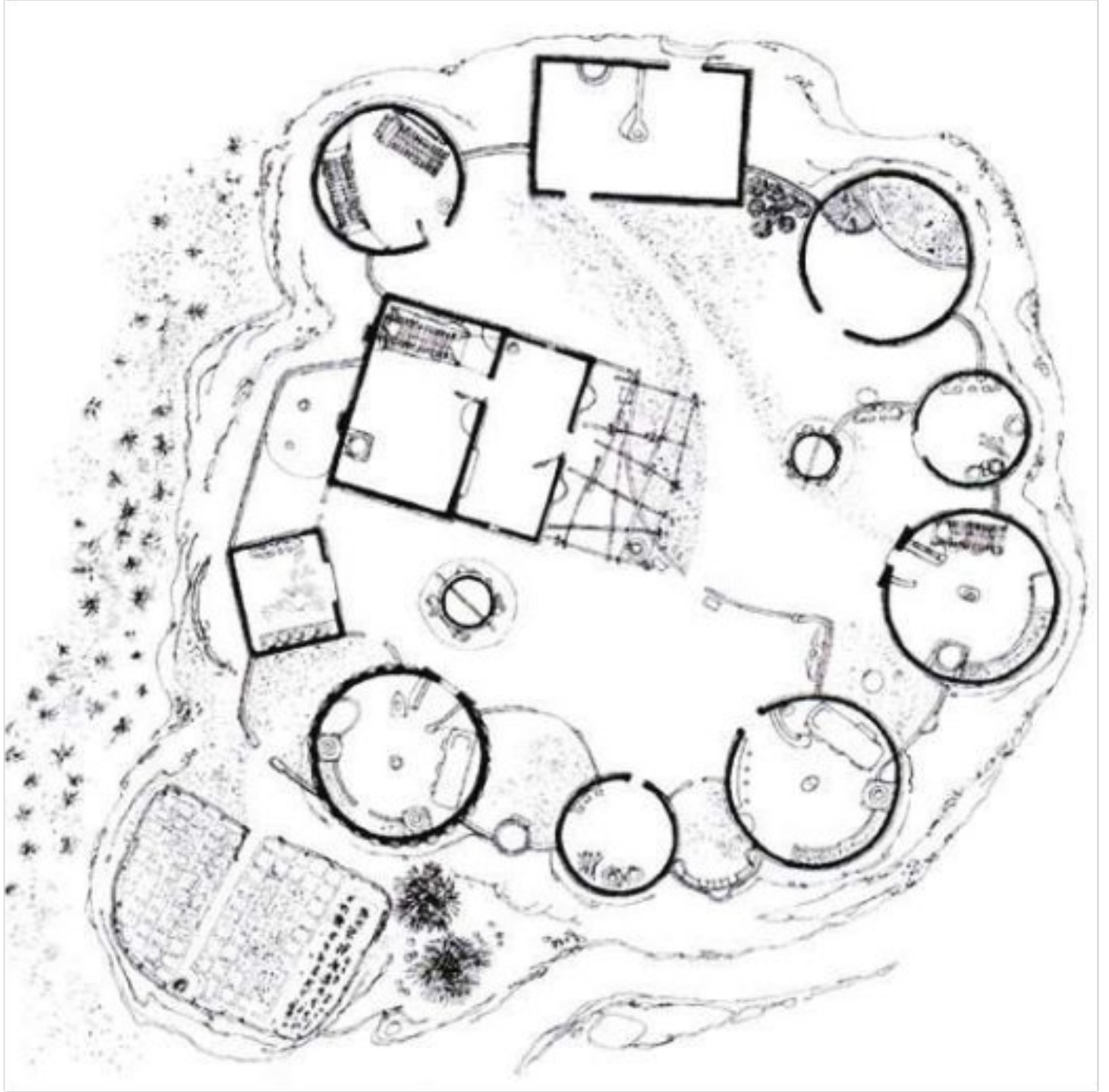


FIGURE 2.4
Mokoulek

(a) Mokoulek, Cameroon. The small buildings inside the stone wall are granaries. The rectangular building (top right) holds the sacred altar. (b) Architectural diagram of Mokoulek. (c) First three iterations of the Mokoulek simulation. The seed shape is composed of a circle drawn with passive lines (black) and with gray active lines both inside and outside the circle. (d) Fourth iteration of the Mokoulek simulation.

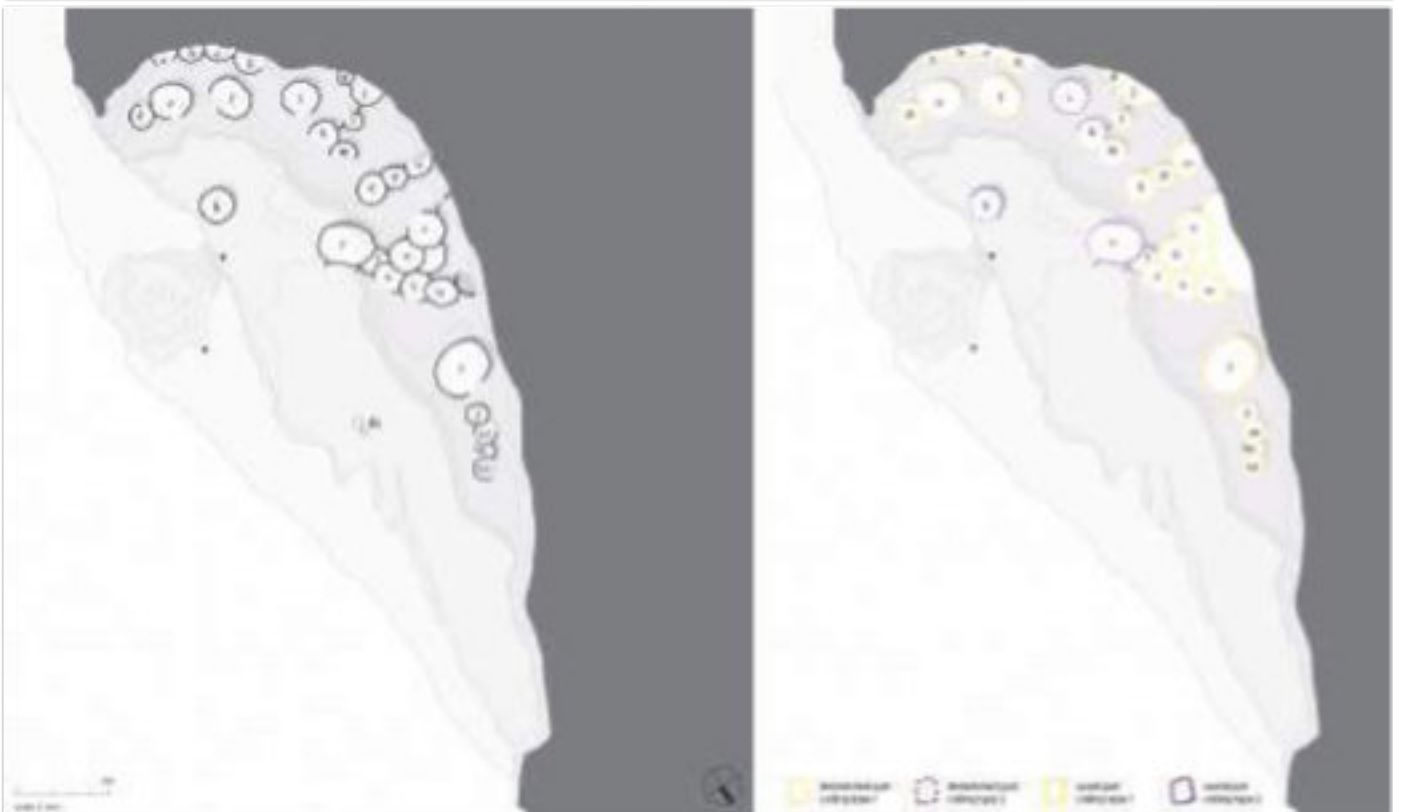
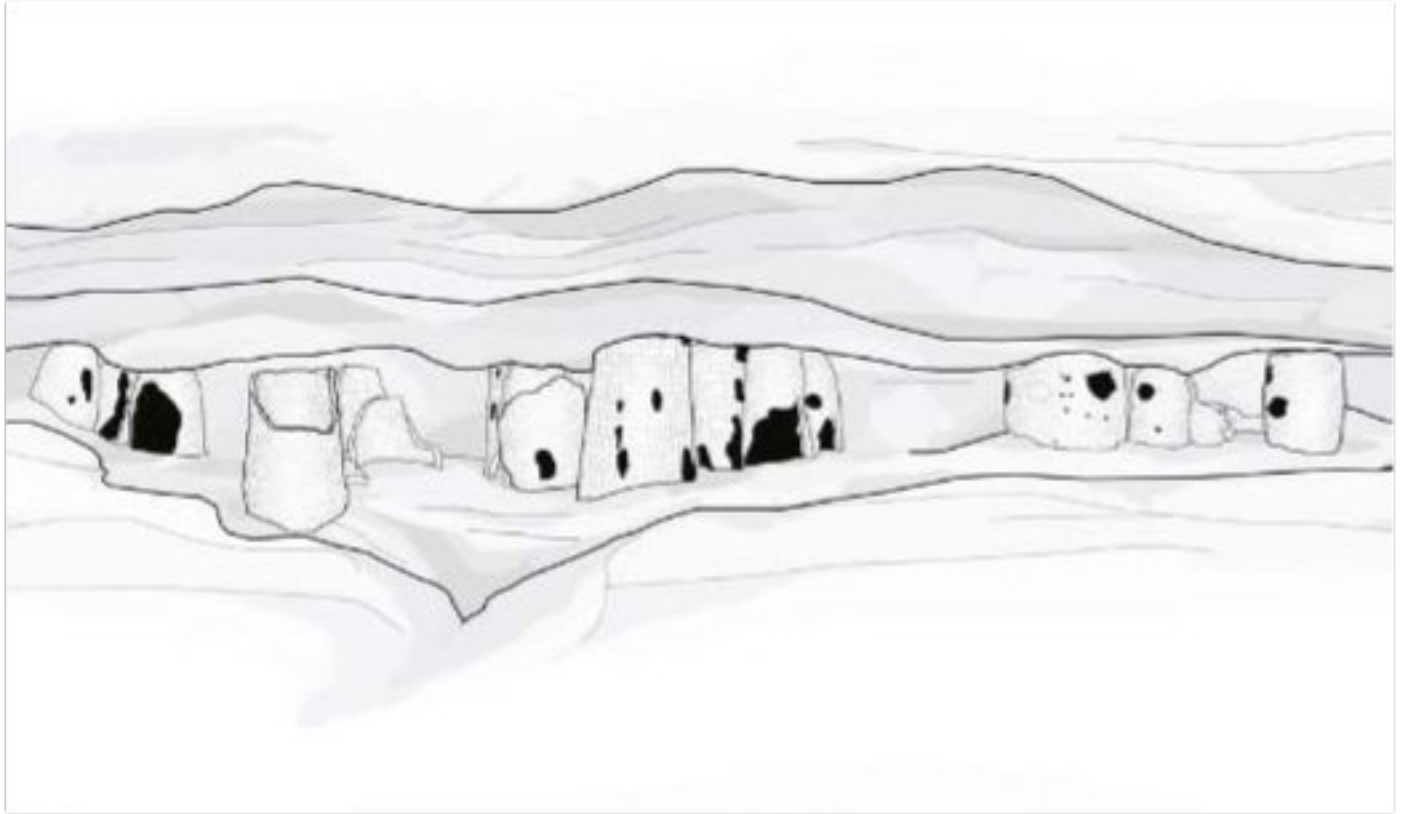
(a and b, by permission from Seignobos, 1982.)

STORE / wheat COLLECT

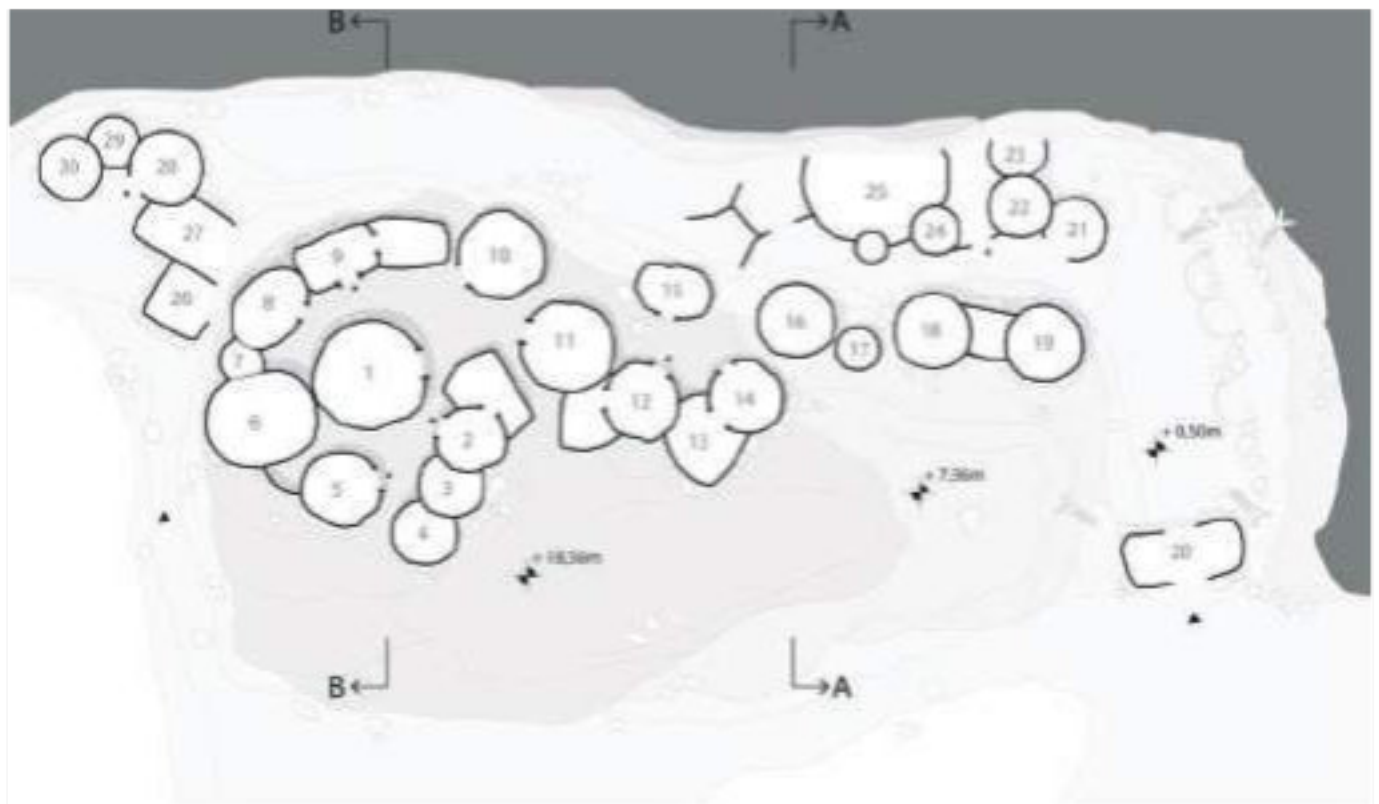


CAMEROON, MUSGUM: CHIEF OF THE VILLAGE IN THE CENTRE, GRANARY
IN FRONT OF EACH HOUSE
[HTTPS://WWW.ARCHDAILY.COM.BR/BR/01-167330/ARQUITETURA-
VERNACULAR-CASAS-MUSGUM-NOS-CAMAROEES/52B8F6DAE8E44
E83AF00009E-ARQUITETURA-VERNACULAR-CASAS-MUSGUM-NOS-
CAMAROEESPLANTA](https://www.archdaily.com.br/br/01-167330/arquitetura-vernacular-casas-musgum-nos-camaroes/52b8f6dae8e44e83af00009e-arquitetura-vernacular-casas-musgum-nos-camaroesplanta)

STORE / wheat COLLECT



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Niger, Tamou's village, Zarma People: wheat granaries similar to houses
<https://www.fao.org/3/x5023f/x5023F07.htm>



Senegal, mantingue: granaries protected form rodents
<https://www.fao.org/3/x5023f/x5023F08.htm>

STORE / wheat COLLECT

The role of the granary in these communities is so important that every precaution must be taken to protect it from fire, damp, rodents and thieves. In this zone of the Sahel with its capricious climate, where years of good harvests do not follow one another, where the hunger gap is long and food shortages dreadful, the granary presents itself as a defence against the unforeseen. The vicissitudes of nature have thus forced the peoples of North Cameroon to develop a way of life in which forecasts, concern for the future and the accumulation of grain play a significant role. Efficient management of food resources confers prestige, pride and social status on all good farmers. According to a local proverb, "a head of a family whose granary is full of millet may grumble within his family" and in the event of a shortage, he may well take on other women in exchange for millet, thereby enlarging his fields, his descendants and his granaries.

DES VÉGÉTAUX ET LEURS USAGES CHEZ LES PEUPLES DU NORD-CAMEROUN: SÉLECTION
ET MODE D'EMPLOI DU XIXE AU XXE SIÈCLE
[HTTPS://WWW.SCIELO.BR/J/HCSM/A/JFCKYP5RCBZWCYR3SZJNHJR/?LANG=FR](https://www.scielo.br/j/hcsm/a/JFCKYP5RCBZWCYR3SZJNHJR/?lang=fr)

La place du grenier dans ces communautés est si importante que toutes les précautions nécessaires doivent être prises en faveur de sa préservation contre les incendies, l'humidité, les rongeurs et les voleurs. Dans cette zone du Sahel au climat capricieux, où les années de bonnes récoltes ne se suivent pas, où les périodes de soudure sont longues et les disettes redoutables, le grenier se présente alors comme une parade contre les imprévus. Les vicissitudes de la nature ont ainsi contraint les peuples du Nord-Cameroun à développer un mode de vie où les prévisions, le souci du lendemain et l'accumulation des grains vont occuper une place non négligeable. Un management efficient des ressources alimentaires confère d'ailleurs à tout bon paysan, prestige, fierté et considération sociale. Selon un proverbe local, "un chef de famille dont le grenier est rempli de mil peut gronder dans sa famille " et en cas de disette, il pourrait bien prendre d'autres femmes en échange du mil et agrandir par conséquent ses champs, sa descendance et ses greniers.



Cameroon, Mokoulek: Housing in circle

<https://equatorjournal.com/post/648913907163021313/ren%C3%A9-gardi-mabas-mandara-mountains-cameroon>

STORE / wheat COLLECT

It's usually around the central granary that these various ritual practices take place. In general, these are the rites of twins, widowhood, rain, mystical protection, the fight against the evil eye and harvest rites, etc.

Among the Guiziga and Moundang of the Diamaré plain, for example, the head of the family's granary is located in the center of the house, symbolizing his superiority and centrality in the household. The wife's, on the other hand, is located next to her hut.

In addition, the granaries of the village chief differ from those of ordinary men in their size, and in their symbolic and communal representation. Indeed, in the case of cults that concern the community, it is generally around the chief's granaries that the rituals are performed. And in the event of food shortages in the village, the chief's granaries serve as a food resource for all, especially his loan granaries. Otherwise, they are surrounded by numerous symbolisms that make them very special spaces where all these ritual practices relating to the veneration of secondary divinities take place.

Indeed, as we've said, these granaries are not just built to store food and shelter precious objects. The people who built them considered them sacred sites for ritual practices in respect of secondary divinities. They represent the architectural and technical civilizations of populations that have taken place in time and space. Since it is around them that individuals devote sacred worship to the ancestors (their souls protect the granaries and feed on the sesame seeds stored there).

LES GUIZIGAS DU CAMEROUN SEPTENTRIONAL

[HTTPS://HORIZON.DOCUMENTATION.IRD.FR/EXL-DOC/PLEINS_TEXTES/PLEINS_TEXTES_6/](https://horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_6/)

MEM_CM/06467.PDF

C'est généralement autour du grenier central que ces différentes pratiques rituelles s'effectuent. Il s'agit en général des rites des jumeaux, de veuvage, de la pluie, de protection mystique, de lutte contre le mauvais œil et de rite de récolte, etc.

Chez les Guiziga et les Moundang de la plaine du Diamaré par exemple, le grenier du chef de famille se trouve au centre de la maison, symbole de sa supériorité et de sa centralité dans une maison. En revanche, celui de la femme se situe à côté de sa case.

Ajoutons que les greniers du chef de village se singularisent de ceux des hommes ordinaires, par leur grandeur et par leur représentation symbolique et communautaire. En effet, en cas des cultes qui concernent la communauté, c'est généralement autour des greniers du chef que se pratiquent les rituels. Et en cas d'insuffisance alimentaire dans le village, les greniers du chef servent de ressource alimentaire pour tous, surtout ses greniers de prêt. Autrement, ils sont entourés de nombreux symbolismes qui font d'eux des espaces tout particuliers où se déroulent toutes ces pratiques rituelles relatives à la vénération des divinités secondaires.

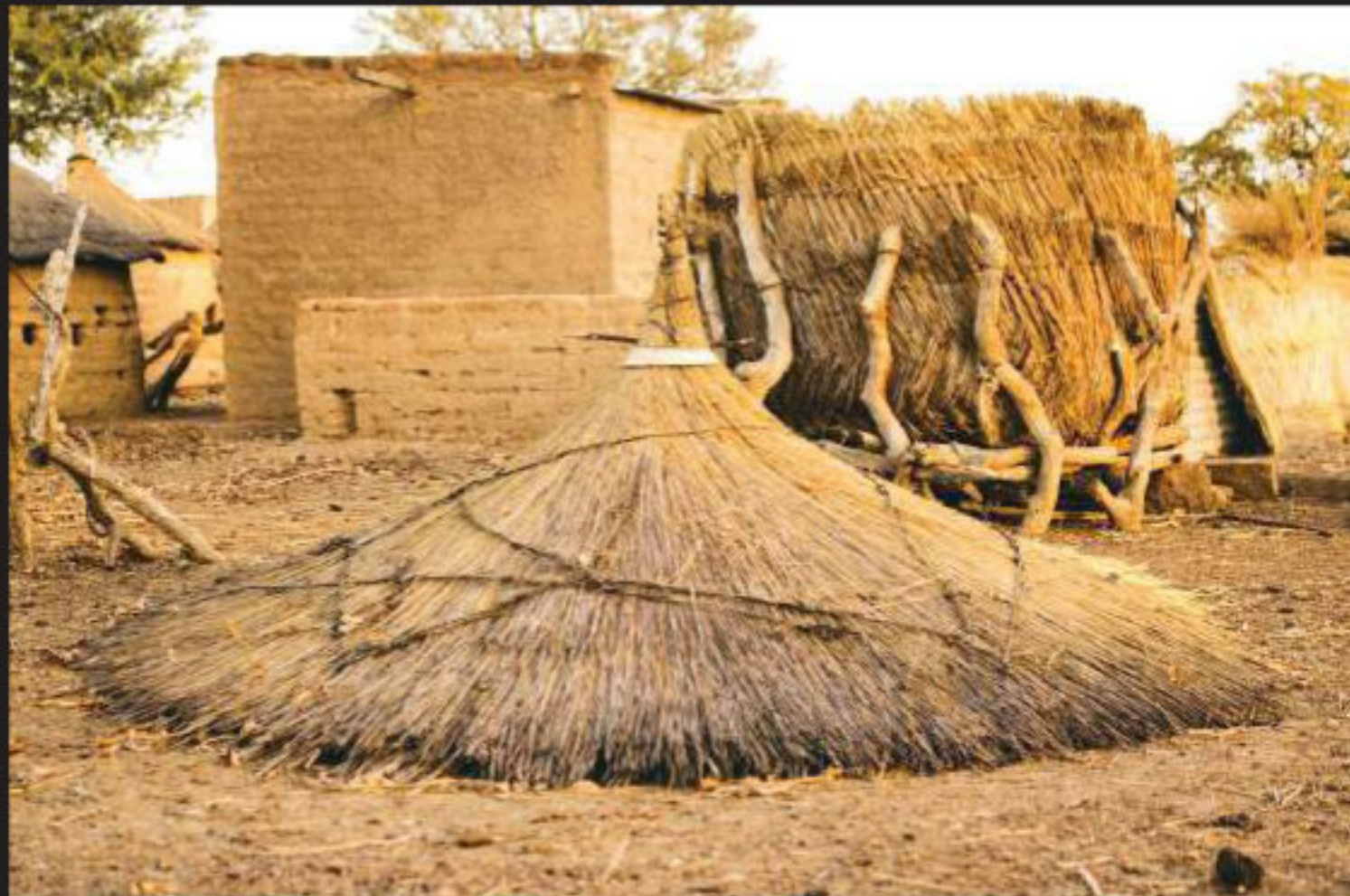
En effet, comme on l'a dit, ces greniers ne sont pas seulement construits pour la conservation des vivres et pour mettre à l'abri des objets précieux. Ceux qui les édifient les considèrent et les érigent en des lieux sacrés des pratiques rituelles à l'endroit des divinités secondaires. Ils représentent des civilisations architecturales et techniques des populations qui ont eu lieu dans le temps et dans l'espace. Puisque c'est autour d'eux que les individus vouent des cultes sacrés aux ancêtres (leurs âmes protègent les greniers et se nourrissent des sésames qui y sont conservés).



Cameroon, Musgum: Granary in front of each house
http://www.fides.org/fr/news/58502-AFRIQUE_CAMEROUN_Le_Cameroun_possibile_point_de_soudure_entre_les_crisis_nigeriane_et_centrafricaine



Cameroon, Bamikélé people: chefferie de Bandjoun.
http://iedes08.canalblog.com/albums/anna_au_cameroun/photos/23685693-entree_de_la_chefferie_de_bandjoun.html



Burkina Faso, Dagari People: Underground wheat storage.

