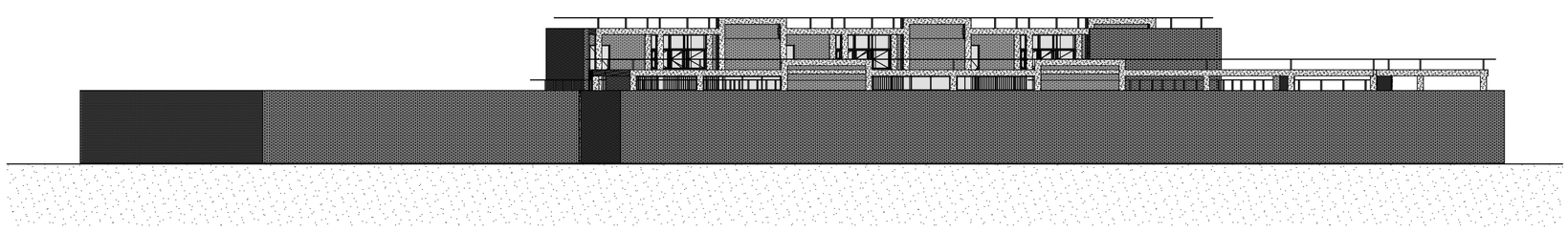

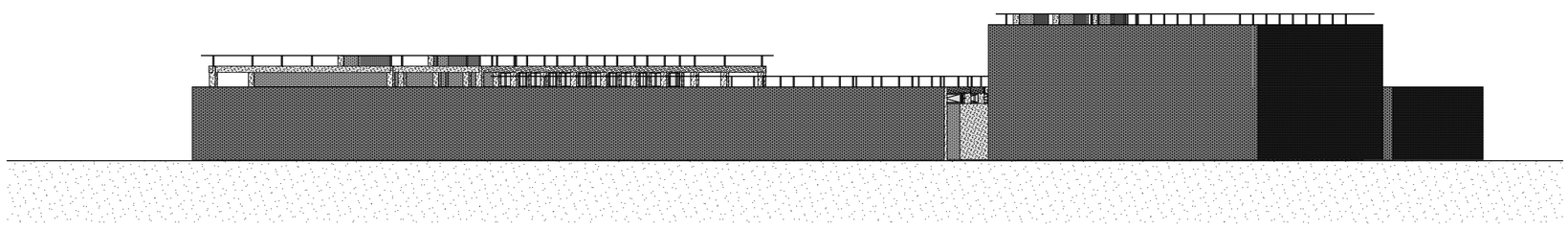