[https://www.alamyimages.fr/grenier-dans-une-zone-rurale-du-burkina-faso-image348708417.html?imageid=091AA082-2F61-4DF5-986D-0D9D3E00B941](https://www.alamyimages.fr/grenier-dans-une-zone-rurale-du-burkina-faso-image348708417.html?imageid=091AA082-2F61-4DF5-986D-0D9D3E00B941&p=1253827&pn=1&searchId=7203013ecb21c4e4b177f0a434f5549e&searchty)
&p=1253827&pn=1&searchId=7203013ecb21c4e4b177f0a434f5549e&searchty
pe=0



Mali, Yendouma Ato: each housing owns a granary in a comm
<https://partnerspaysdogon.nl/fr/projecten/cultuur/2017/06/yendouma-ato/>



Mali, Labezanga: granaries attached to each housing
<https://www.georggerster.com/en/labbezanga-mali>



Niger, Tamou's village, Zarma People: wheat granaries similar to houses
<https://www.gettyimages.ch/detail/nachrichtenfoto/grenier-%C3%A0-mil-dans-le-village-zarma-de-tamou-en-nachrichtenfoto/1269284280?language=fr>



Soudan: Toposa granary
Rafiki Theatre, https://fr.m.wikipedia.org/wiki/Fichier:Folklore_Arts_of_E.African_nomads_57.jpg



Tunisia, Ksour: common granaries

<https://www.mosaicnorthafrica.com/exploring-the-ksour-of-southern-tunisia/>



Cameroon, Bamikélé people: chefferie de Bandjoun.
http://iedes08.canalblog.com/albums/anna_au_cameroun/photos/23685693-entree_de_la_chefferie_de_bandjoun.html

STORE / wheat COLLECT

The guardian watches over the safety of both the seed grain and the grain for consumption, not only against any depredations from wherever they may come, but also, indirectly, against the improvidence of women, who have at hand, in their tent or hut, just enough to feed the family.

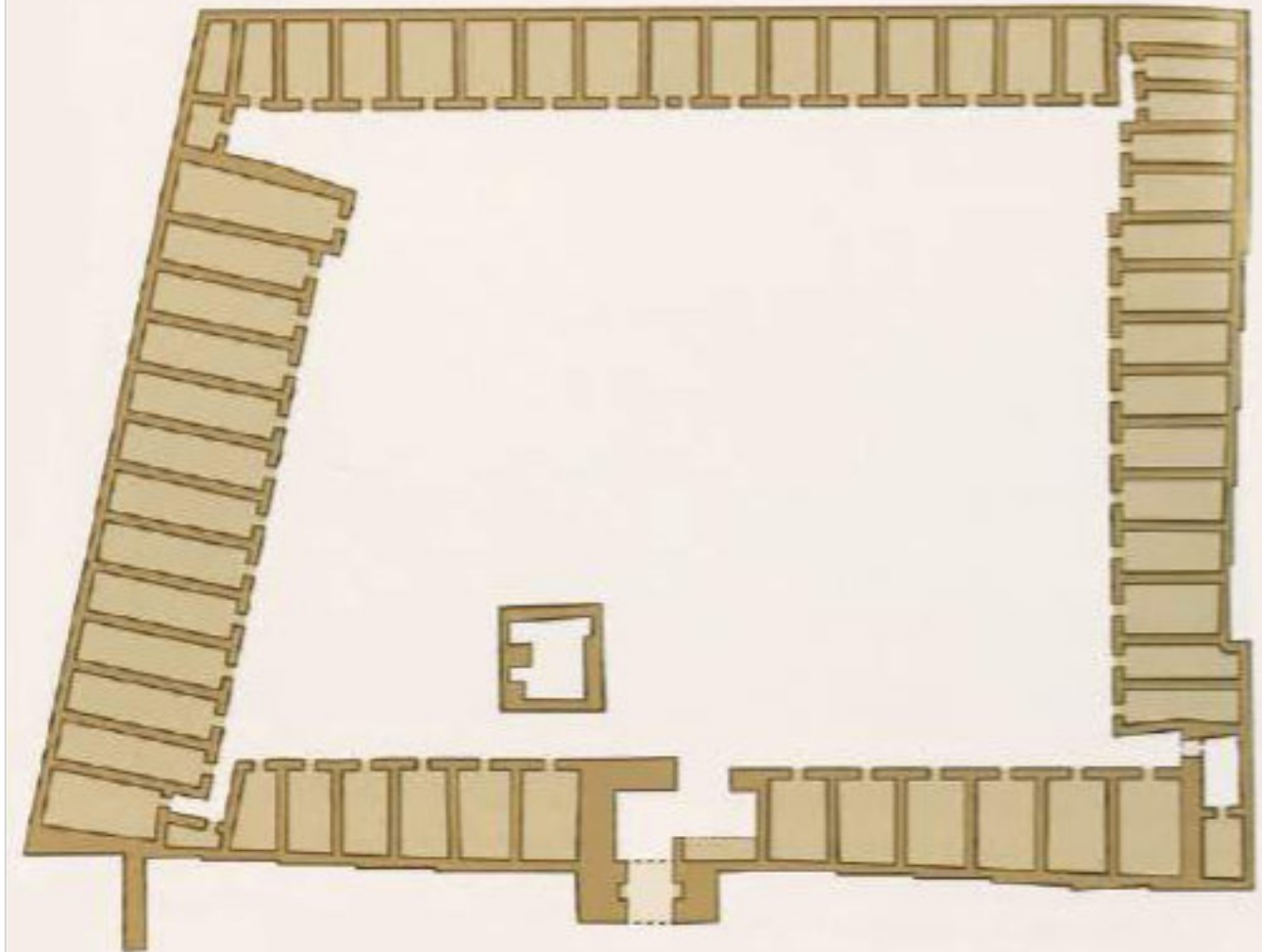
The fear of women wasting food has been observed in other regions. As one semi-sedentary Tunisian noted, «Everyone prefers to have their grain well sheltered and well ventilated, away from women.»

FERCHIOU, SOPHIE. 'PLACE DE LA PRODUCTION DOMESTIQUE FÉMININE DANS L'ÉCONOMIE FAMILIALE DU SUD TUNISIEN'. REVUE TIERS MONDE 19, NO. 76 (1978): 831–44.

Le gardien veille à la sûreté et du grain de semence et du grain de consommation, non seulement contre toutes déprédations d'où qu'elles viennent, mais aussi, indirectement, contre l'imprévoyance des femmes, qui ont à portée de la main, sous leur tente ou leur hutte, juste ce qu'il faut pour nourrir la famille

La peur du gaspillage féminin fut observée pour d'autres régions. Comme le constatait un semi-sédentaire tunisien « chacun préfère avoir son grain bien à l'abri et bien aéré, loin des femmes ».

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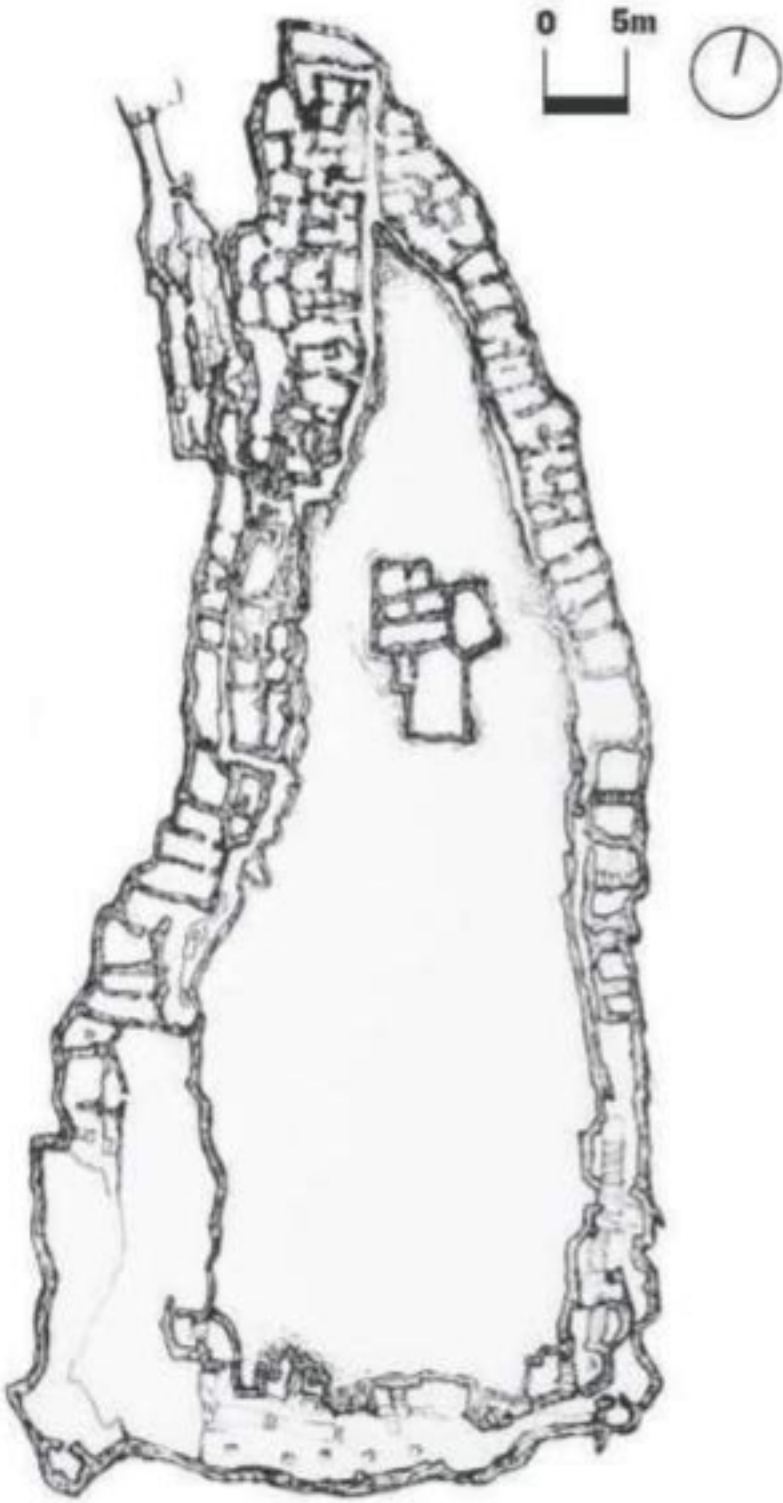
TUNISIA, KSOUR: COMMON GRANARIES
POPP, HERBERT, AND ABDEL FETTAH KASSAH. 'LES KSOUR DU SUD
TUNISIEN: ATLAS ILLUSTRÉ D'UN PATRIMOINE CULTUREL'. BAYREUTH,
GERMANY: NATURWISSENSCHAFTLICHE GESELLSCHAFT BAYREUTH E.V,
2010.

STORE / wheat COLLECT



4696**6v;0::,246<+05v-69;0-0,+ *633,*;0=, .9(5(9@v
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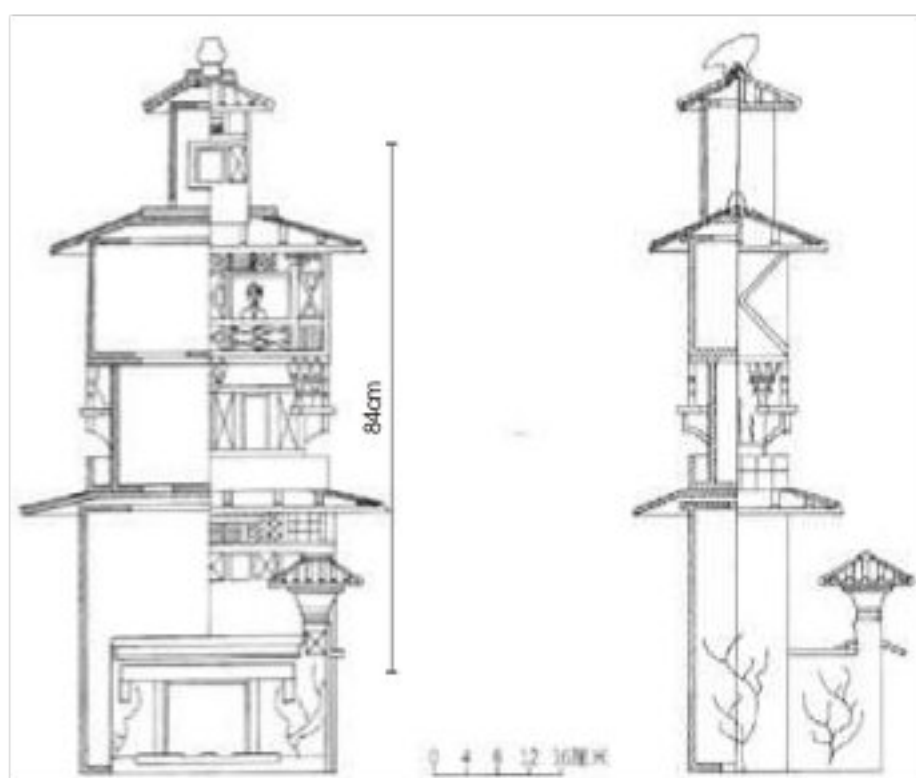
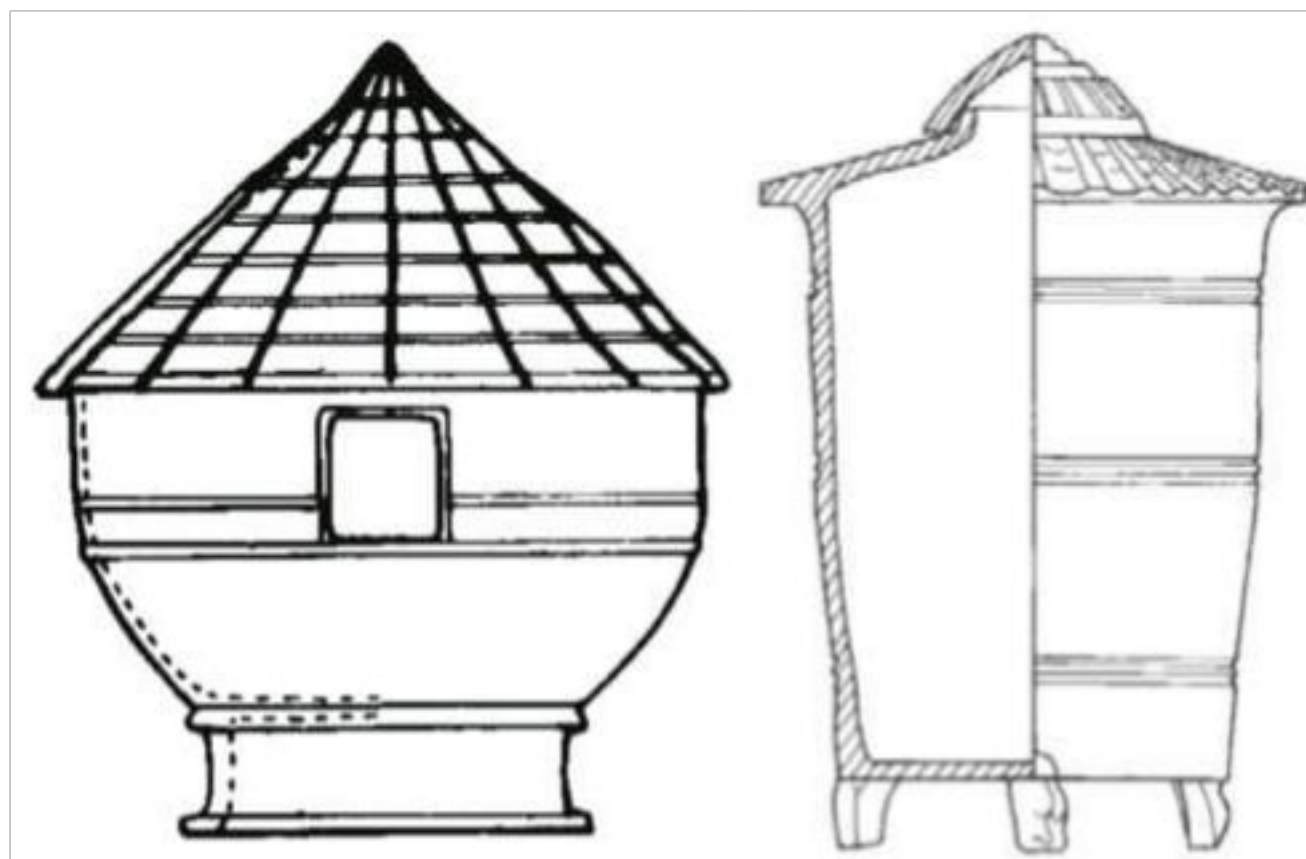
STORE / wheat COLLECT



Id Issa floor plan

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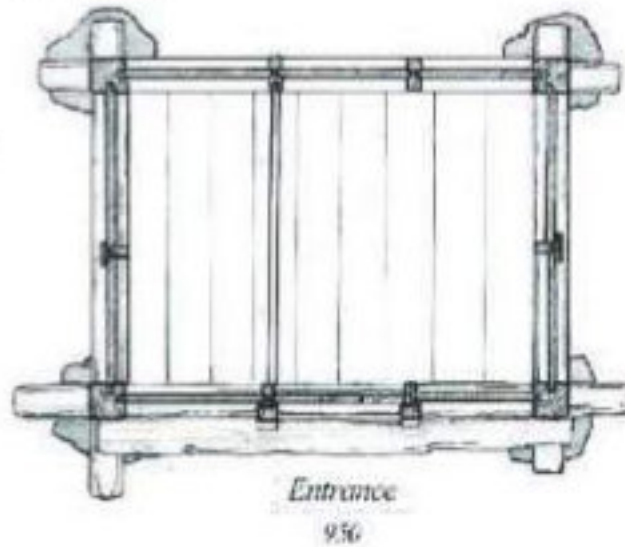
STORE / wheat COLLECT



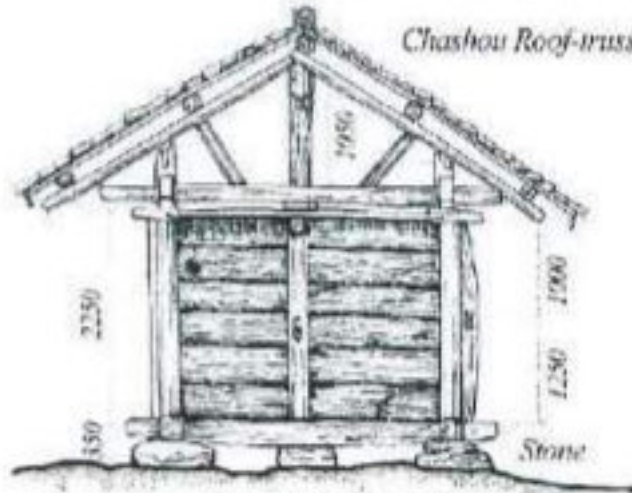
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PLAN 1:50

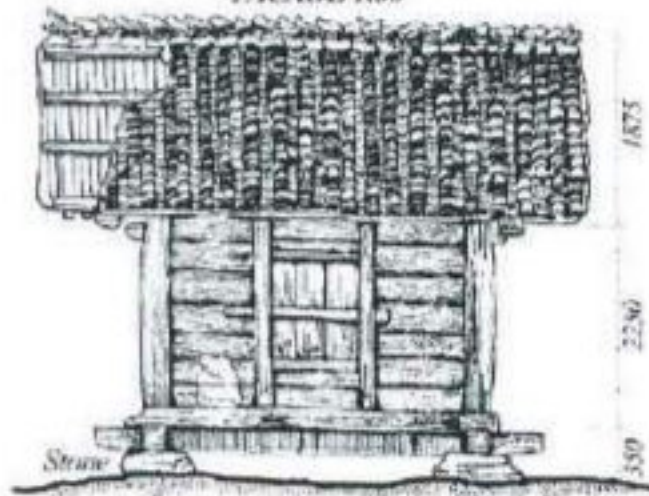


Chashou Roof-truss



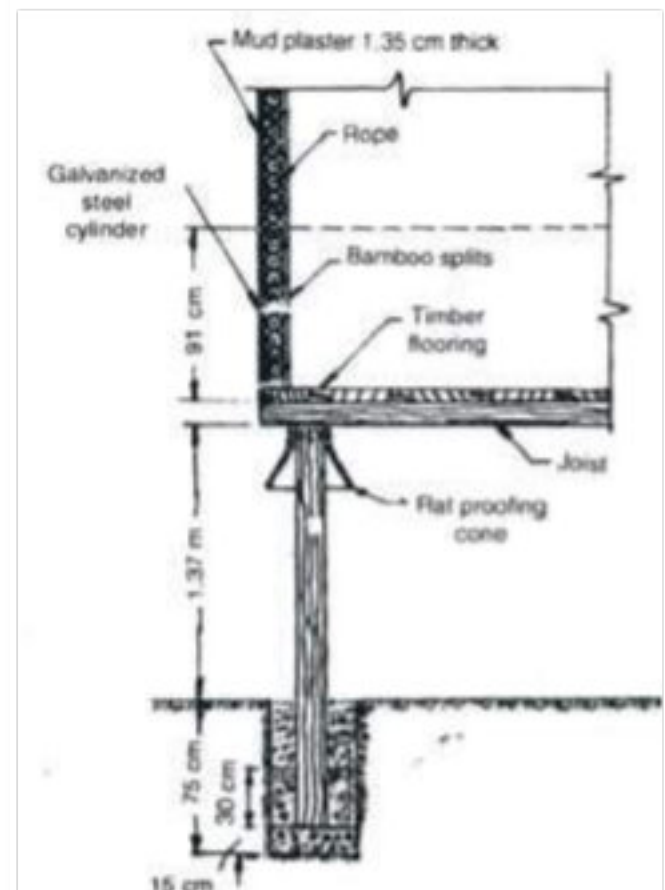
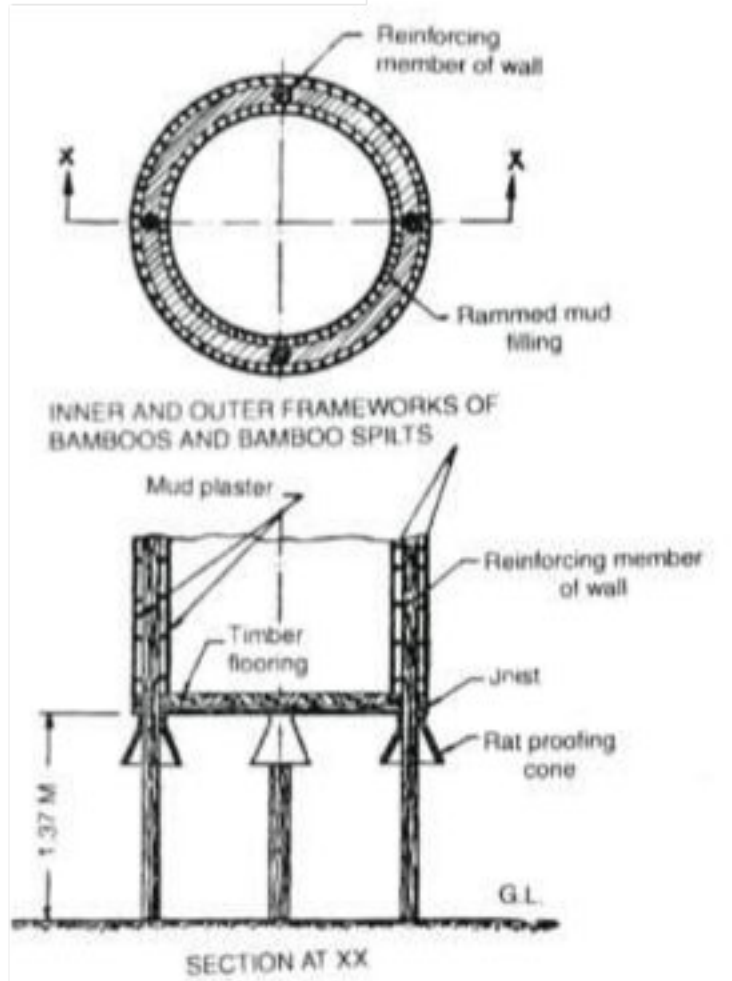
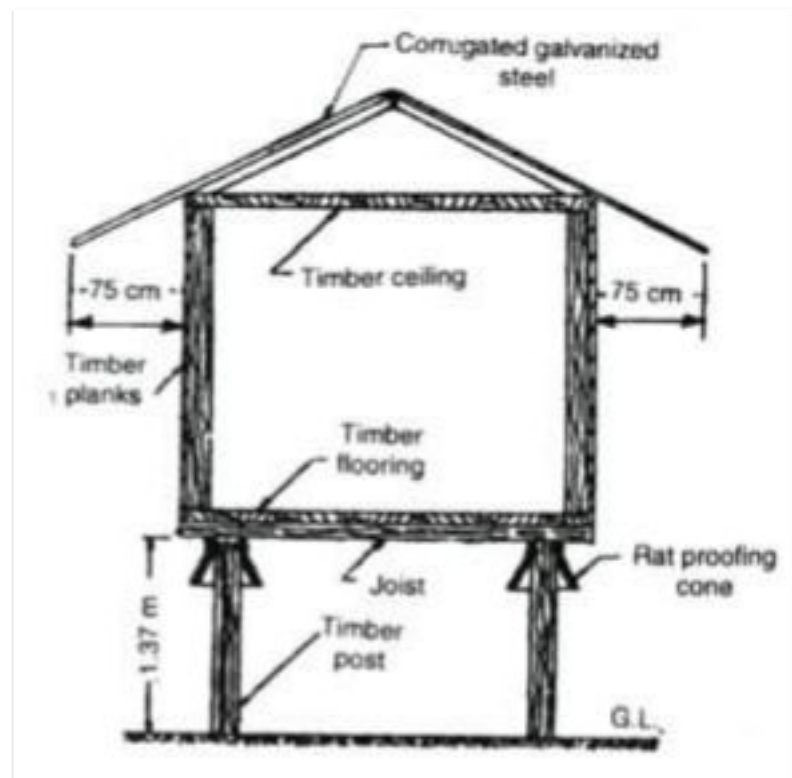
ELEVATION 1:50

FACADE 1:50

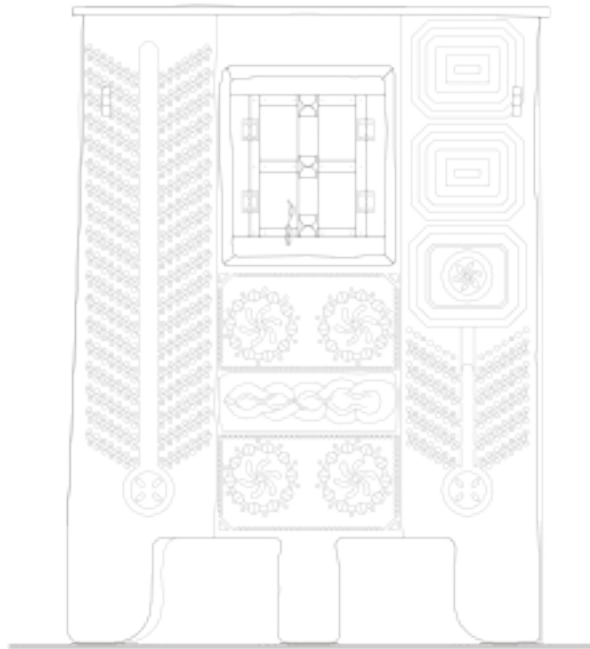


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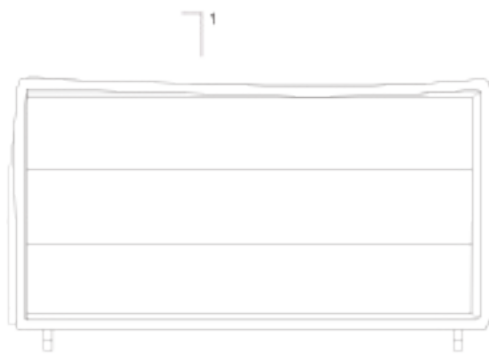
Front elevation



Side elevation



Section 1



Plan (Top View)



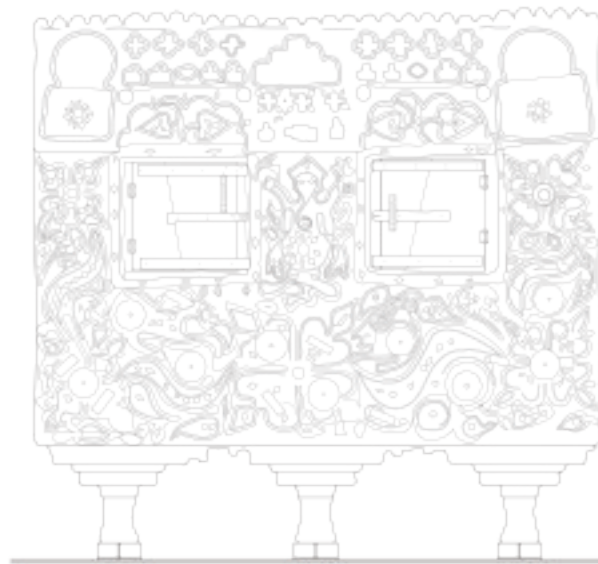
Scale for Drawings (mm)



Isometric view

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SOUTH ASIAN DECORATIVE ARTS & CRAFTS COLLECTION TRUST
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STORE / wheat COLLECT



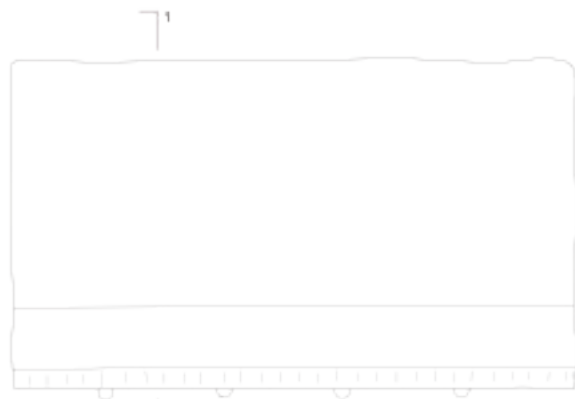
Front elevation



Side elevation



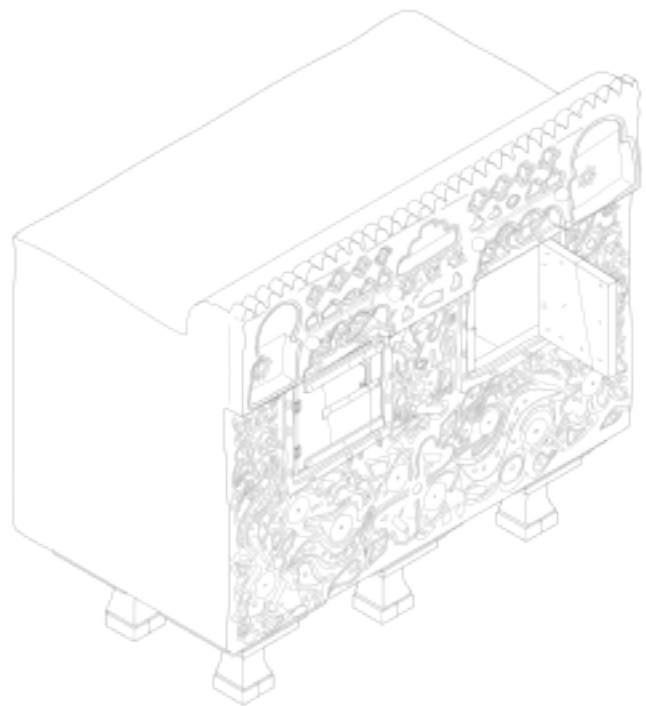
Section 1



Plan (Top View)



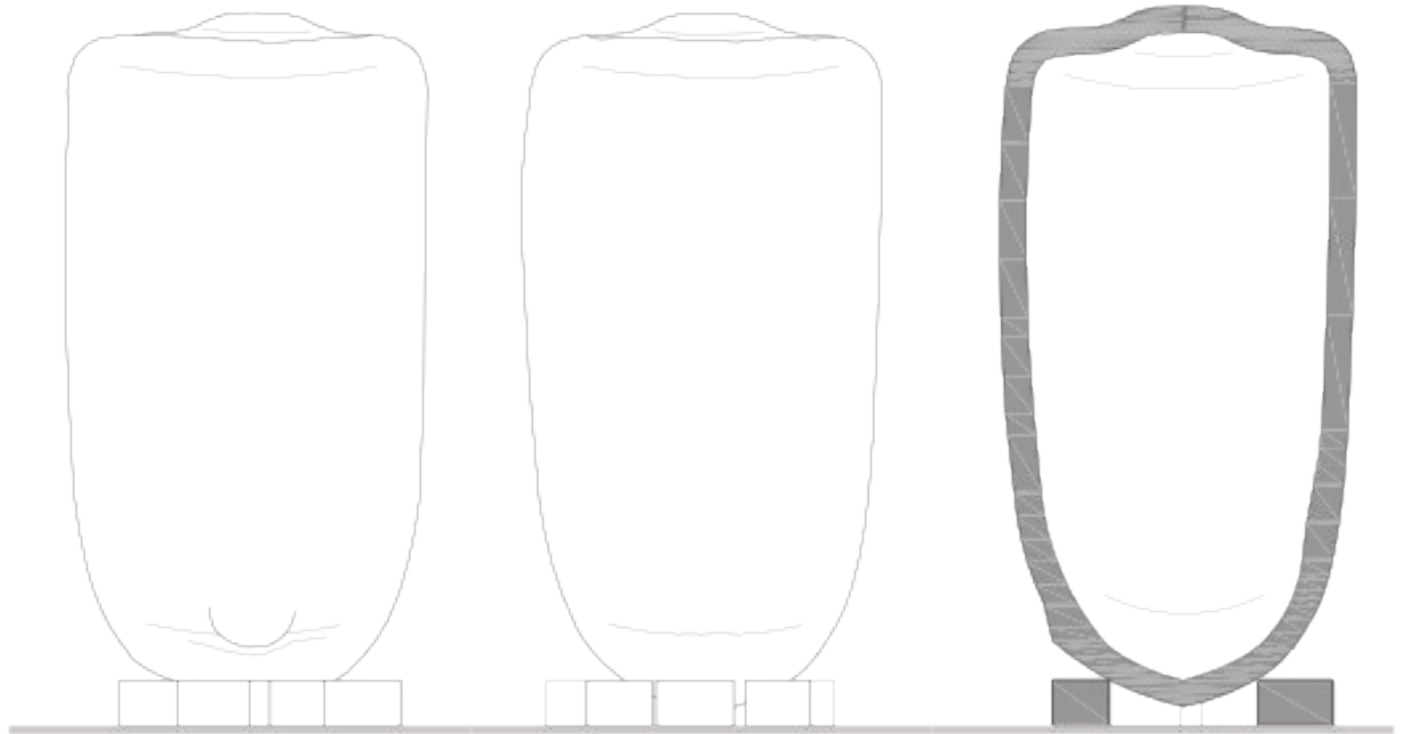
Scale for Drawings (mm)



Isometric View

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STORE / wheat COLLECT



Front elevation

Side elevation

Section 1



Plan (Top View)



Isometric view

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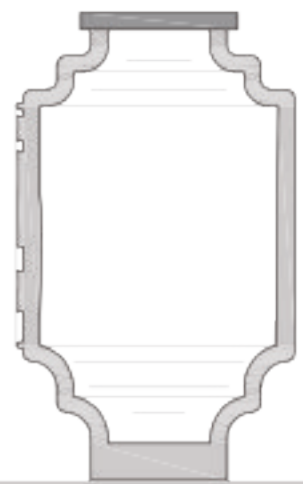
STORE / wheat COLLECT



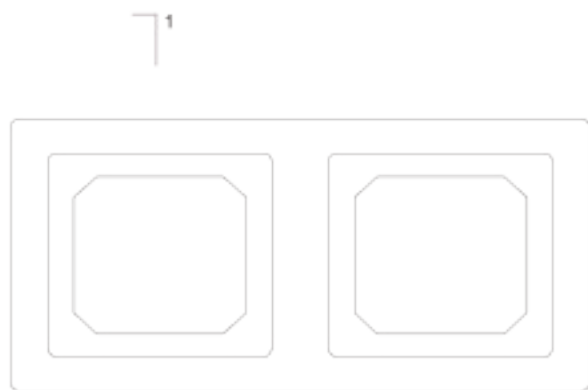
Front elevation



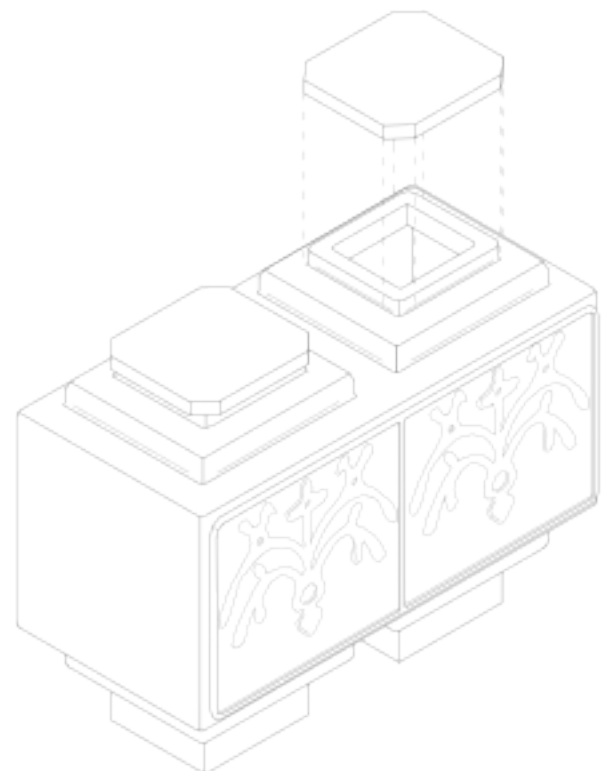
Side elevation



Section 1



Plan (Top View)



Isometric view (open)



Scale for Drawings (mm)

INDIA, BARNALA, PUNJAB, PADOLA

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SOUTH ASIAN DECORATIVE ARTS & CRAFTS COLLECTION TRUST

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Front elevation

Side elevation

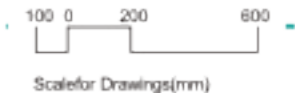
Side elevation



Plan (Top View)

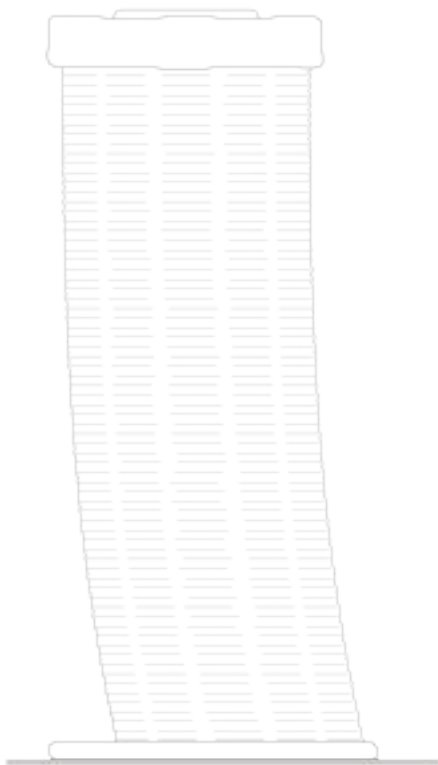


Isometric View

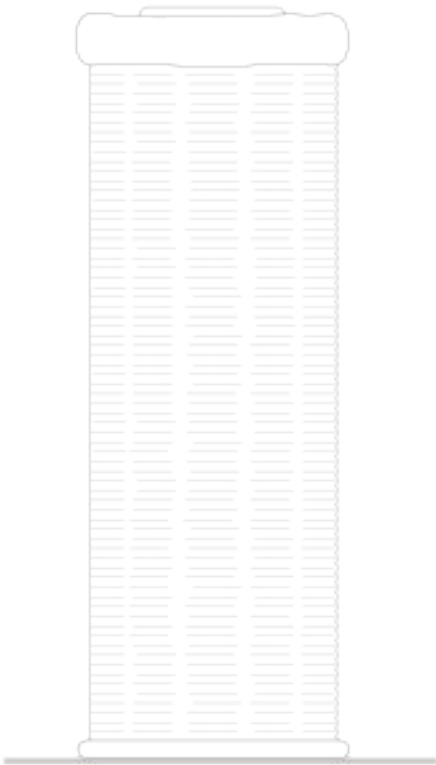


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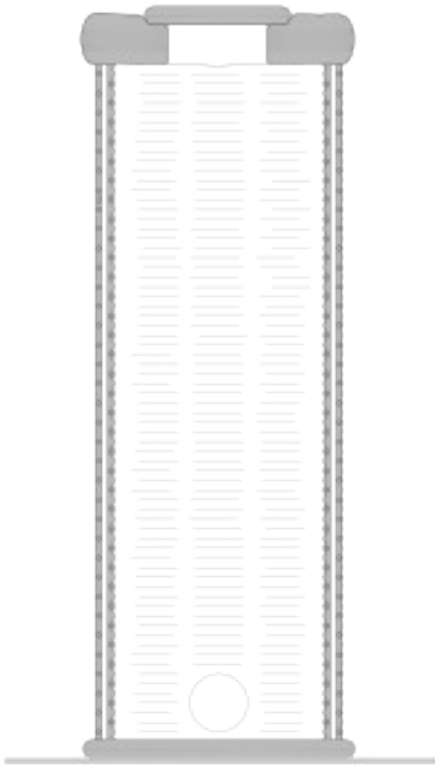
STORE / wheat COLLECT



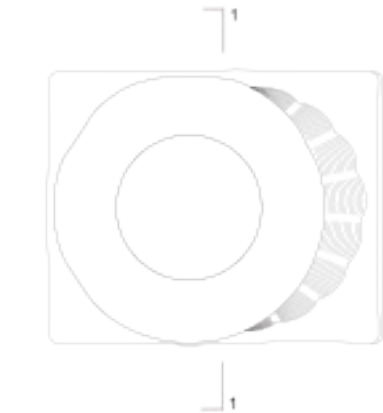
Front elevation



Side elevation



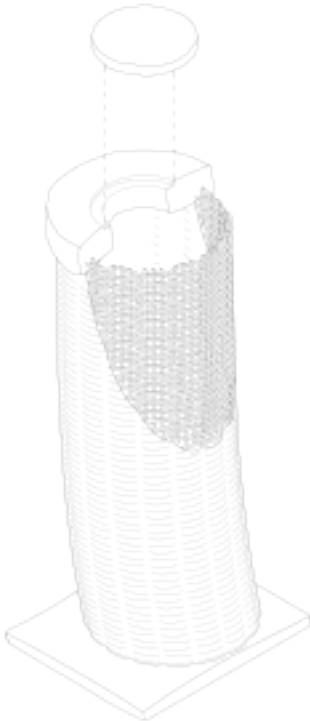
Section 1



Plan (Top view)



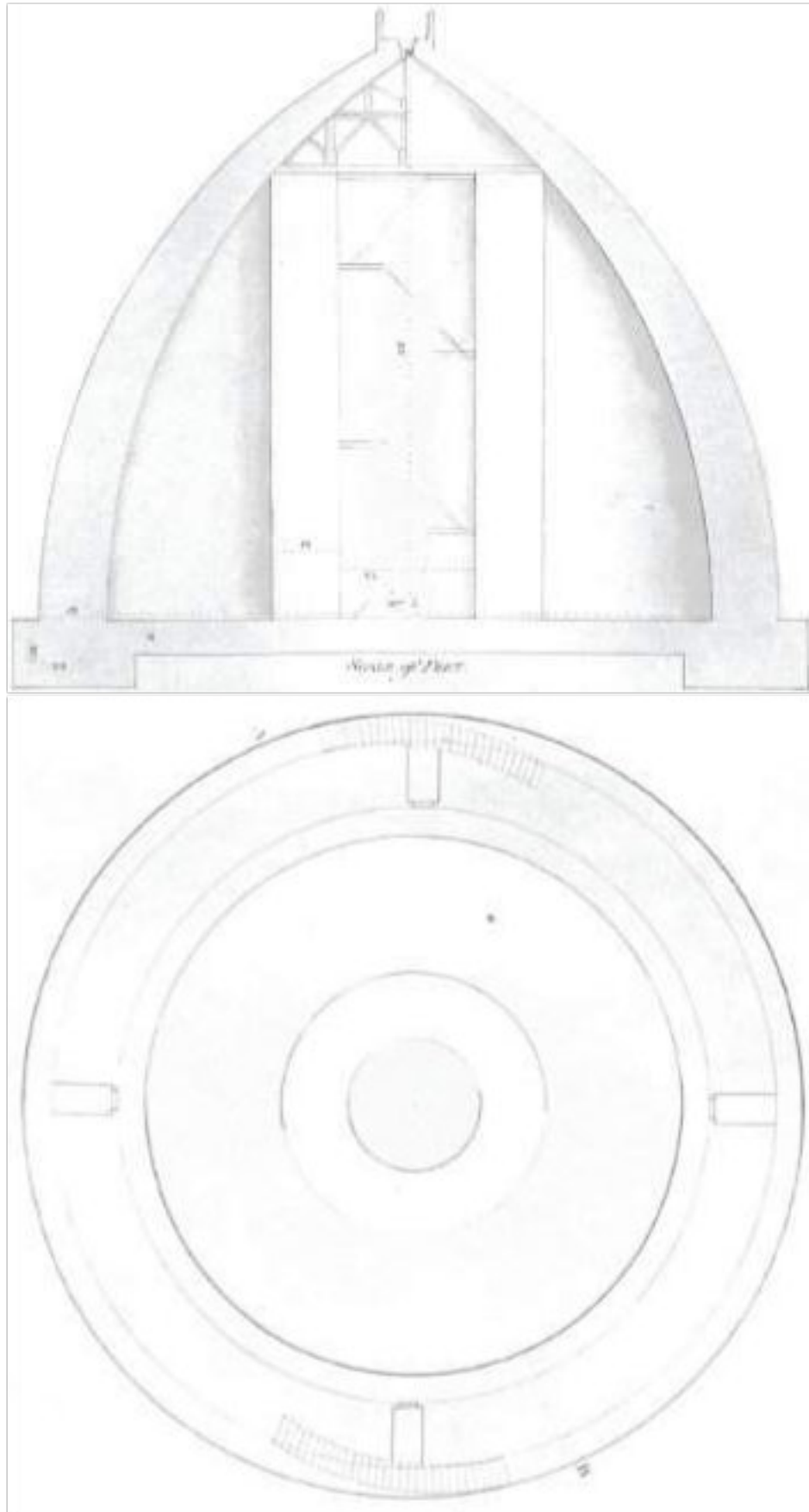
Scale for Drawings(mm)

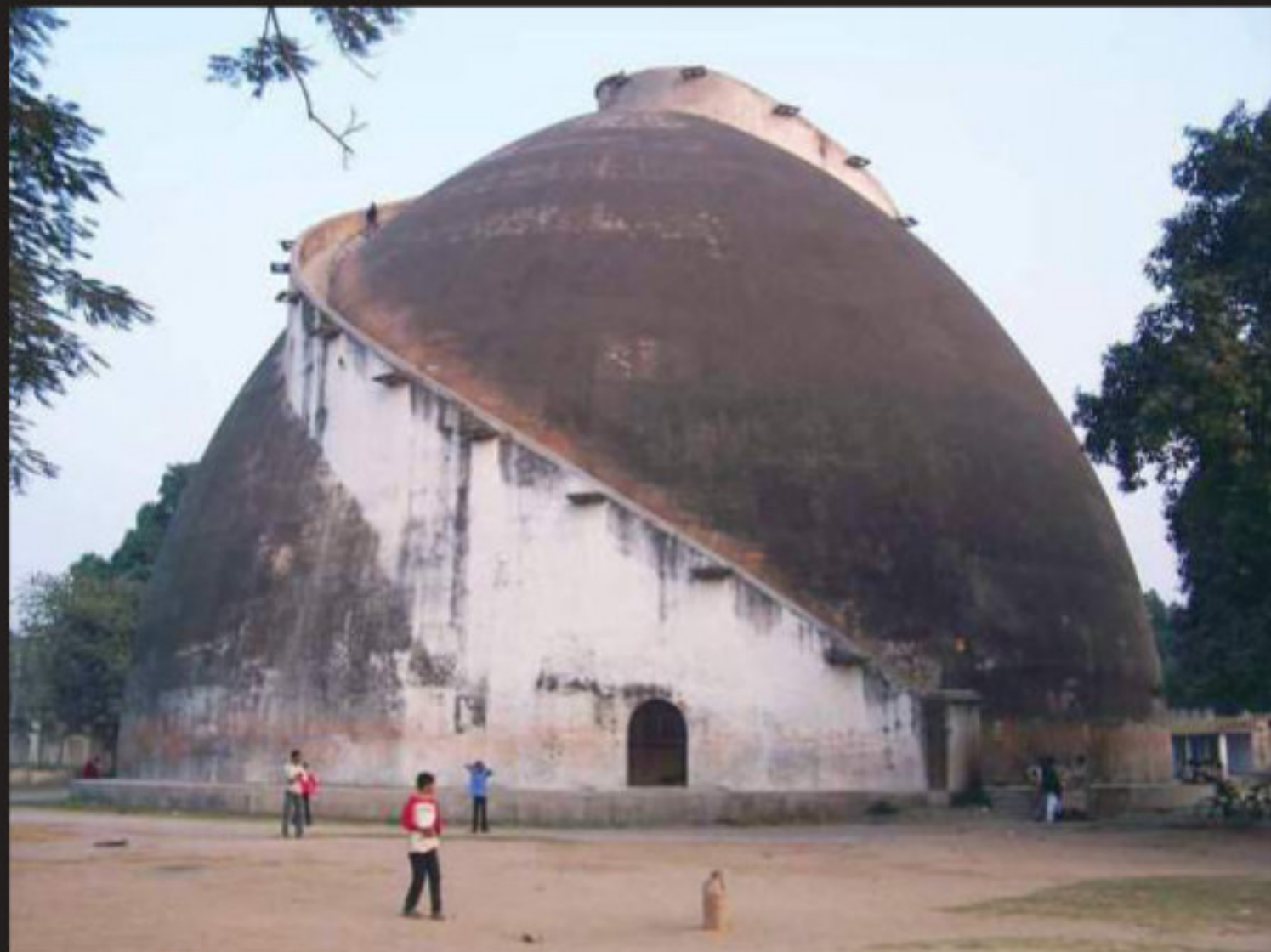


Exploded Isometric View

INDIA, DUNGARPUR, RAJASTHAN, KABLO
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 *(;,.69@\$4(51<:/
 ,5.30:/F5(4,\$.9(5(9@v

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Garstin, John. « Golghar at Bankipur ». Patna, 1786. <https://architexturez.net/doc/az-cf-177898>

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The function of the hórreo, used since Neolithic times (Gómez-Tabanera, 2004, pp. 414-428), has been to store and conserve cereals.

The structural elements of these specialised hórreos must fulfil the functions of insulation from soil humidity, defence, essentially from rodents and granivorous birds, storage of cereals and covering of the entire construction. The structure of the Galician hórreo essentially presents: the base, the supports, the rodent defence elements, the storage chamber and the roof (Lla-no Cabado, 1974, pp. 150-154; Caamaño Suárez, 2003, pp. 293-299).

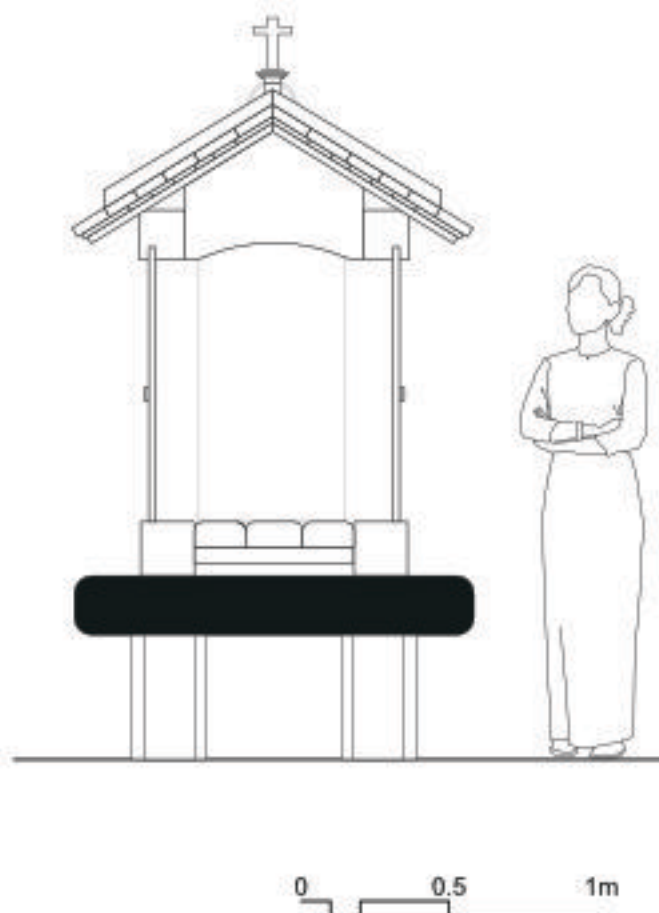
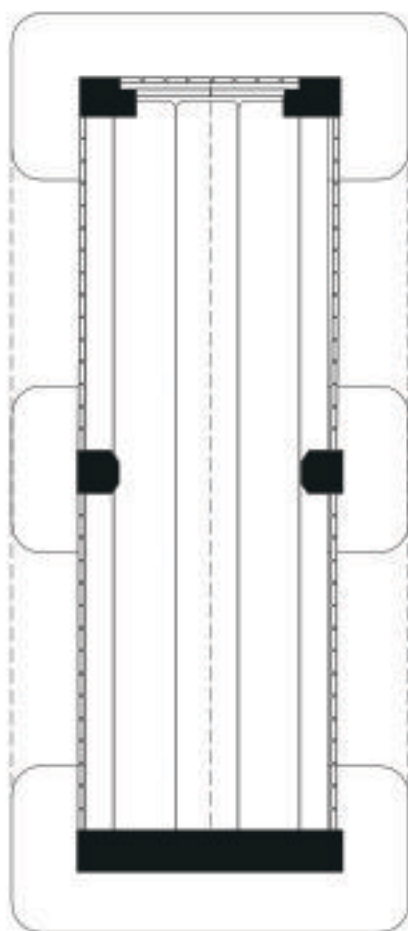
Depending on the solidity or slope of the terrain, it is sometimes necessary to construct a flat base, or soleira, to support the hórreo's feet. The soleira also lends itself to raising the construction and thus obtaining greater ventilation, so much so that, in some cases, the hórreo may be built on the roof of the farmhouse itself.

ROVATI, PAOLO. 'EL HÓRREO GALIZIANO NEL PAESAGGIO RURALE E NELL'ARCHITETTURA TRADIZIONALE SPAGNOLA', N.D. 317-139.

La funzione dell'hórreo, utilizzato fin dal Neolitico (Gómez-Tabanera, 2004, pp. 414-428), è stata quella di immagazzinare e conservare i cereali.

Gli elementi strutturali di questi gra-nai specializzati debbono svolgere le funzioni di isolamento dall'umidità del suolo, di difesa, essenzialmente dai roditori e dagli uccelli granivori, di immagazzinamento di cereali e di copertura dell'intera costruzione. La struttura dell'hórreo galiziano presenta essenzialmente: la base, i supporti, gli elementi di difesa dai roditori, la camera-deposito e la copertura (Lla-no Cabado, 1974, pp. 150-154; Caamaño Suárez, 2003, pp. 293-299). Dipendendo dalla solidità o dalla pendenza del terreno, a volte risulta necessario costruire una base pianeggiante, o soleira, che consenta di appoggiare i piedi dell'hórreo. La soleira si presta inoltre ad innalzare la costruzione e ottenere così una maggiore ventilazione, tanto che, in alcuni casi, l'hórreo può essere costruito sul tetto della stessa casa colonica.

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SPAIN, GALICIA, HORREO
REDRAWN FROM : ROVATI, PAOLO. 'EL HÓRREO GALIZIANO NEL PAESAGGIO
RURALE E NELL'ARCHITETTURA TRADIZIONALE SPAGNOLA', N.D.

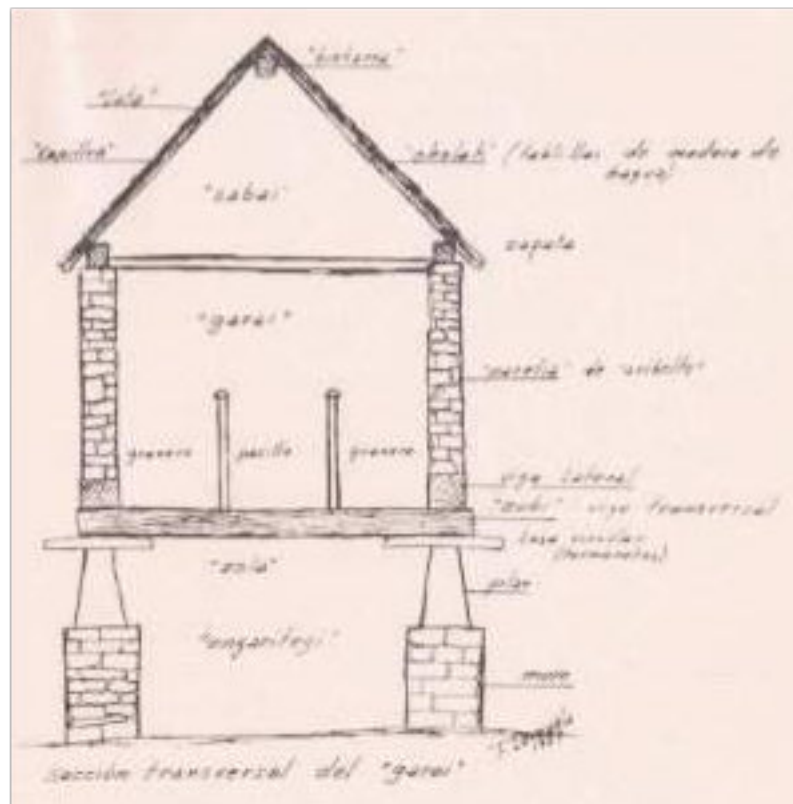
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Although the name 'hórreo' has become generalised, both for the Galician language and for the Galician and Castilian, in our region other local names are used, although some have a fairly large geographical area local, although some have a fairly large geographical area, among which are *cabaceira* (or *cabeceira*), *cabaceiro*, *cabana*, *cabás*, *cabazo*, *canasto*, *canastra*, *canastra*, *canastra*, *cabana*, *cabás*, *cabazo*, *cabazo*, *canasto*, *canastra*, *canastro*, *canizo*, *caustra*, *caroceiros*, *celeiros*, *graneira*, *graneiro*, *hórreo*, *hórro*, *palleiras*, *paneira*, *piorno*, *sequeiro*, etc. In some areas they differentiate between those of one form and those of another. Thus, for example, in the region of Amaía (bordering Santiago de Compostela), those made of interwoven rods and, generally, round, are called *cabanas*, while those made of stone, wood or mixed, always rectangular, are called *hórreos*. Or in Os Ancares (Lugo), within the area of the "Asturian" type, the *hórros* are those of common size, and the *paneiras* are the large ones with wide corridors.

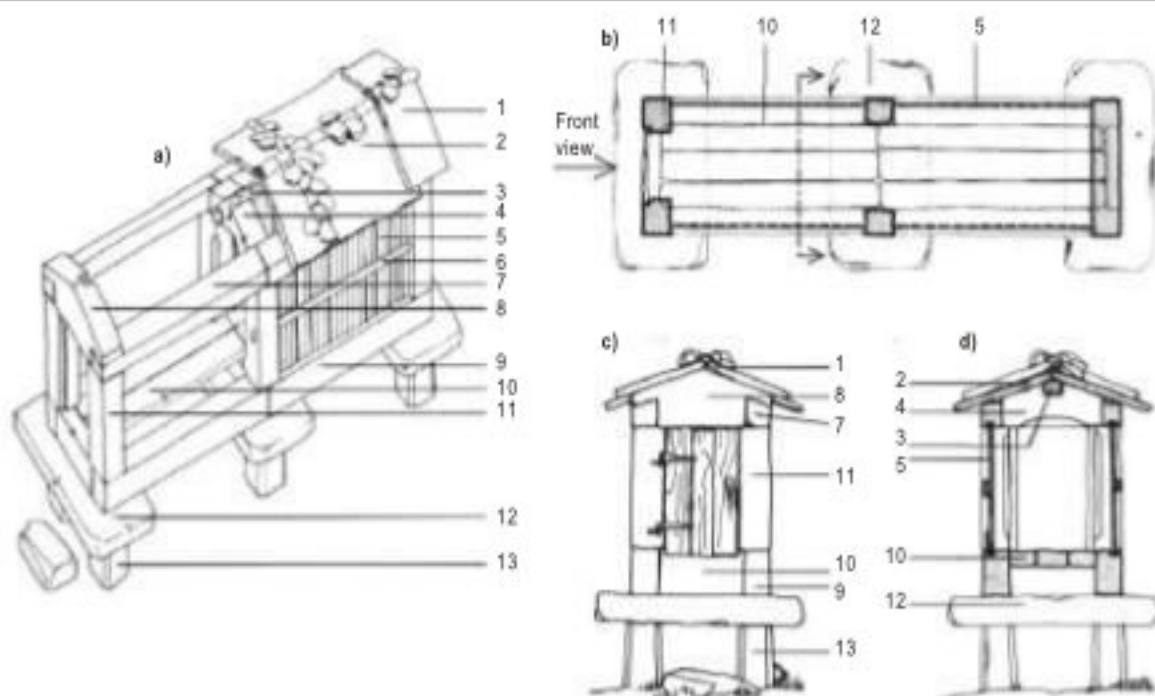
PEREZ, CLODIO GONZALEZ. 'LOS HORREOS GALLEGOS'. UNIVERSIDAD AUTONOMA DE MADRID, 1997. 16.

Aunque se ha generalizado la denominación hórreo , tanto para el idioma gallego como para el castellano, en nuestra tierra se usan otras de carácter local, aunque algunas cuentan con un área geográfica bastante grande , entre las que se cuentan, cabaceira (o cabeceira) , cabaceiro, cabana, cabás, cabazo, canasto, canastra, canastro, canizo , caustra, caroceiros, celeiros , graneira, graneiro, hórreo, hórro, palleiras , paneira, piorno, sequeiro, etc. En algunas zonas diferencian entre los de una forma y los de otra. Así, por ejemplo, en la comarca de Amaía .(limitrofe con Santiago de Compostela), a los hechos de varas entretejidas y, generalmente , redondos , les llaman cabanas , mientras que a los de piedra, madera o mixtos, siempre rectangulares, hórreos. O en Os Ancares (Lugo), dentro del área del tipo «asturiano», los hórros son los de tamaño corriente, y las paneiras los grandes y con amplios corredores .

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HORREO IN STONE IN CASA LAVA, SPAIN. ZUBIAUR CARREÑO, JAVIER. EL HÓRREO NAVARRO. DIARIO DE NAVARRA. PAMPLONA: DIARIO DE NAVARRA, 1996.



Key	Galician language	Spanish	English
1	Sobrepena	Vierteaguas	Overhanging eave
2	Cubrición de lousas	Cubierta de pizarra	Roof covering of slates
3	Cume	Cumbrera	Ridge
4	Tixeira	Viga de cubierta	Rafter
5	Bagalustos	Tablas de cerramiento	Closing boards
6	Cinta	Travesaño	Wall girt
7	Soleiras	Viga de alero	Eave beam
8	Pecho do penal	Hastial	Gable end
9	Trabes	Viga de solera	Floor beam
10	Piso	Piso	Floor
11	Columnas	Pilares	Columns
12	Cepas/tomarratos	«Desvía-ratones»	Flat stone to keep off rodents
13	Pas	Pies/bases	Feet

Figure 1. Parts of a Mondoñedo-type hórreo: a) three-dimensional view, b) layout, c) front view and d) section. Source of drawings: De-Llano (1983).

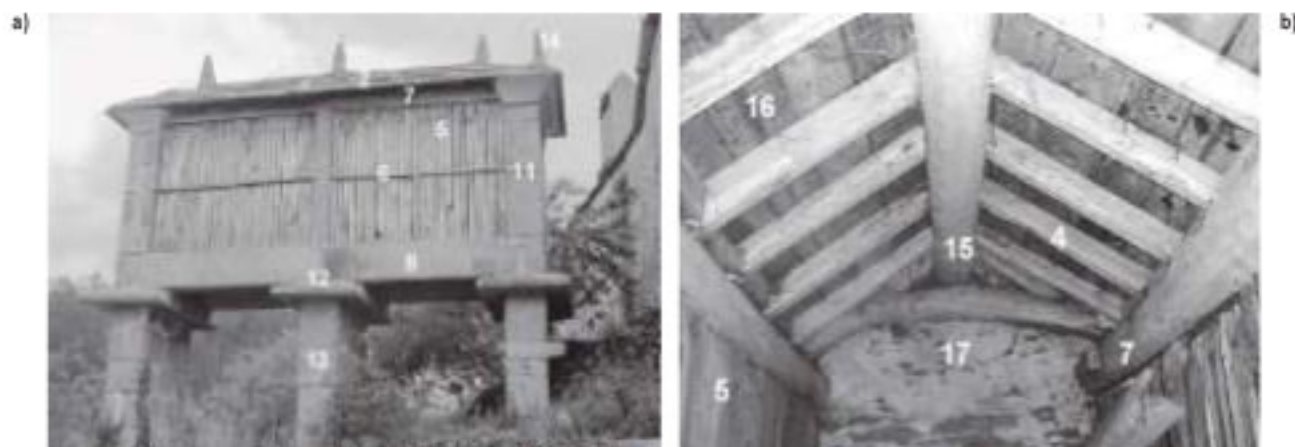
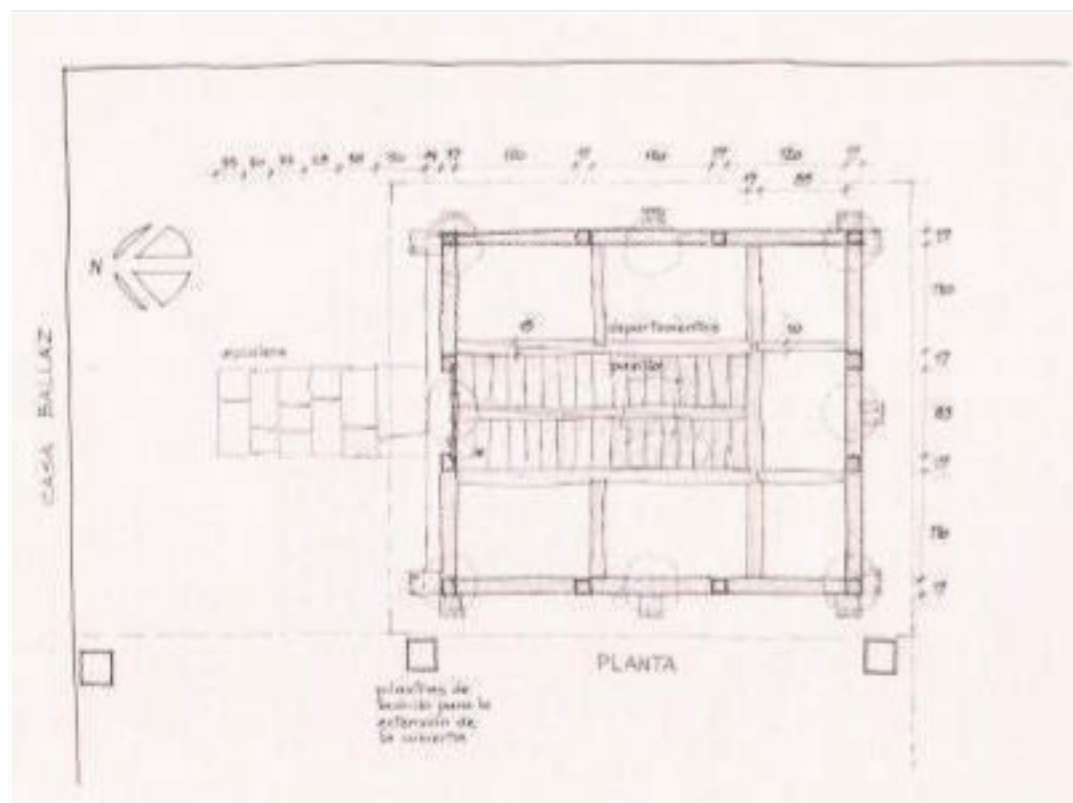
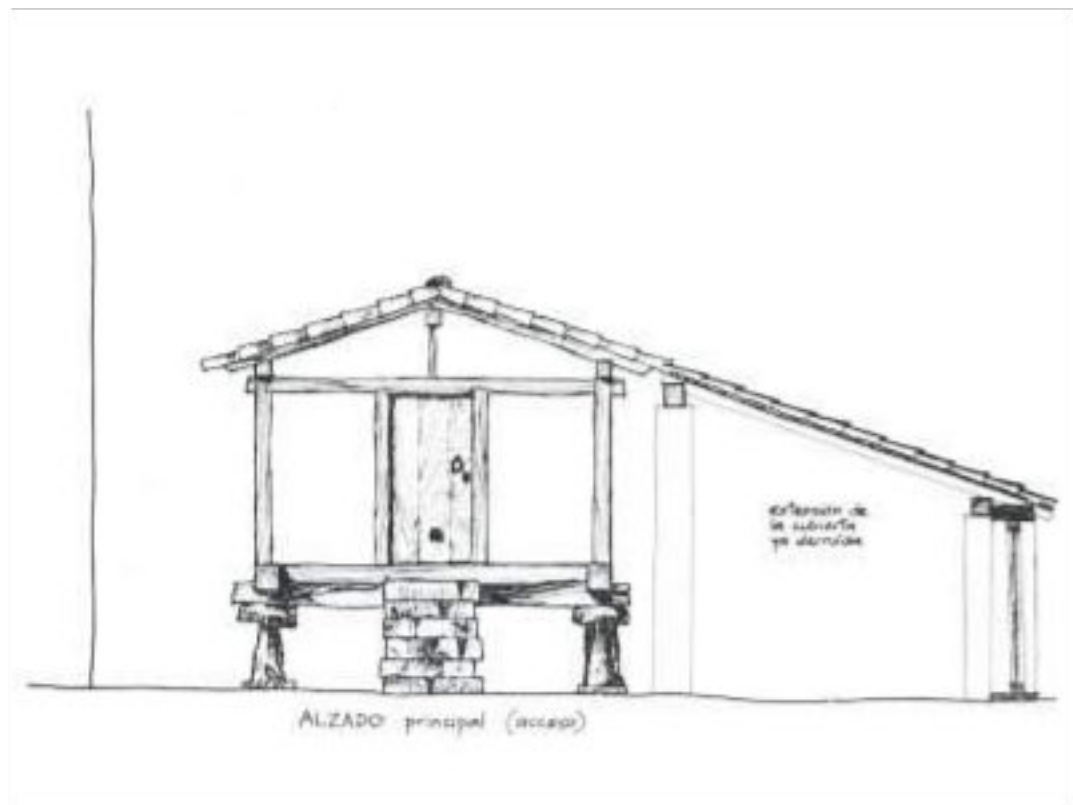


Figure 2. A Mondoñedo-type hórreo: a) outdoors: 2) roof covering of slates, 5) closing boards, 6) wall girt, 7) eavebeam, 9) floor beam, 11) columns, 12) flat stone to keep off rodents, 13) feet and 14) roof decoration stones; and b) indoors: 4) rafter, 15) ridge-piece, 16) wood board roof sheeting to support slates and 17) back wall.

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 oNvvvvvvvvvZQhvvvvvvvvvvvvvvv

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HORREO IN WOOD IN GALICIA, SPAIN. ZUBIAUR CARREÑO, JAVIER. EL HÓRREO NAVARRO. DIARIO DE NAVARRA. PAMPLONA: DIARIO DE NAVARRA, 1996.

STORE / wheat COLLECT

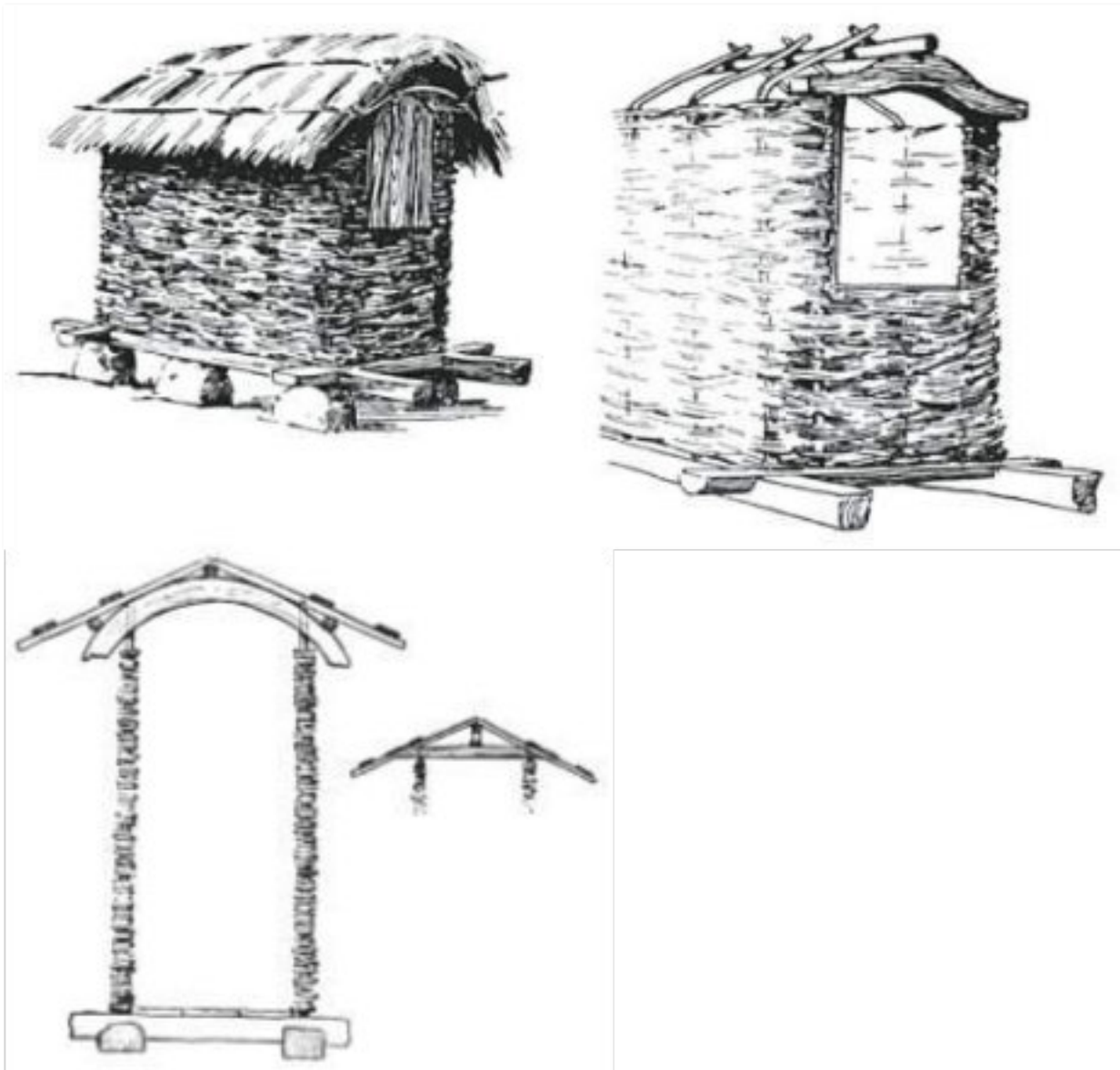
- 1 - With interlocking lintels and a round base.
- 2 - With interlocking rods, rectangular in plan.
- 3 - Of vertical lath, circular in plan (perhaps derived from type 1).
- 4 - Wooden, developed in height.
- 5 - Wide, with vertical wooden lath (balusters), with four sloping walls.
- 6 - Wide, with vertical wooden laths and four upright walls.
- 7 - Narrow, made of vertical wooden lath, with four sloping walls and transverse feet.
- 8 - Narrow, vertical wooden lath and granite columns, with four sloping walls and solid feet.
- 9 - Narrow, vertical wooden lath and granite columns, with only the long sloping walls.
- 10 - Narrow, vertical wooden lath house, sometimes with granite purlins and columns, with four upright walls.
- 11 - Narrow, entirely made of stone, with vertical slits, with four upright walls.
- 12 - Narrow, made entirely of rough chippings, with a few vertical cracks, and four upright walls.
- 13 - Narrow, entirely made of stone, horizontal cracks, with four upright walls.
- 14 - Narrow, horizontal wooden slat, with four upright walls.
- 15 - Incorporated into houses, cottages or haystacks.
- 16 - Narrow, wooden, precariously built and recently widespread.

ERNESTO VEIGA DE OLIVEIA, FERNANDO GALHANO, AND JORGE DIAS.
ESPIGUEIROS PORTUGUESES: SISTEMAS PRIMITIVOS DE SECAGEM E
ARMAZENAMENTO DE PRODUTOS AGRÍCOLAS. ETNOGRÁFICA PRESS.
LISBOA: CELTA EDITORA, 1994. [HTTPS://DOI.ORG/10.4000/BOOKS.
ETNOGRAFICAPRESS.6662](https://doi.org/10.4000/books.etnograficapress.6662).

- 1 – De vergas entretecidas, de base redonda.
- 2 – De varas entretecidas, de planta rectangular.
- 3 – De ripado vertical, de planta circular (derivado talvez do tipo 1).
- 4 – De madeira, desenvolvido em altura.
- 5 – Largo, de ripado vertical de madeira (balaústres), com as quatro paredes inclinadas.
- 6 – Largo, de ripado vertical de madeira, com as quatro paredes apuradas.
- 7 – Estreito, de ripado vertical de madeira, com as quatro paredes inclinadas e pés transversais.
- 8 – Estreito, de ripado vertical de madeira e colunas de granito, com quatro paredes inclinadas, e pé maciço.
- 9 – Estreito, de ripado vertical de madeira e colunas de granito, só com as paredes compridas inclinadas.
- 10 – Estreito, de ripado vertical de madeira, por vezes com padieiras e colunas de granito, com as quatro paredes apuradas.
- 11 – Estreito, inteiramente de pedra, com fendas verticais, com as quatro paredes apuradas.
- 12 – Estreito, inteiramente de rudes lascas de piçarra, raras fendas verticais, com as quatro paredes apuradas.
- 13 – Estreito, inteiramente de pedra, fendas horizontais, com as quatro paredes apuradas.
- 14 – Estreito, de ripado horizontal de madeira, com as quatro paredes apuradas.
- 15 – Incorporado em casas, sequeiras ou palheiros.
- 16 – Estreito, de madeira, de construção precária e difusão recente.

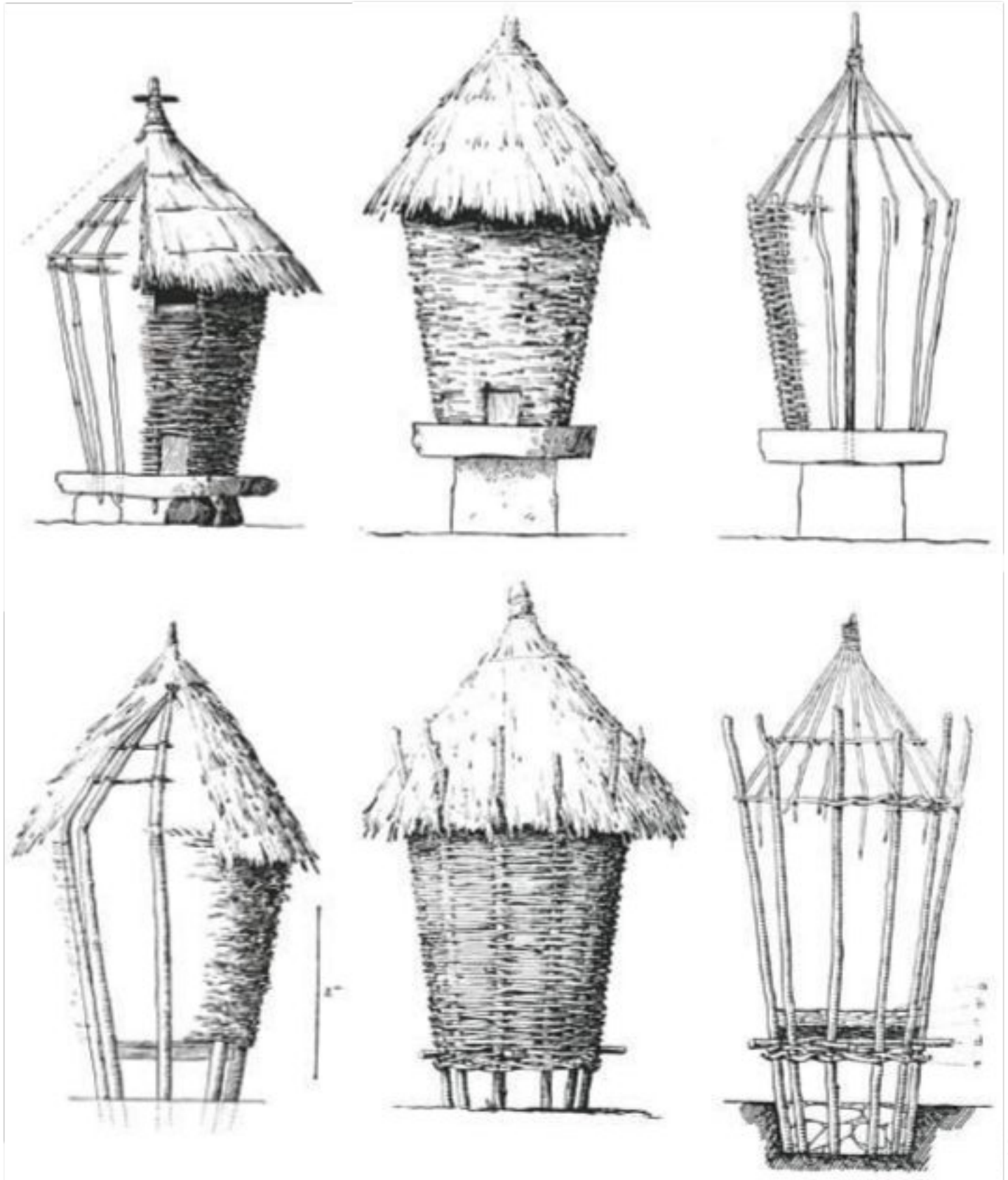


STORE / wheat COLLECT



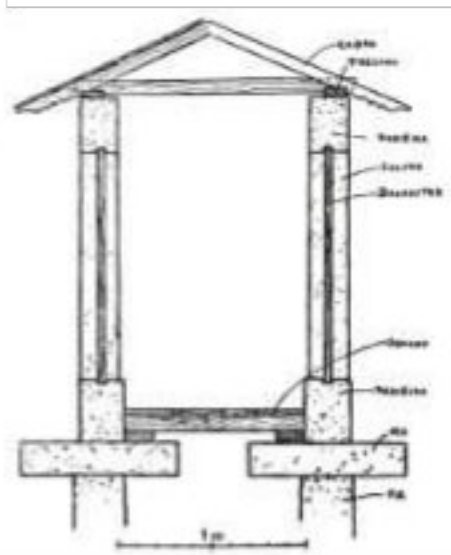
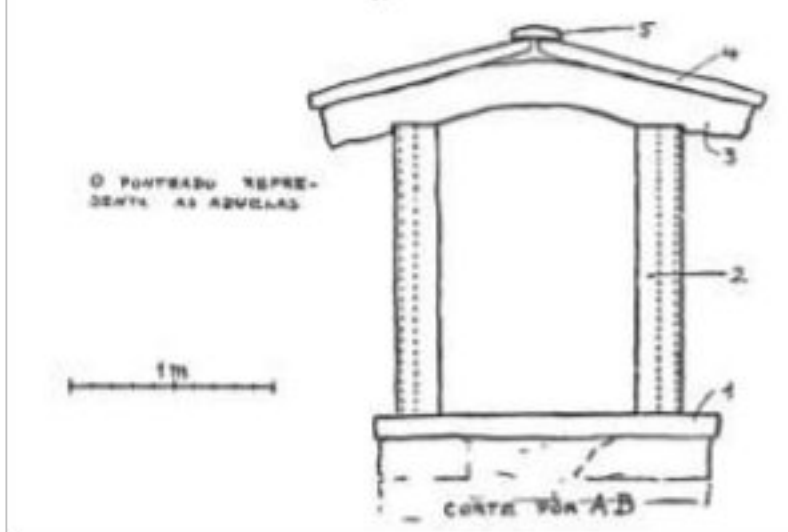
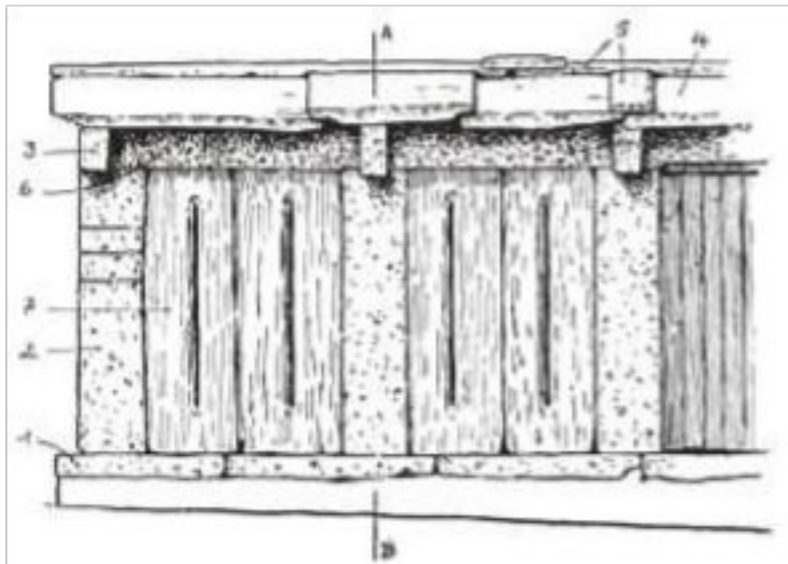
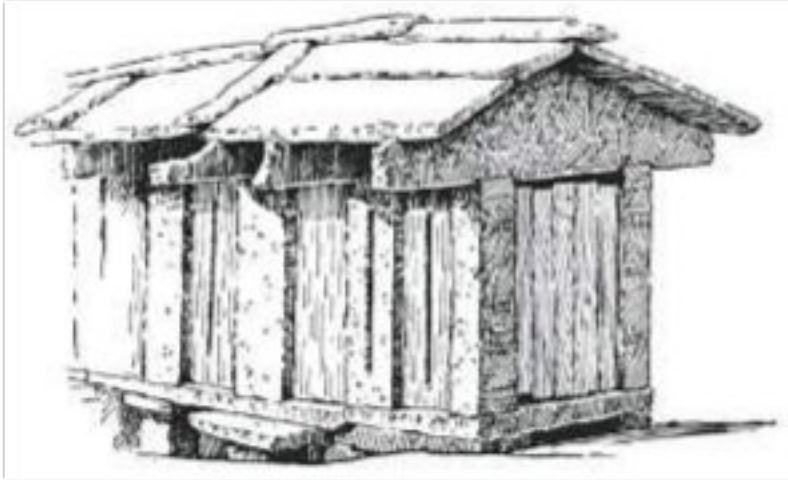
ERNESTO VEIGA DE OLIVEIA, FERNANDO GALHANO, AND JORGE DIAS.
ESPIGUEIROS PORTUGUESES: SISTEMAS PRIMITIVOS DE SECAGEM E
ARMAZENAMENTO DE PRODUTOS AGRÍCOLAS. ETNOGRÁFICA PRESS.
LISBOA: CELTA EDITORA, 1994. [HTTPS://DOI.ORG/10.4000/BOOKS.
ETNOGRAFICAPRESS.6662](https://doi.org/10.4000/books.etnograficapress.6662).

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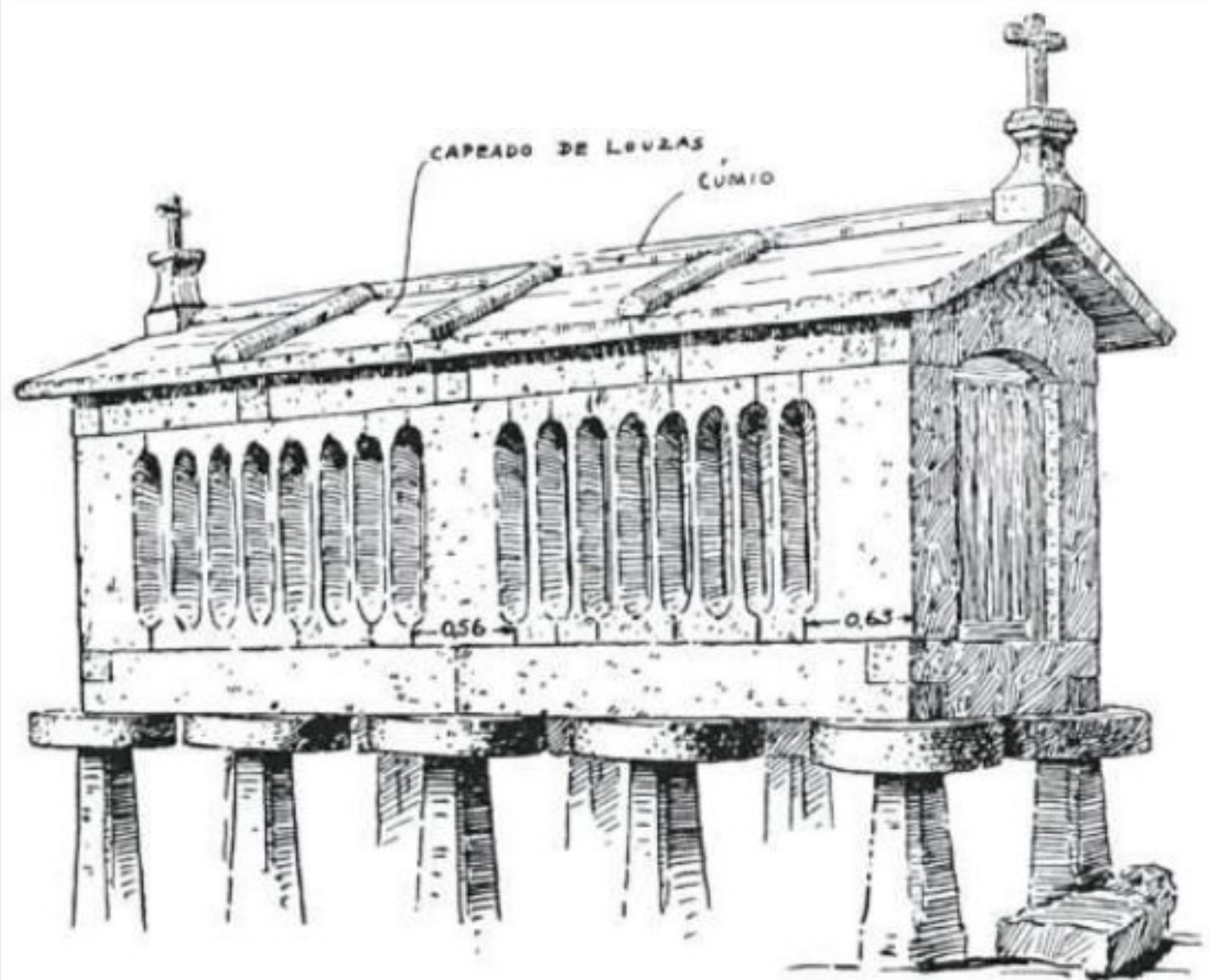


ERNESTO VEIGA DE OLIVEIA, FERNANDO GALHANO, AND JORGE DIAS.
ESPIGUEIROS PORTUGUESES: SISTEMAS PRIMITIVOS DE SECAGEM E
ARMAZENAMENTO DE PRODUTOS AGRÍCOLAS. ETNOGRÁFICA PRESS.
LISBOA: CELTA EDITORA, 1994. [HTTPS://DOI.ORG/10.4000/BOOKS.
ETNOGRAFICAPRESS.6662](https://doi.org/10.4000/books.etnograficapress.6662).

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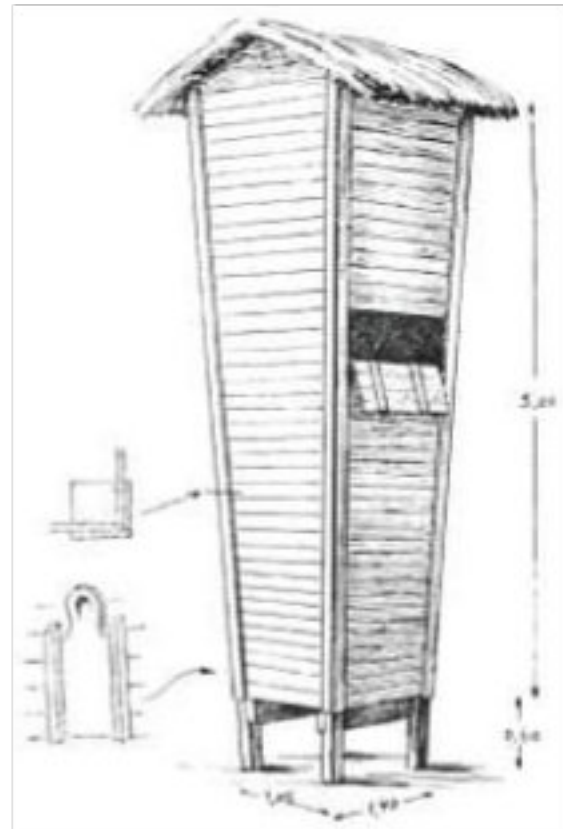
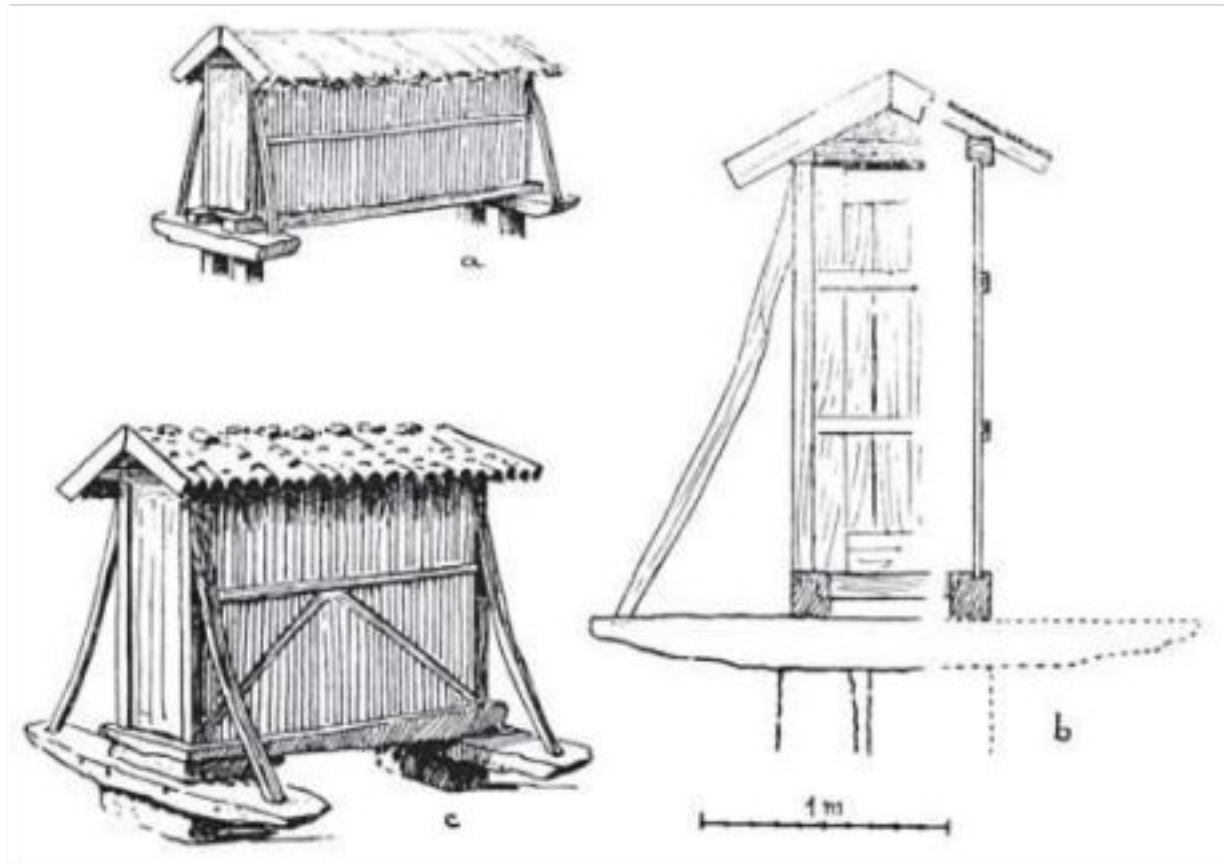


ERNESTO VEIGA DE OLIVEIRA, FERNANDO GALHANO, AND JORGE DIAS.
ESPIGUEIROS PORTUGUESES: SISTEMAS PRIMITIVOS DE SECAGEM E
ARMAZENAMENTO DE PRODUTOS AGRÍCOLAS. ETNOGRÁFICA PRESS.
LISBOA: CELTA EDITORA, 1994. [HTTPS://DOI.ORG/10.4000/BOOKS.
ETNOGRAFICAPRESS.6662](https://doi.org/10.4000/books.etnograficapress.6662).



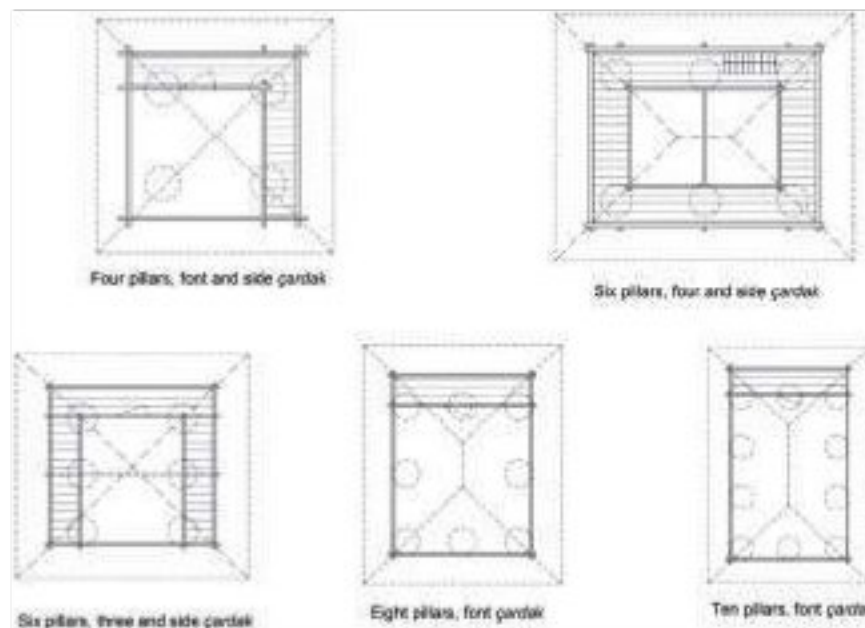
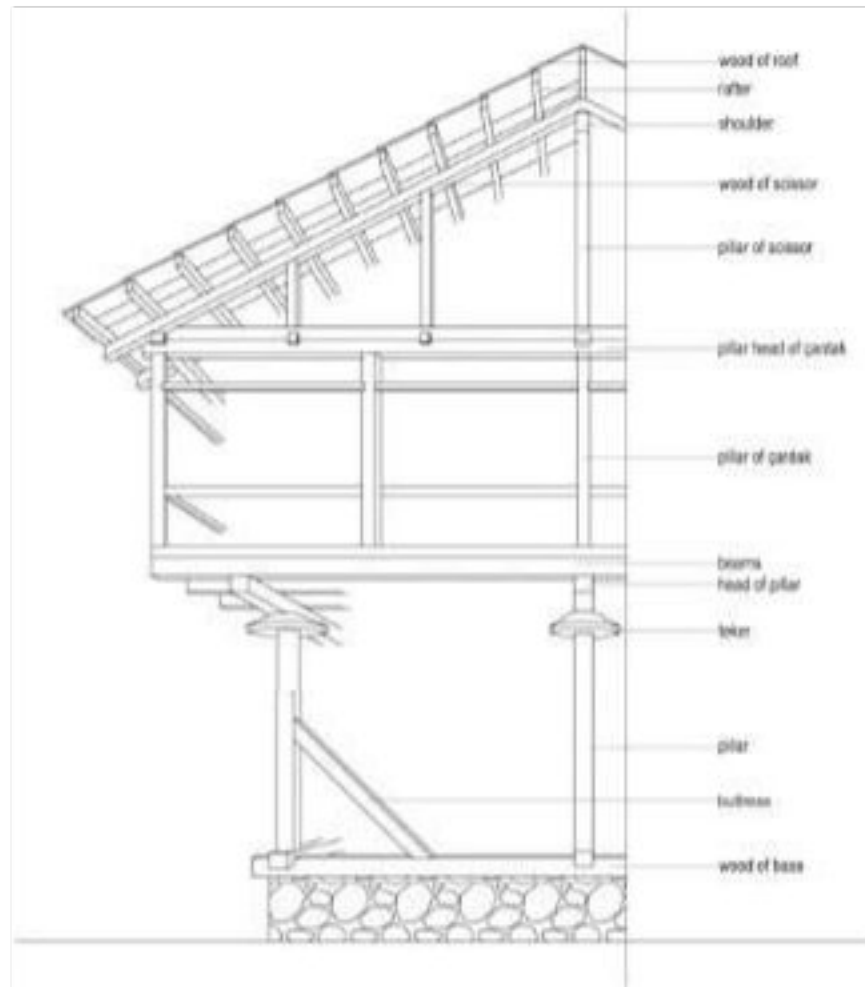
Ernesto Veiga de Oliveira, Fernando Galhano, and Jorge Dias. Espigueiros Portugueses: Sistemas Primitivos de Secagem e Armazenamento de Produtos Agrícolas. Etnográfica Press, Lisboa: Celta Editora, 1994. <https://doi.org/10.4000/books.etnograficapress.6662>.

STORE / wheat COLLECT



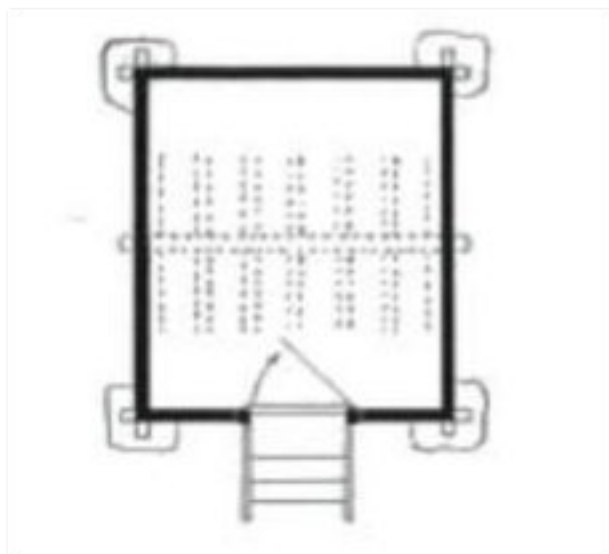
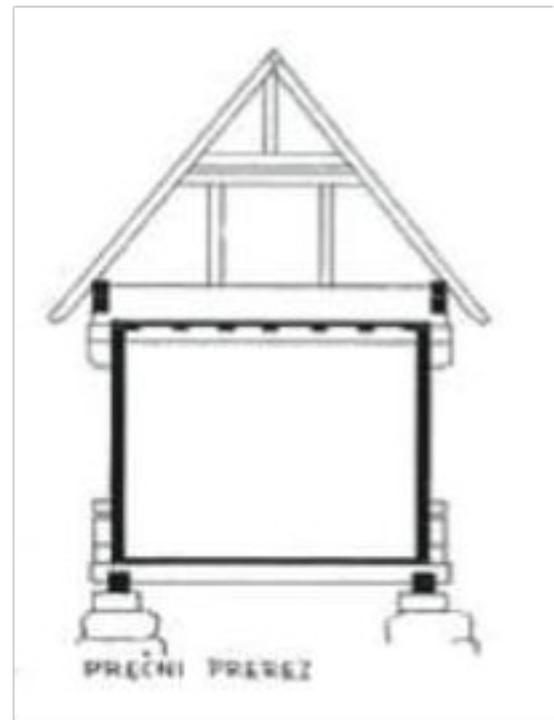
ERNESTO VEIGA DE OLIVEIA, FERNANDO GALHANO, AND JORGE DIAS.
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LISBOA: CELTA EDITORA, 1994. [HTTPS://DOI.ORG/10.4000/BOOKS.
ETNOGRAFICAPRESS.6662](https://doi.org/10.4000/books.etnograficapress.6662).

STORE / wheat COLLECT

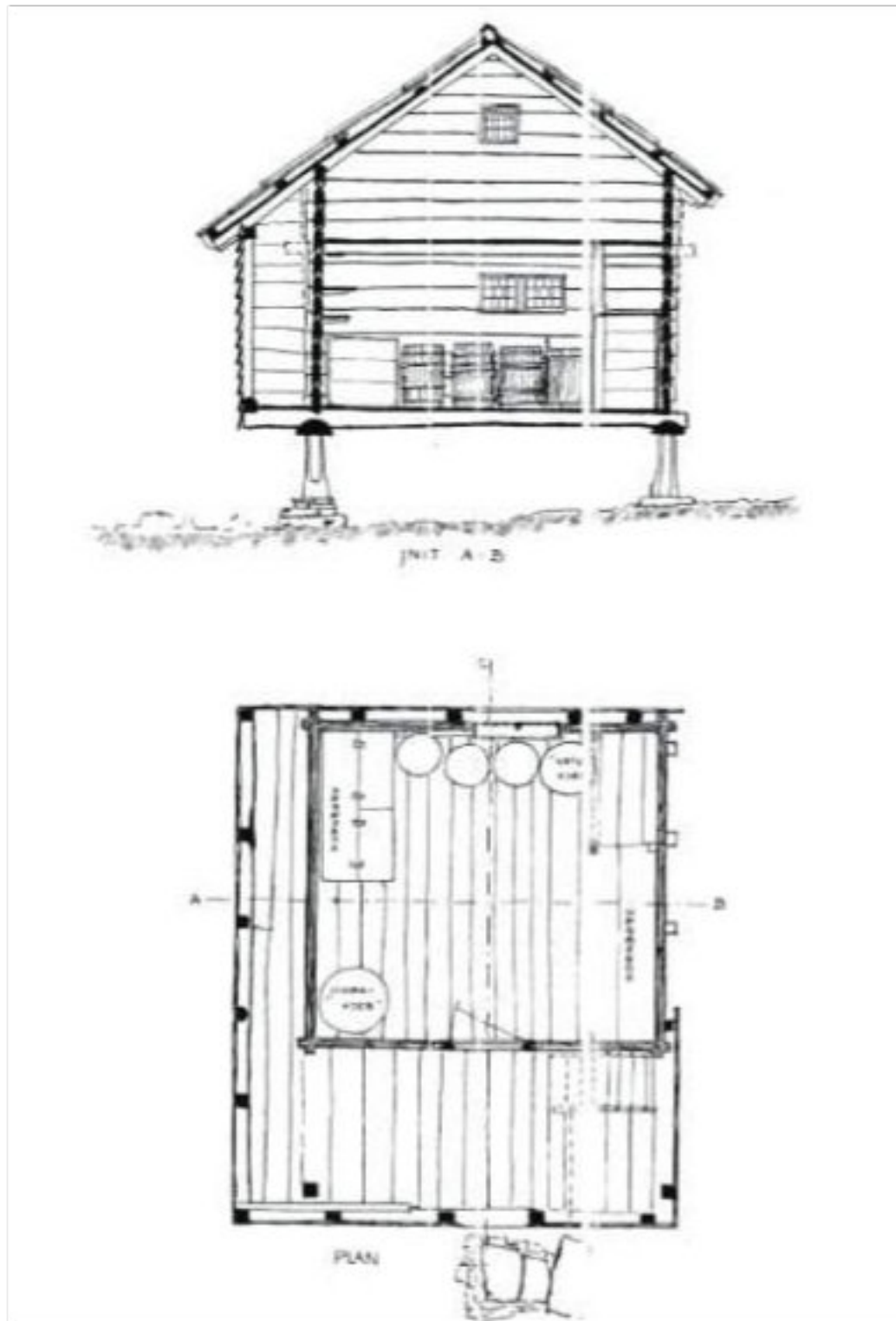


ERARSLAN, ALEV. 'AN EXAMPLE OF TRADITIONAL TIMBER BUILDING TECHNIQUES FROM ANATOLIA. GRANARY STRUCTURES IN THE REGION OF THE EASTERN BLACK SEA, TURKEY; SERENDER'. INTERNATIONAL WOOD PRODUCTS JOURNAL 12, NO. 1 (2 JANUARY 2021): 58–70. [HTTPS://DOI.ORG/10.1080/20426445.2020.1805688](https://doi.org/10.1080/20426445.2020.1805688).

STORE / wheat COLLECT

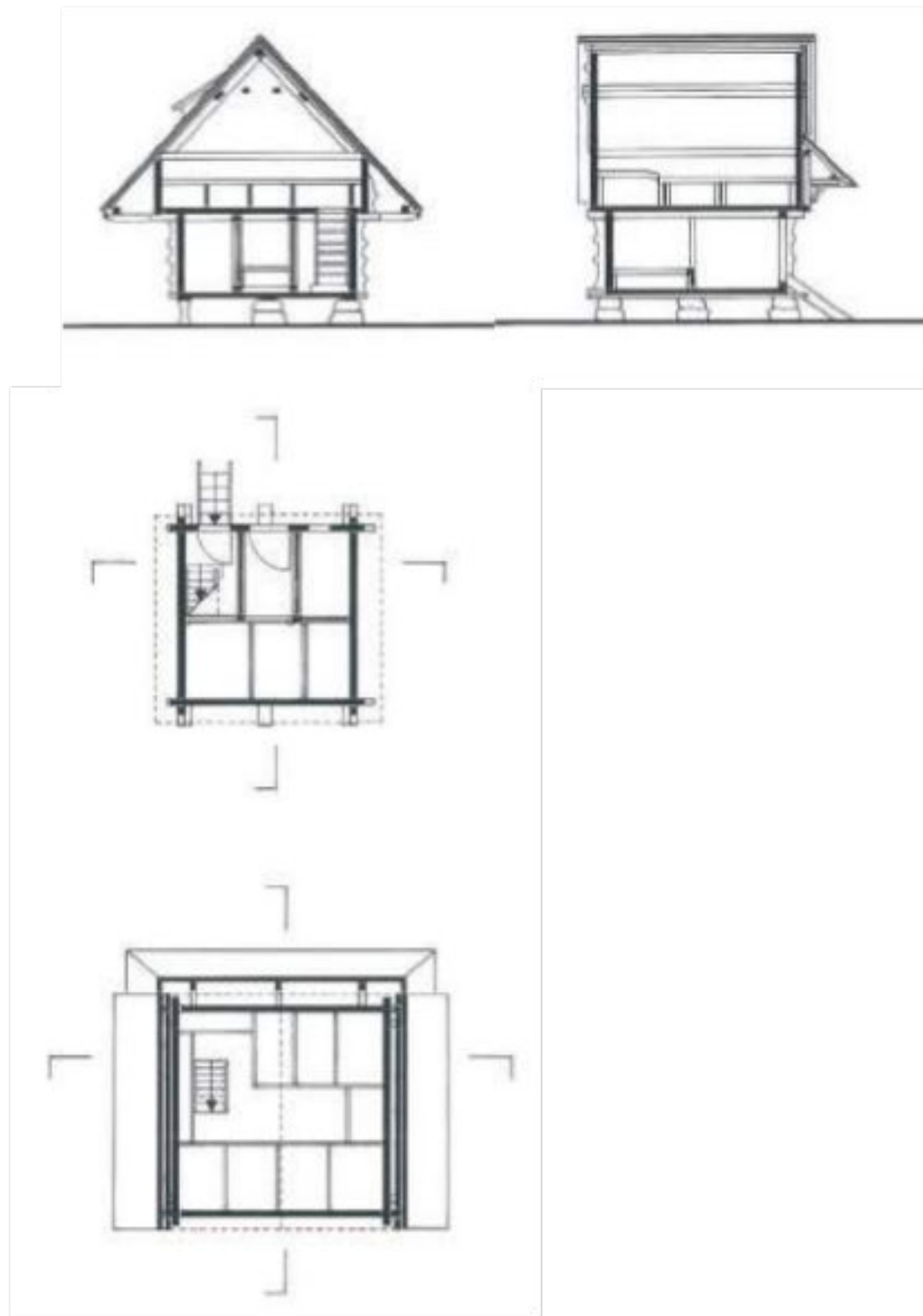


STORE / wheat COLLECT



"STABBUR" - NORWEGIAN GRANARY, NORSK FOLKEMUSEUM. « STABBUR
FRA NES, MUNDHEIM ». [HTTPS://DIGITALTMUSEUM.NO/011053635136/](https://digitaltmuseum.no/011053635136/)
STABBUR-FRA-NES-MUNDHEIM.

STORE / wheat COLLECT



GRANARY, SOTTENS, GLAUSER, DANIEL, DU GROS-DE-VAUD À LA BROYE.
LES MAISONS RURALES DU CANTON DE VAUD TOME 4. BÂLE: SOCIÉTÉ
SUISSE DES TRADITIONS POPULAIRES, 2003.



Glauser, Daniel, Du Gros-de-Vaud à la Broye. Les maisons rurales du canton de Vaud tome 4. Bâle: Société suisse des traditions populaires, 2003.

STORE / wheat COLLECT

Even Adam Smith recognized the social forces involved in the grain trade. Why has the state, throughout the ages, thought it appropriate to intervene in the control of grain wherever it holds sway? Why has it not left the feeding of its armies and its towns to the grain merchants? The reply varies according to the society or historical period under consideration, but one point remains unchanged: grain is not a commodity like all the others. It can be bought and sold, object of speculation, a means of making profit, like any other commodity. With this difference: people have to eat every day, and the harvest is only once, or twice, or at the absolute maximum, three times a year. The volume of the harvest is variable: good and bad years follow each other without any foreseeable order. If the town, the seat of government, cannot find all its grain resources in its own hinterland and has to rely heavily on supplies from far away, other causes of uncertainty arise. Thus, the need to eat every day involves definite needs, which are met by unstable resources.

The fear of going without the commodities necessary for living is proportionate to the income level of each family, the nature of such income, the family's stability and its economic reserves. For the poor, whose resources are uncertain and whose reserves are nil, this fear tends to become a daily anguish. This anguish benefits those who appear to be the nearest and most easily identifiable controllers of the shortages: the grain traders. The latter, unlike the officials who controlled the sale of all other commodities in Athens, were subject to the death sentence for serious faults in the exercise of their office. What was pardonable for metals, textiles and even oil was not so for wheat

[...]

All grain-consuming civilizations have left written evidence of intervention by the state (if there was one) in the grain trade, at least during a serious shortage which, in the towns, threatened the power of the state itself. The individual anguish of urban consumers quickly fans the flames of revolt.

[...]

Modern economists interested in grain prices in the less industrialized countries and refusing to acknowledge that these prices have anything to do with power relationships, preach private enterprise and laissez-faire. They persist in trying to prove that the grain traders are not making excessive profits, and are preferable to incompetent, nonmotivated and probably corrupt officials. Supposing that the operations of all the middlemen in the grain trade, of the credit and usury systems and the landowner relationships were absolutely clear to an investigator gifted with persuasion and second sight; supposing that traditional economic reasoning showed, with the aid of these facts, that, on the whole, everybody's profits were normal and that, as Adam Smith wrote, "freedom of the grain trade is the best protection against famine"; it would still be difficult to convince those suffering from hunger and famine of the "normal" character of the grain-trading operations of the businessmen, big or small. This "normality" is perceived in the abstract, on the assumption that grain is a commodity like any other, whereas in fact the life or death of the weak depend upon it.

SPITZ PIERRE, 'THE PUBLIC GRANARY: AN HISTORICAL BASIS FOR STATE INTERVENTION.'
CERES : THE FAO REVIEW. [HTTPS://WWW.NZDL.ORG/CGI-BIN/LIBRARY?E=D-00000-00---OFF-0CDL-00-0---0-10-0---0---0DIRECT-10---4-----0-1L-11-EN-50---20-ABOUT---00-0-1-00-0-4---0-0-11-10-OUTFZZ-8-10&CL=CL1.37&D=HASHF2842D99C1D10F8A9AE536.4>=1](https://www.nzdl.org/cgi-bin/library?E=D-00000-00---OFF-0CDL-00-0---0-10-0---0---0DIRECT-10---4-----0-1L-11-EN-50---20-ABOUT---00-0-1-00-0-4---0-0-11-10-OUTFZZ-8-10&CL=CL1.37&D=HASHF2842D99C1D10F8A9AE536.4>=1).

STORE / wheat COLLECT

[...]

In his book *Legislation et le commerce des grains* published in 1775, Necker, future minister of Louis XVI of France, wrote:

"The Landowner sees wheat merely as the fruit of his labours and the product of the land belonging to him; he wants to treat it like any other income. (...) The Trader sees nothing more in this commodity than an item that is bought and sold; he wants to be able to acquire it and resell it as he pleases. The People (...) think of wheat as an element necessary for their survival. They are in the world and they want to live there. They want to be able to ensure their subsistence by their own work. (...) The Landlord invokes the rights of property; the Merchant, those of freedom; the People, those of humanity. (...) Within this continual clash of interests, principles and opinions, the Legislator must seek out the truth."

[...]

However, the measures taken by the state must not disturb its social basis. According to the nature of that basis, the state has, theoretically, the choice of different types and degrees of agrarian reform and intervention in the food distribution system. The political situation considerably reduces the field of possibilities. It may however be observed that it is often less costly politically for the state to denounce the excesses of the grain traders, who are, together with the moneylenders, the protagonists of private enterprise in the poor countries, and possibly to take a series of measures limiting their power, than to allow a fundamental agrarian reform to be organized. Particularly since trade can be more easily condemned on the basis of moral or religious principles than on the basis of ownership.

[...]

Economists who refuse to see any social or political factors in the price of grain forget, or pretend to forget, that Adam Smith wrote that any new set of rules proposed by traders should be examined "with extremely suspicious interest," since it emanates from "a type of men (...) who usually intend to cheat and even oppress the people and who have, consequently, on many occasions both cheated and oppressed them. To condemn state intervention in the control of trade in subsistence commodities is to ignore the contradictory character of the social forces on which the state relies for support, and is, despite declaration of intent, to join the side of the powerful."

SPITZ PIERRE, 'THE PUBLIC GRANARY: AN HISTORICAL BASIS FOR STATE INTERVENTION,'
CERES : THE FAO REVIEW. [HTTPS://WWW.NZDL.ORG/CGI-BIN/LIBRARY?E=D-00000-00---OFF-0CDL-00-0---0-10-0-0---0DIRECT-10---4-----0-1L-11-EN-50---20-ABOUT---00-0-1-00-0-4---0-0-11-10-0UTFZZ-8-10&CL=CL1.37&D=HASHF2842D99C1D10F8A9AE536.4>=1](https://www.nzdl.org/cgi-bin/library?E=D-00000-00---OFF-0CDL-00-0---0-10-0-0---0DIRECT-10---4-----0-1L-11-EN-50---20-ABOUT---00-0-1-00-0-4---0-0-11-10-0UTFZZ-8-10&CL=CL1.37&D=HASHF2842D99C1D10F8A9AE536.4>=1).

STORE / wheat COLLECT

It has become obvious, in fact, that public granaries are more than just a storage technique. They occupy a central position in a security regime that aimed at governing public discourse, emotions and discipline.

[...]

While an institution such as the granary might have failed to provide safety from hunger, it was certainly instrumental in encouraging a feeling of security that – far from being a mere “security theatre” (B. Schneier) – could itself become an effective deterrent.

[...]

The creation of a granary constituted a symbolic act that visualised political claims and secured food policy against competing institutions. It constituted a policy by marking its patrons as security conveyors and its customers as security takers, while simultaneously illustrating social distinction via the constant performance of inclusion or exclusion.

COLLET, DOMINIK, 2010. STORAGE AND STARVATION: PUBLIC GRANARIES AS AGENTS OF FOOD SECURITY IN EARLY MODERN EUROPE. HISTORICAL SOCIAL RESEARCH VOL. 35. 2010. VOL. NO. 4, P. VOLUMES PER YEAR: 1.

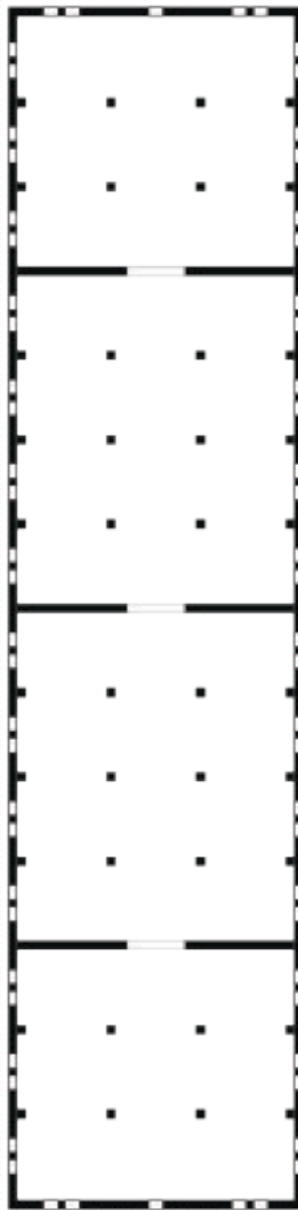


a Das Zoll-Amt und Zoller-Niederlag, insgemein die
große Mauth genannt, in Nürnberg
h. d. d. den belgischen schiedliche Mauthhallen

a Le bureau de douane, vulgairement la grande
Balançe de Nuremberg
h. d. d. den belgischen schiedliche Mauthhallen

NÜRNBERG. Ansicht des 1498 bis 1502 von Hans Beheim erbauten Kornhauses (Mauthalle) auf dem heutigen Hallplatz. Online. Available from: <https://www.zvab.com/kunst-grafik-poster/N%C3%9CRNBERG-Zoll-Amt-G%C3%BCter-Niederlag-insgemein-gro%C3%9Fe/15108964212/bd>

STORE / wheat COLLECT



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MAUTHALLE, BUILT AS PUBLIC GRANARY, NUREMBERG, 1502, HANS BEHAIM THE ELDER
 REDRAWN FROM : COLLET, DOMINIK, 2010. STORAGE AND STARVATION: PUBLIC GRANARIES AS AGENTS OF FOOD SECURITY IN EARLY MODERN EUROPE. HISTORICAL SOCIAL RESEARCH VOL. 35. 2010. VOL. NO. 4, P. VOLUMES PER YEAR: 1.



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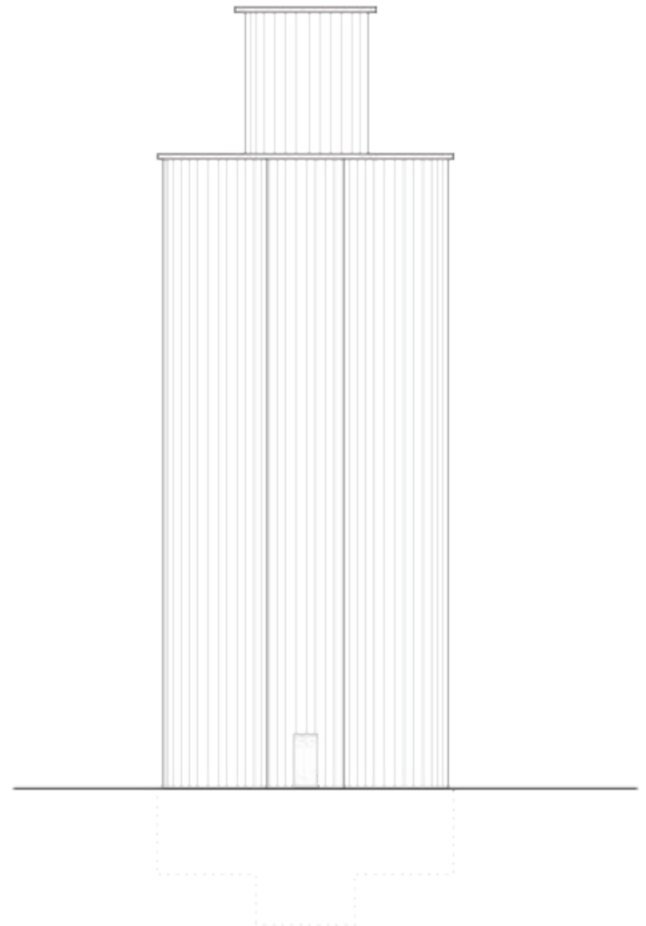
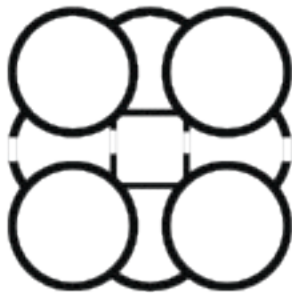
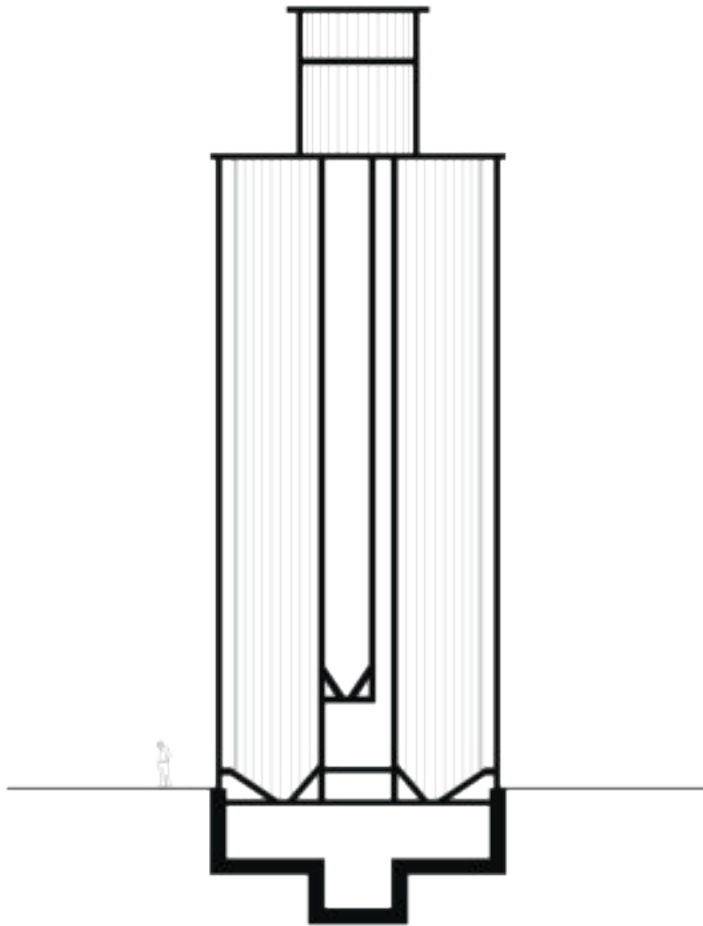
Verlag von George Gropius in Berlin.

gegründet von

DAS GROSSE MAGAZIN.

Das grosse Magazin, Berlin Magazine, Steel engraving, Georges Gropius, 1833

STORE / wheat COLLECT



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RURAL CONCRETE ELEVATOR, GREAT PLAINS, 1915
REDRAWN FROM: MAHAR-KEPLINGER, LISA. GRAIN ELEVATORS. NEW
YORK: PRINCETON ARCHITECTURAL PRESS, 1993.

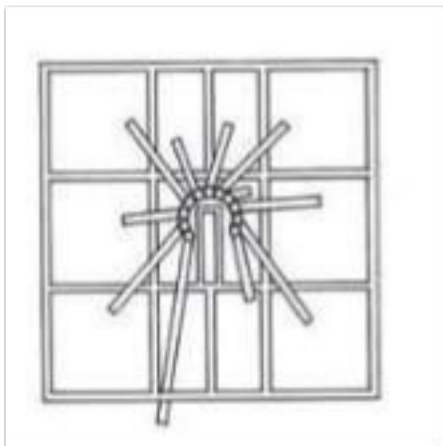
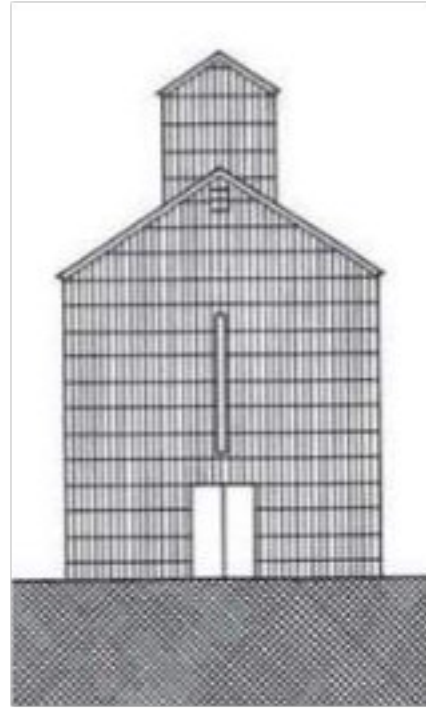
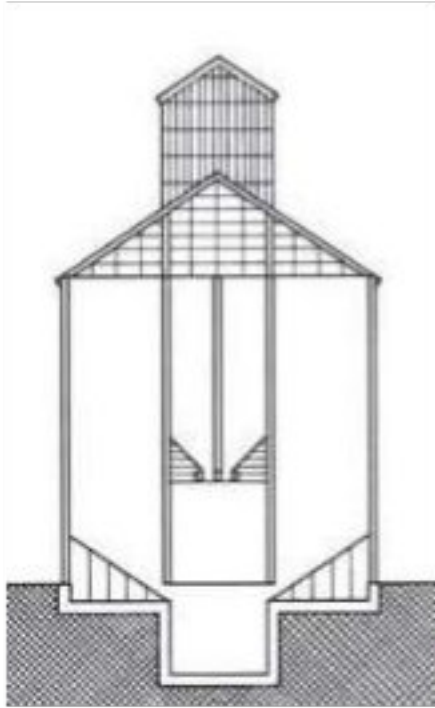


Fig. 1. 1929.

TROIS RAPPELS
A MESSIEURS LES ARCHITECTES
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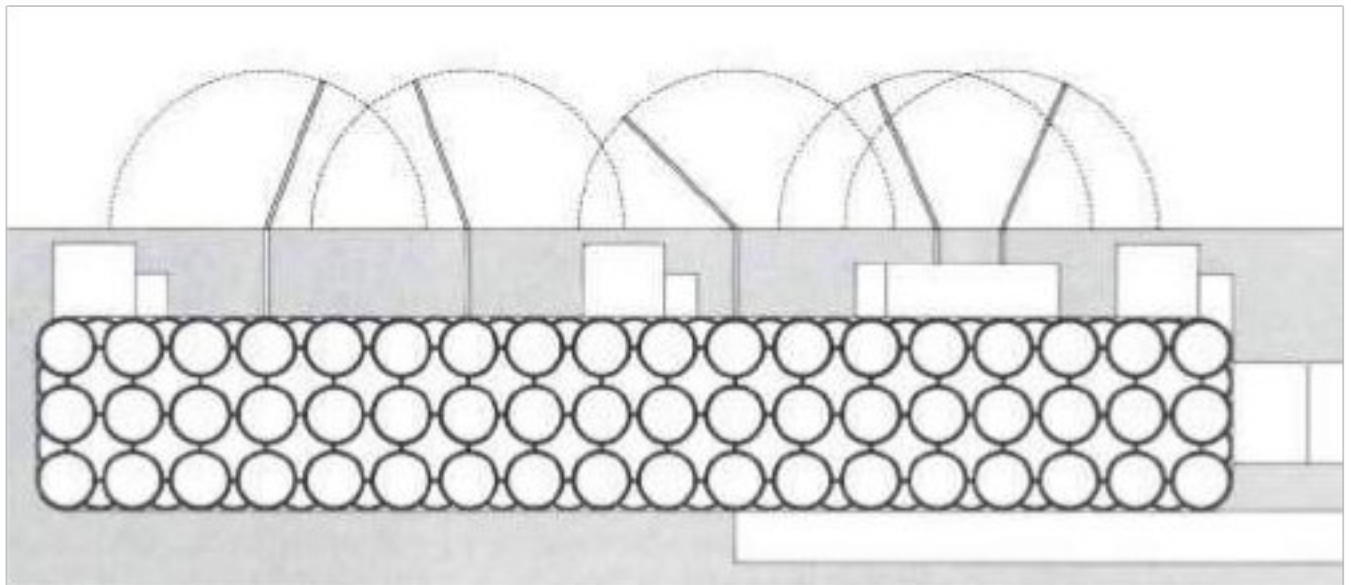
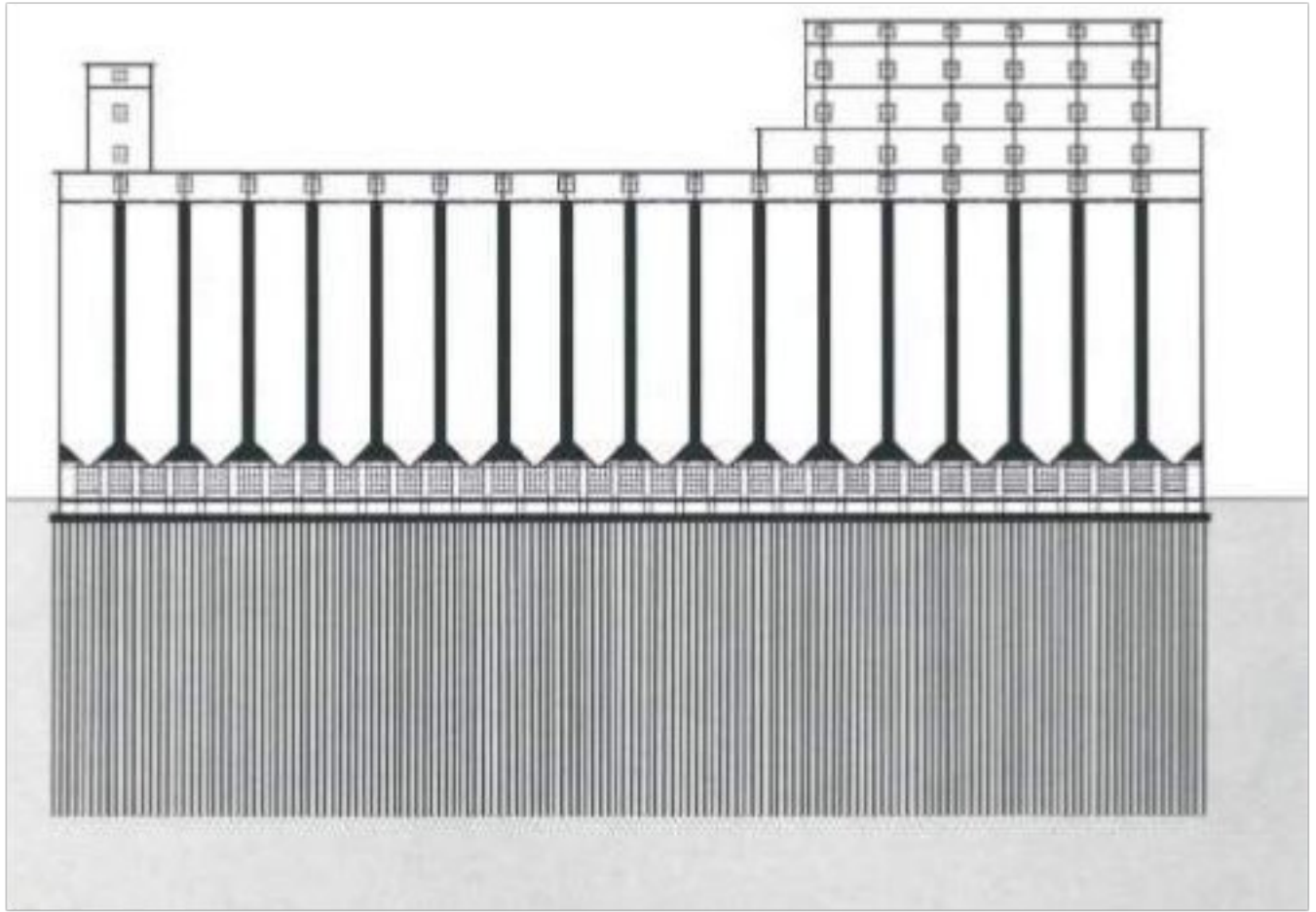
Le Corbusier. Vers une architecture. Ed. 1977, Revue. Collection de « l'esprit nouveau ». Paris: Arthaud, 1977.

STORE / wheat COLLECT



URBAN CONCRETE ELEVATOR, NEW YORK, 1915
MAHAR-KEPLINGER, LISA. GRAIN ELEVATORS. NEW YORK: PRINCETON
ARCHITECTURAL PRESS, 1993.

STORE / wheat COLLECT



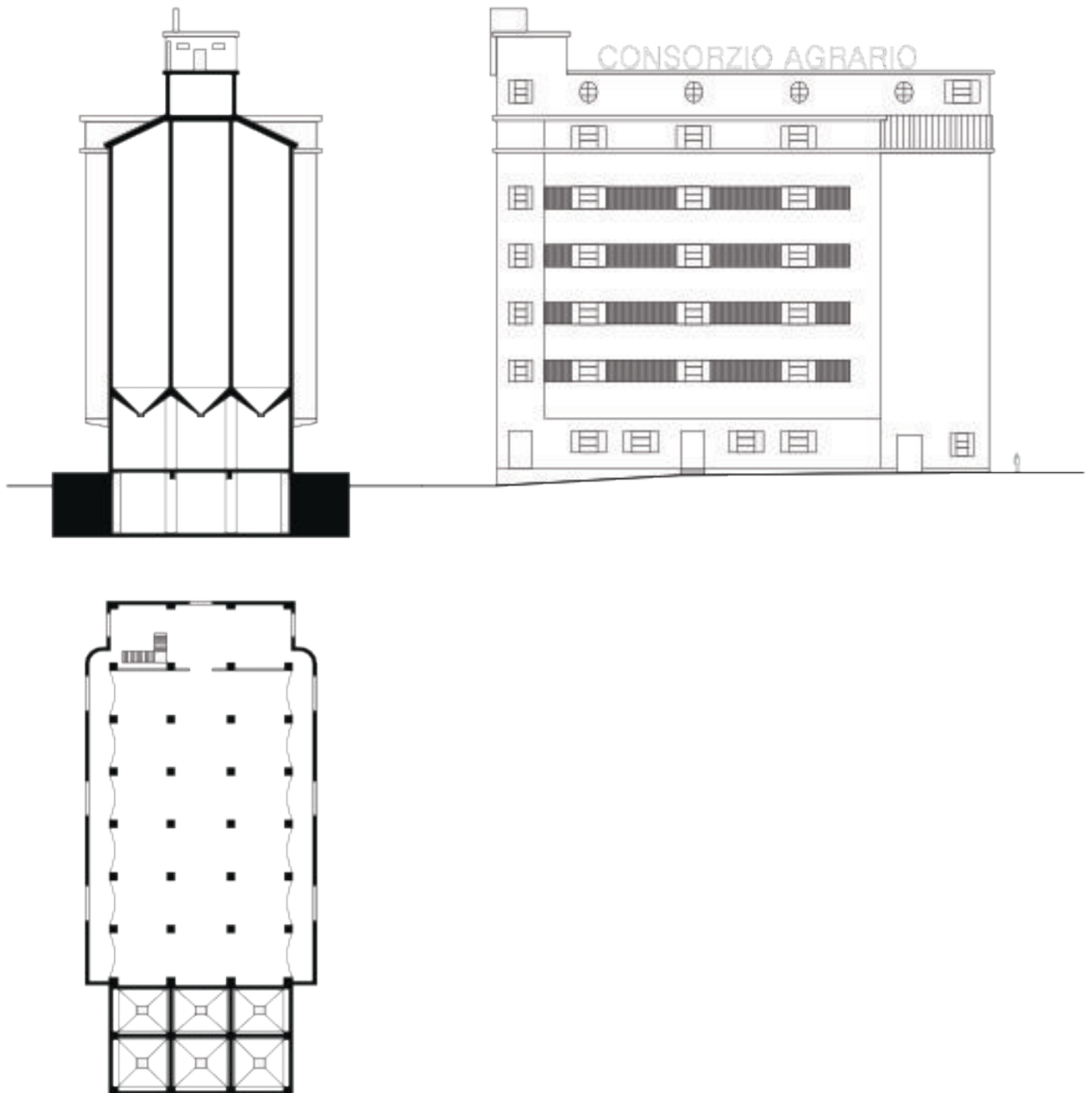
URBAN CONCRETE ELEVATOR, NEW YORK, 1915, MAHAR-KEPLINGER, LISA.
GRAIN ELEVATORS. NEW YORK: PRINCETON ARCHITECTURAL PRESS, 1993.

STORE / wheat COLLECT

In the 1930s, Mussolini's regime (1922–1943) embarked on a large building campaign to construct granaries across the Italian peninsula and in Italian territories abroad. This building mania was a direct result of Italy's invasion of Ethiopia in 1935: following the imposition of sanctions by the League of Nations, the regime ordered the obligatory consignment of wheat by producers to public storage facilities to centrally manage a critical alimentary resource and publicize the government's efforts to insure national food security. In this way, fascist politics transformed the granary from banal industrial structure into symbolic architecture that conveyed self-sufficiency and embodied imperial ambitions. (...) Heavily mediated, the granary as mediator was a visual palliative, a structure that represented the culmination of the regime's arduous, decade-long battle for wheat.

LO, RUTH. « MEDIATOR/MEDIATED: GRANARIES AND THE POLITICS OF WHEAT IN FASCIST ITALY », 6 MAI 2019. [HTTPS://ARTHISTORY.COLUMBIA.EDU/EVENTS/COLLINSKAUFMANN-FORUM-ARCHITECTURE-AND-ITS-IMPERIAL-OBJECTIVES-RUTH-LO-MEDIATORMEDIATED](https://arthistory.columbia.edu/events/collinskaufmann-forum-architecture-and-its-imperial-objectives-ruth-lo-mediatormediated).

STORE / wheat COLLECT



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Top : Philippines, Pasig City, <https://www.integrisagroindustries.com/products/grain-silo>

Middle : Russia, Moscow, Cimbria Unigrain Rusia, <https://pradosilos.com/success-cases/cimbria-unigrain-rusia/>

Bottom : Saudi Arabia, Jizan, Thabat, <https://www.thabat.sa/JazanGrainSilosandAncillaryFacilities.aspx?cms=q8FmFJgiscL2fwlzON1%2BDuUbAahMX9Fs>

STORE / wheat COLLECT

Art. 1: The Confederation shall ensure that a reserve of approximately 100,000 tonnes of wheat is maintained in the country at all times (basic reserve).

If the international situation so requires, the Federal Council may increase the reserve in accordance with the provisions of Article 5 (supplementary reserve).

Art. 2: Half of the basic reserve is stored by the administration.

Art. 7: The reserves must be distributed in a judicious manner over the entire territory and housed in a technically satisfactory manner and under fair conditions. Stockpile holders are obliged to house, monitor and renew the stockpiles entrusted to them in a judicious manner.

Art. 10: The Federal Council shall set the purchase prices for domestic wheat each year, at the latest at the time of the main harvest and after hearing the parties concerned; [...].

Art. 34: The Confederation shall monitor the prices of bread flour and bread. [...]

Art. 36: The Confederation shall encourage efforts to provide consumers with bread of good physiological quality.

Art. 39: Trade in wheat shall be supervised by the Confederation.

The Berne Wheat Chamber : Founded in 1652, it managed forty granaries at the end of the Ancien Régime, both in the German-speaking part of the canton and in the Pays de Vaud.

'LOI FÉDÉRALE SUR L'APPROVISIONNEMENT DU PAYS EN BLÉ (LOI SUR LE BLÉ)
(DU 20 MARS 1959), FF 1959 I 513 - '. [HTTPS://WWW.FEDLEX.ADMIN.CH/ELI/
FGA/1959/1_526_513_188/FR](https://www.fedlex.admin.ch/eli/fga/1959/1_526_513_188/fr). ABROGÉE EN 2000

Art. 1 : La Confédération veille à ce qu'une réserve d'environ 100 000 tonnes de blé soit entretenue en tout temps dans le pays (réserve de base). Si la situation internationale l'exige, le Conseil fédéral peut augmenter la réserve, conformément aux dispositions de l'article 5 (réserve supplémentaire).

Art. 2 : La moitié de la réserve de base est stockée par l'administration.

Art. 7 : Les réserves doivent être réparties de façon judicieuse sur l'ensemble du territoire et logées d'une manière satisfaisante du point de vue technique et à des conditions équitables. Les détenteurs de stocks sont tenus de loger, surveiller et renouveler de façon judicieuse les réserves qui leur sont confiées.

Art 10. : Le Conseil fédéral fixe chaque année, au plus tard au moment de la récolte principale et après avoir entendu les intéressés, les prix d'achat du blé indigène; [...]

Art. 34 : La Confédération surveille les prix de la farine panifiable et du pain. [...]

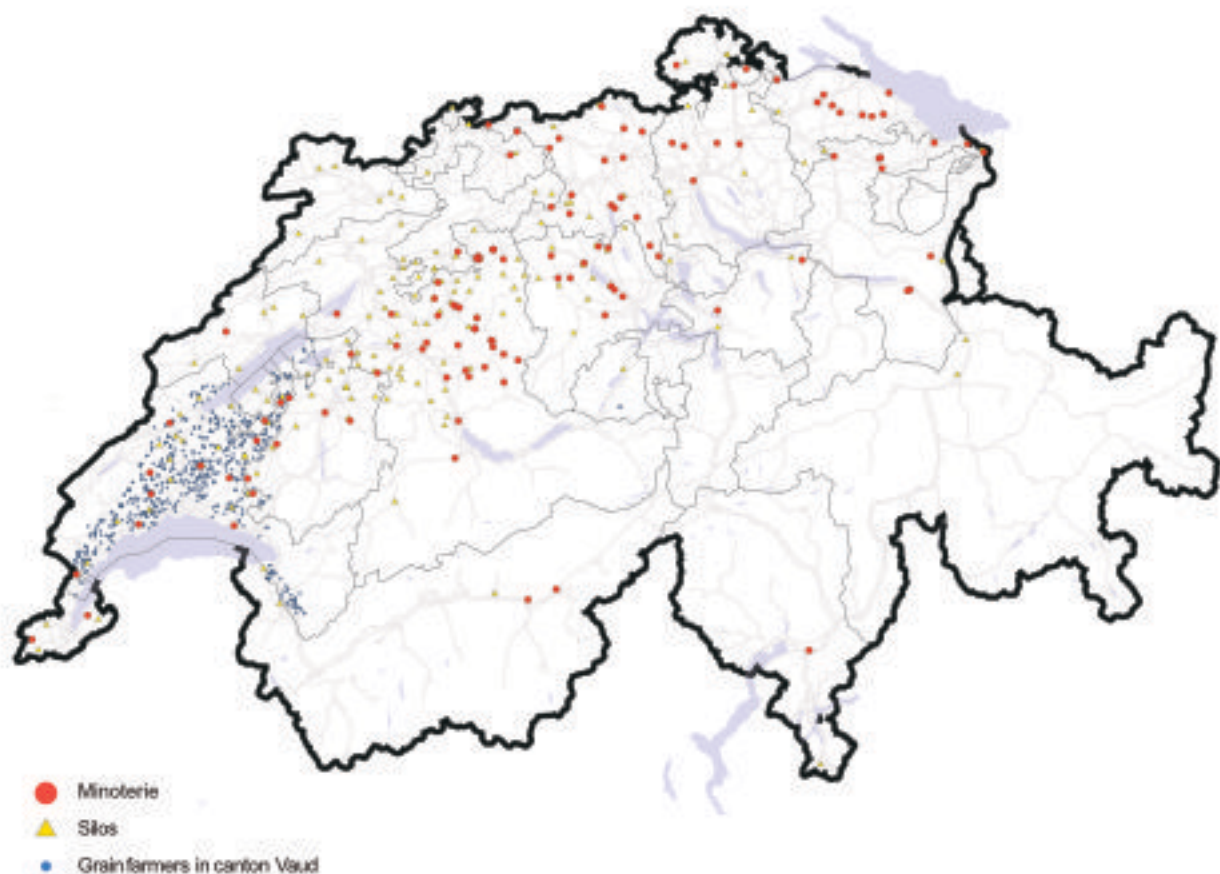
Art. 36 : La Confédération encourage les efforts visant à mettre à la disposition des consommateurs un pain qui soit, du point de vue physiologique, de bonne qualité.

Art. 39 : Le commerce du blé est surveillé par la Confédération.

La Chambre des blés de Berne :

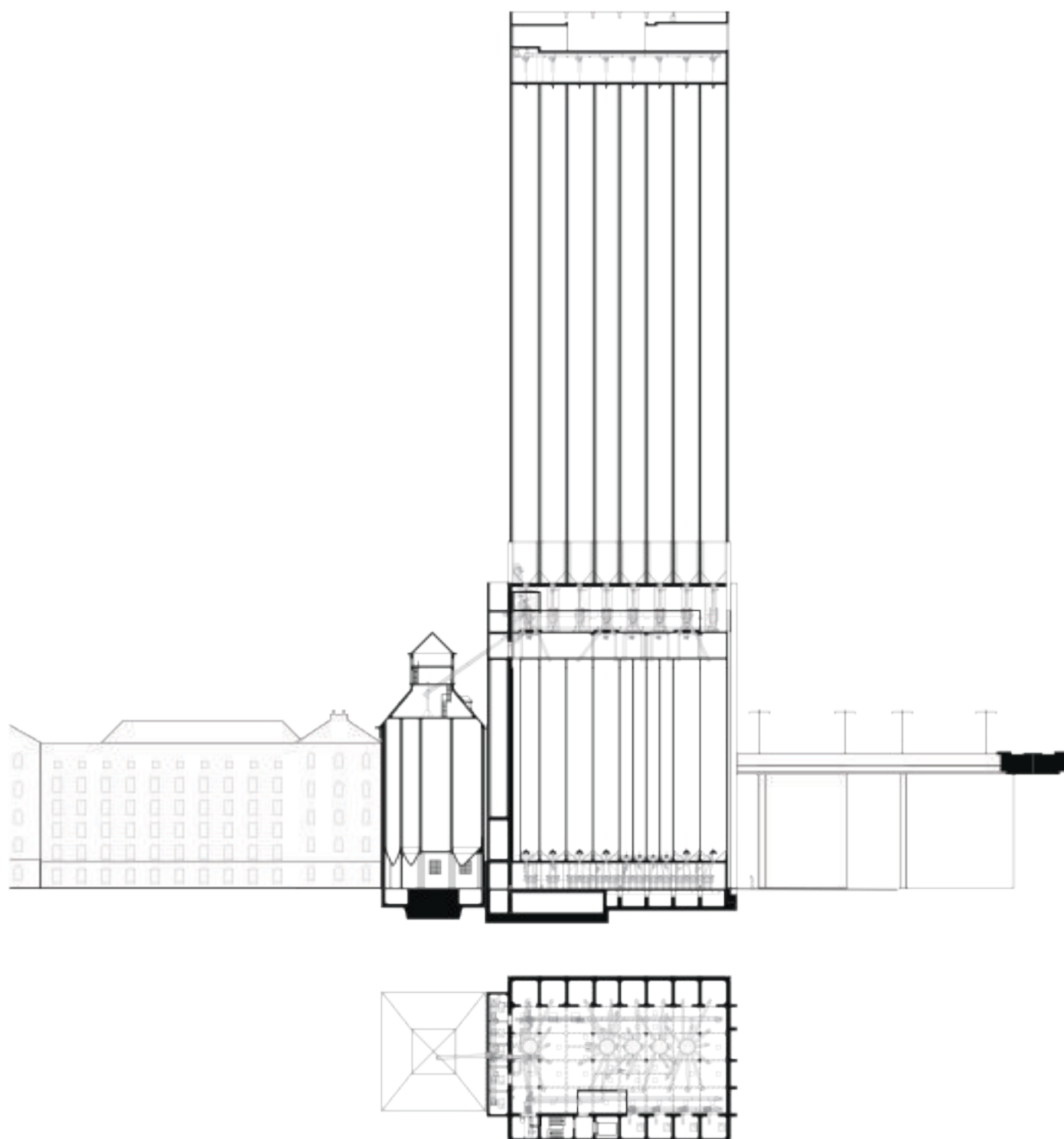
Fondée en 1652, elle gérât à la fin de l'Ancien Régime quarante greniers, tant dans la partie alémanique du canton que dans le Pays de Vaud.

STORE / wheat COLLECT



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STORE / wheat COLLECT



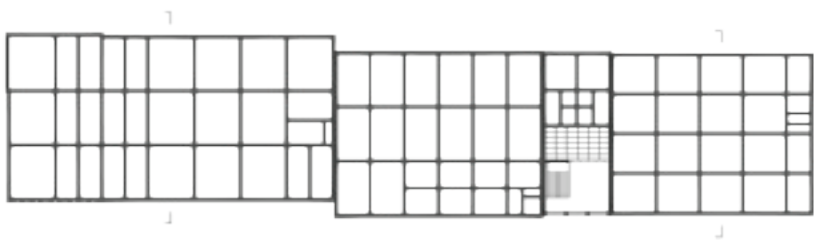
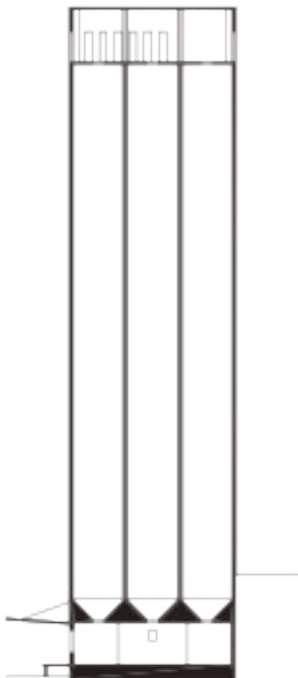
0 2 5 10m

SWISSMILL TOWER - ZURICH, REDRAWN FROM: HARDER HAAS PARTNER
ARCHITEKTEN. « KORNHAUS SWISSMILL ». [HTTPS://WWW.BATIDOC.CH/
PROJET/KORNHAUS-SWISSMILL/567291](https://www.batidoc.ch/projet/kornhaus-swissmill/567291).



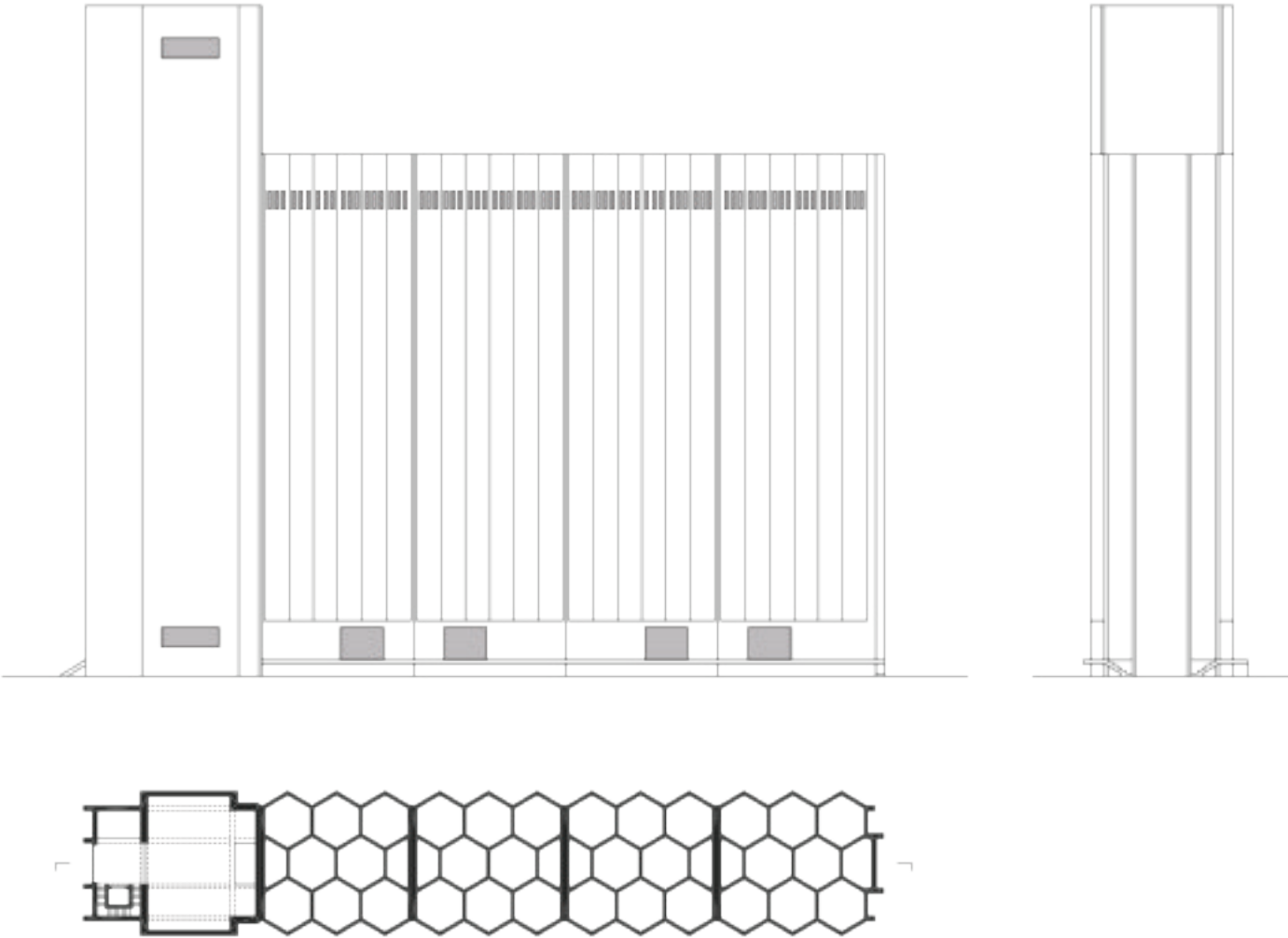
Harder Haas Partner Architekten. « Kornhaus Swissmill ». <https://www.batidoc.ch/projet/kornhaus-swissmill/567291>.

STORE / wheat COLLECT



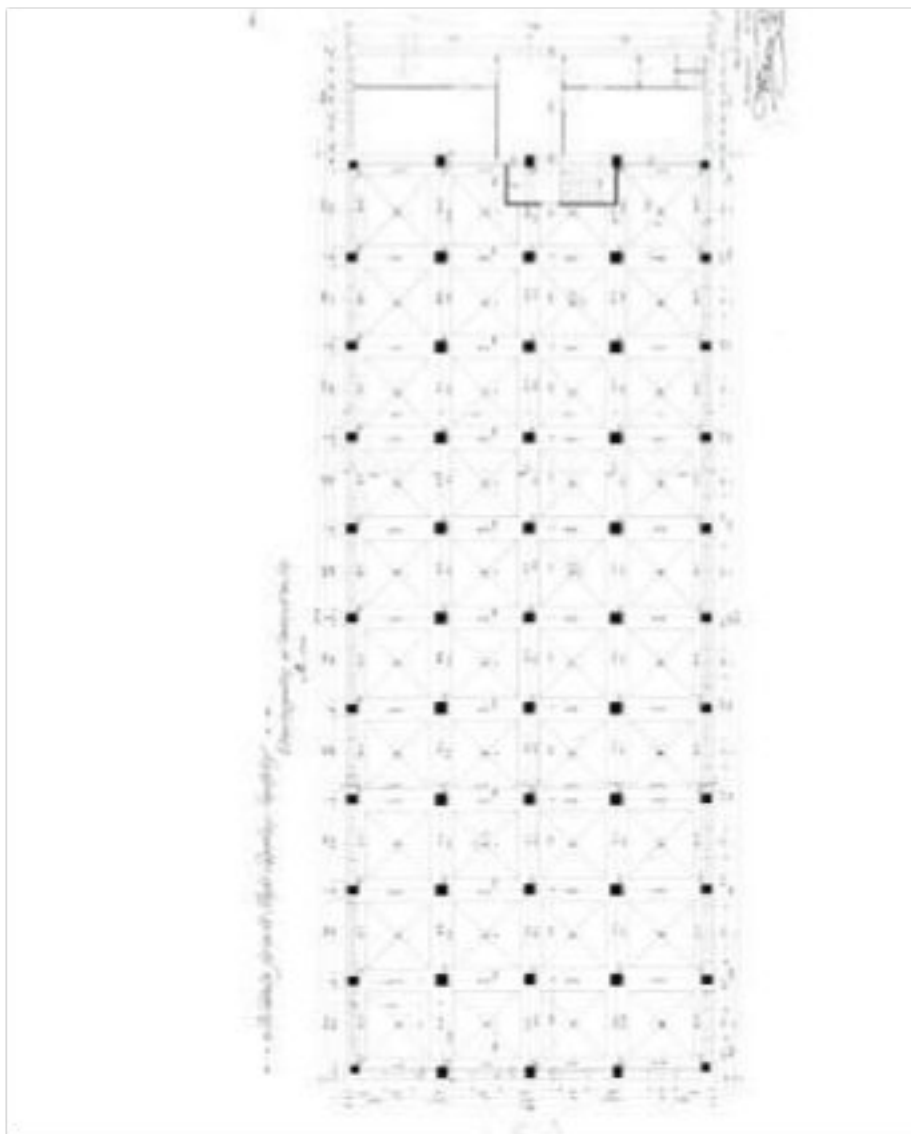
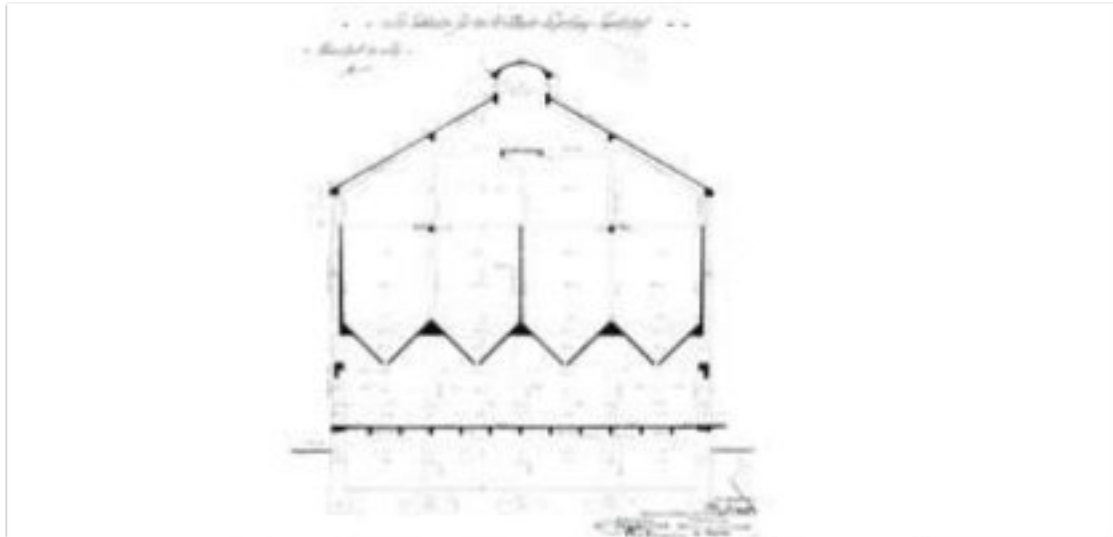
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STORE / wheat COLLECT



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STORE / wheat COLLECT



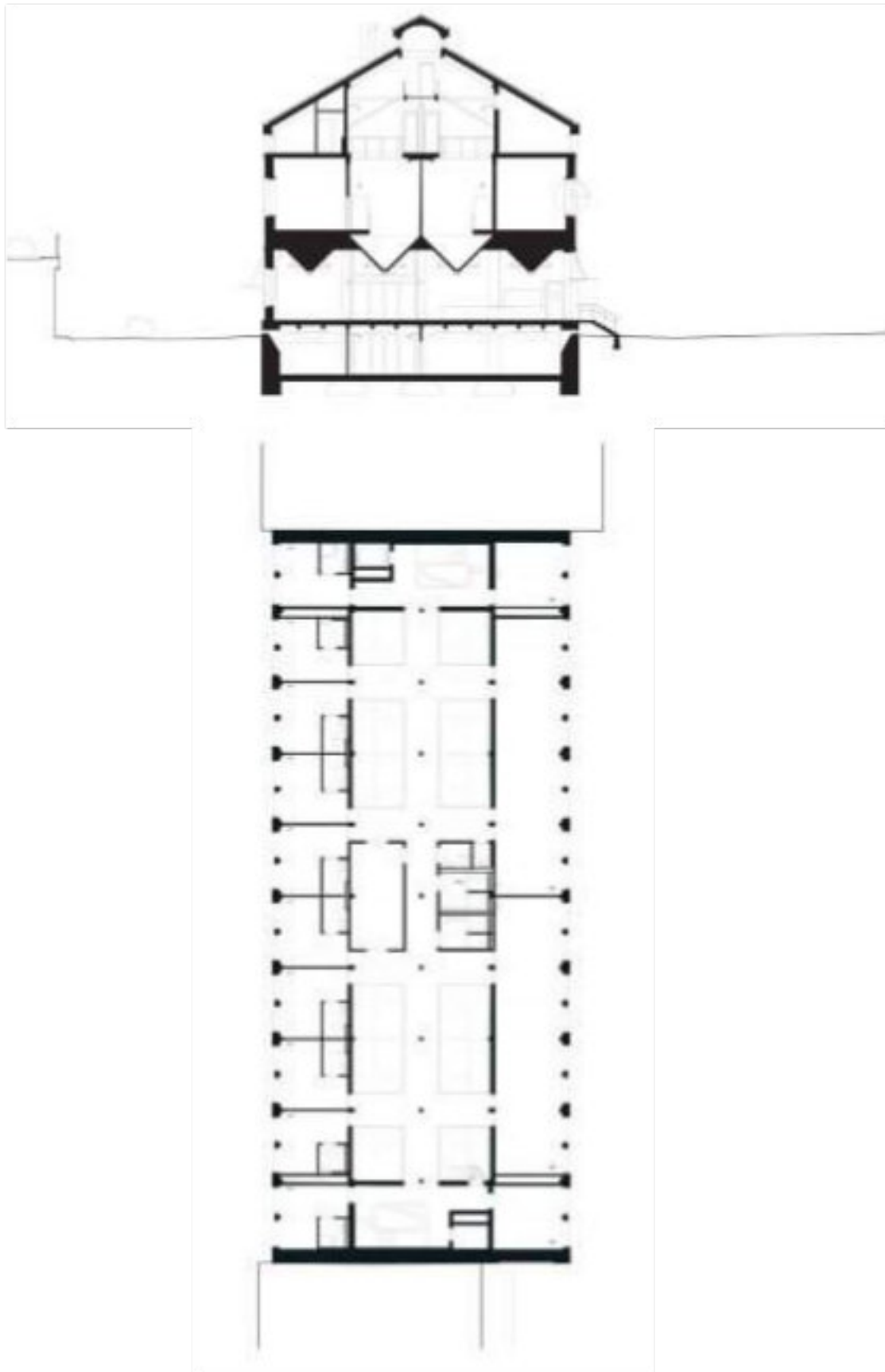
SILO ERLENNATT, BASEL, 1912
HARRY GUGGER STUDIO. SILO ERLENNATT. ONLINE. AVAILABLE FROM:
[HTTPS://WWW.HGUGGER.CH](https://www.hgugger.ch)



Silo Erlenmatt, Basel, 1912

HARRY GUGGER STUDIO. Silo Erlenmatt. Online. Available from: <https://www.hgugger.ch>

STORE / wheat COLLECT

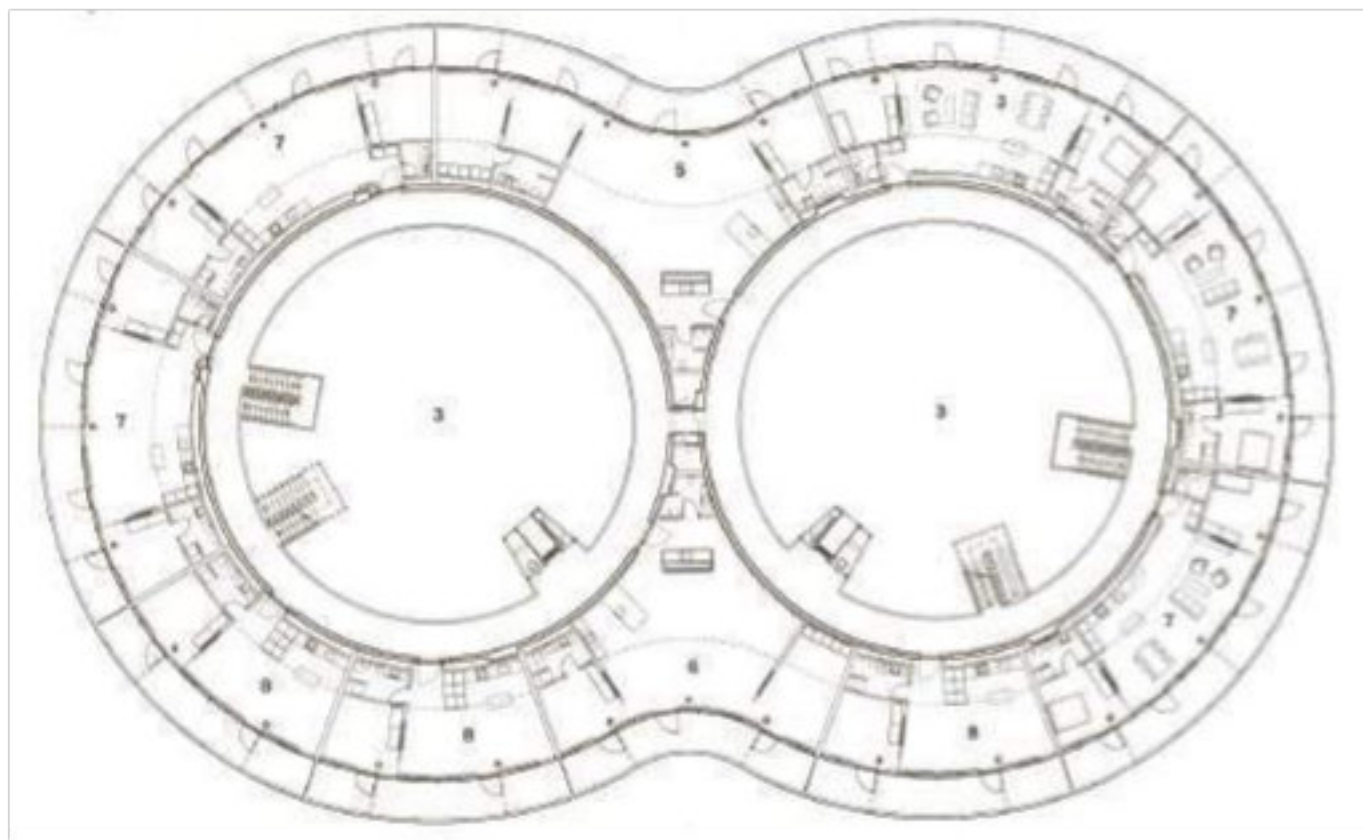


SILO ERLERMATT, BASEL, 2016-2020, HARRY GUGGER STUDIO
HARRY GUGGER STUDIO. SILO ERLERMATT. ONLINE. AVAILABLE FROM:
[HTTPS://WWW.HGUGGER.CH](https://www.hgugger.ch)



Silo Erlenmatt, Basel, 2016-2020, Harry Gugger Studio
HARRY GUGGER STUDIO. Silo Erlenmatt. Online. Available from: <https://www.hgugger.ch>

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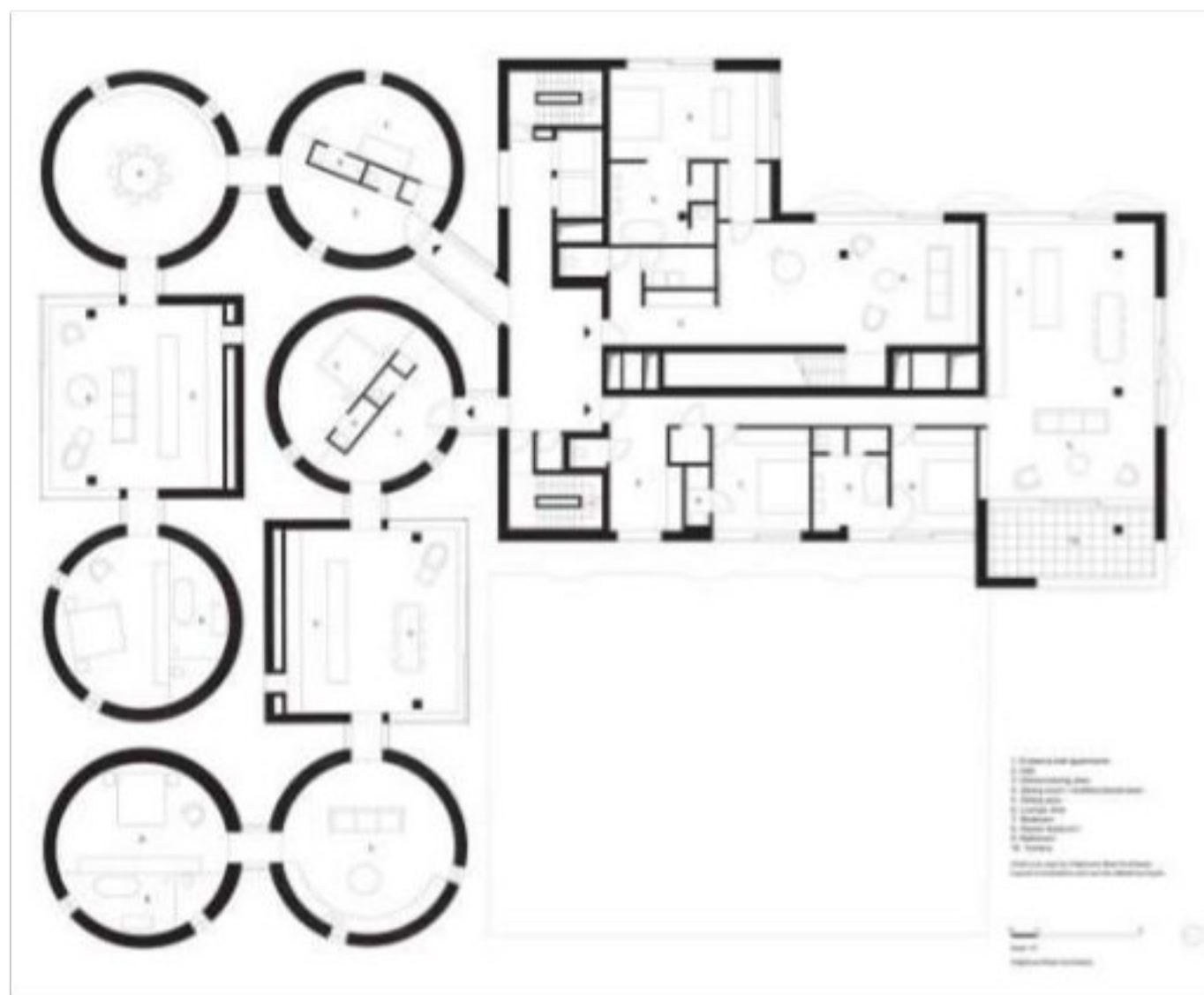
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Silos conversion, residence apartments, MVRDV, 2005, Islands Brygge, Copenhagen, Denmark
 MVRDV - Frøsilø. Online. Available from: <https://www.mvrdv.com/projects/143/fr%C3%B8silø>

STORE / wheat COLLECT



SILOS CONVERTED TO APARTMENTS, STÉPHANE BEEL ARCHITECTS, 2015,
WIJNEGEM, BELGIUM
'KANAAL' IN WIJNEGEM / STÉPHANE BEEL ARCHITECTS, 2017. ARCHDAILY.
ONLINE. AVAILABLE FROM: [HTTPS://WWW.ARCHDAILY.COM/885884/
KANAAL-IN-WIJNEGEM-STEPHANE-BEEL-ARCHITECTS](https://www.archdaily.com/885884/kanaal-in-wijnegem-stephane-beel-architects)

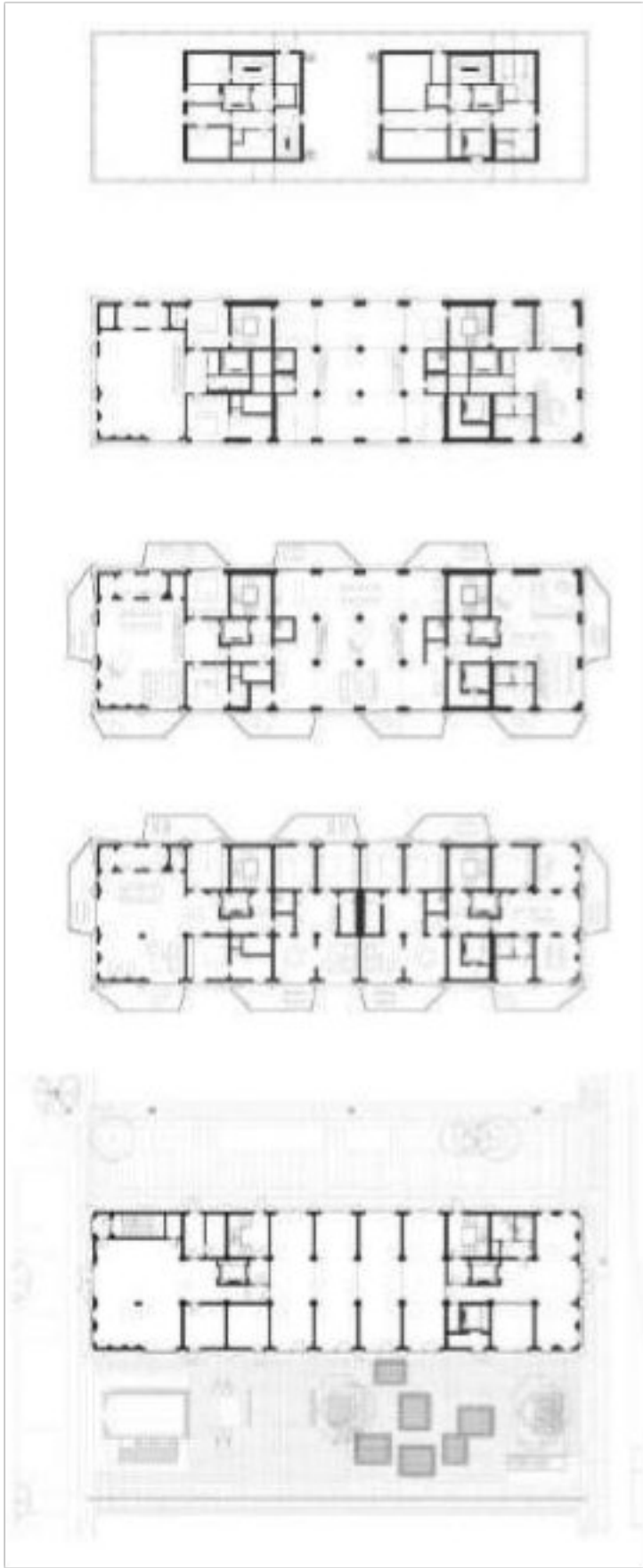


Silos converted to apartments, Stéphane Beel Architects, 2015, Wijnegem, Belgium

'Kanaal' in Wijnegem / Stéphane Beel Architects, 2017. ArchDaily. Online.

Available from: <https://www.archdaily.com/885884/kanaal-in-wijnegem-stephane-beel-architects>

STORE / wheat COLLECT



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Former grain silo transformed into residential complex and public facilities, Cobe, 2017, Copenhagen, Denmark

Cobe - The Silo. Online. Available from: <https://www.cobe.dk/projects/the-silo>

STORE / wheat COLLECT

Nowadays, wheat is an important source in our daily diet, as well as in the global food trade and agriculture in Switzerland. 50% of the Swiss grain's agricultural land is dedicated to wheat. This value is embedded in both human history since the establishment of settled civilizations and in popular culture. As witnessed in history, the lack and inaccessibility of wheat was the cause of revolutionary movements. Then, wheat is power.

How granaries' typologies reflect the structures around the power of wheat? Our investigation puts forward an analysis of pragmatic granaries without any limits in terms of geography or time.

In Jordan, the domestication of plants produced an architectural research for resilient structures to protect and secure these natural supplies. The seemingly simple act of storing wheat, more than a preservation tactic, is a profound demonstration of human dominion over nature.

In certain civilizations in the African continent, the granary's dimensions, positions and its conditions of accessibility reflect the hierarchical organization within a family. The headman's structure is placed in the center of the household and locked to women, whose ones are in their rooms. The central position of the storing structure in the domestic space shows the superiority of the pater familias over women, whose proximity to the grain was even believed to be dangerous for its conservation.

The prohibited access to men's granaries is also a rule in a community in Burkina Faso, where women could not be aware of the storage quantities. Granaries were characterized with colors and decorations as a religious request for protection of supplies. Their construction, form and position were a way for its owner to show his social status among the other members of the community.

Jumping over centuries and geographical borders, this social meaning is recognised in the Galician granaries, known as horreos. Since the 18th century, each farmer needed to have an horreo. Half of them transcended its utilitarian function and represented the farmer's work and its wealth through the addition of elements influenced by Catholicism aesthetics. The decorated horreos are a testament to how deeply the religion and cultural traditions are embedded in grain storage.

Geord Peschken identified a compressed image of the ventilation slits of the Spanish horreos in the alternation of triglyphs and metopes in the Doric frieze of a Greek temple. He argues that in Ancient Greece, the quest for a unifying architectural language in the newly established democratic society found inspiration in ancient granaries. Peschken's explanation testifies to the unifying social function of storage structures and their central significance in cult within tribal economies.

STORE / wheat COLLECT

Across these examples, wheat storage facilities were social and cultural promoters of their owners, but still private. The grain conservation passed progressively from dispersive to centralized along with the parallelism between the control over the wheat storage and over the population. After consecutive food shortages in the 18th-century in Prussia, state granaries were established to prevent famine and regulate prices. The solid appearance of these storage facilities in the public space displayed the abundance of grain to reassure the population.

The same reassuring and controlling intentions were shown through the public storage structures in Italy during the fascist regime. By mandating wheat possession and obligating storage in public facilities, Mussolini aimed to make Italy self-sufficient and to project it as a major European power. The construction and the aesthetics of granaries were conceived as a propaganda tool to publicize both the government's efforts to insure national food security and the power of his nation over international wheat trade.

Similar high structures were developed in the American agricultural scene in the 20th century. Driven by the surplus grain harvested in the great plains, it became a necessity for cities to control storage facilities. The shift from subsistence to a market economy prompted a shift from bag to in-bulk storage. Aiming for a safe, rapid and low-cost solution to store wheat in large quantities, cities engaged in an experimental construction research. The monumental scale and the increasing number of these diversified structures lead to the recognition of an architectural typology, studied by Le Corbusier. The typology of the silo and its in-bulk storage technique is nowadays internationally recognized. The worldwide tallest operating grain elevator was built in Zurich in 2016 and is owned by Coop. Given its central location in the city, its important expression in the urban landscape and the reductive information about it, it can be perceived as a controversial project and questions can be raised. Why was the silo designed to be so high? What are the intentions that drove the project ? Are they imposed by technical requirements for a correct conservation or expressions of a structure of power around wheat storing ?

How granaries express symbolic values as well as technical requirements ?

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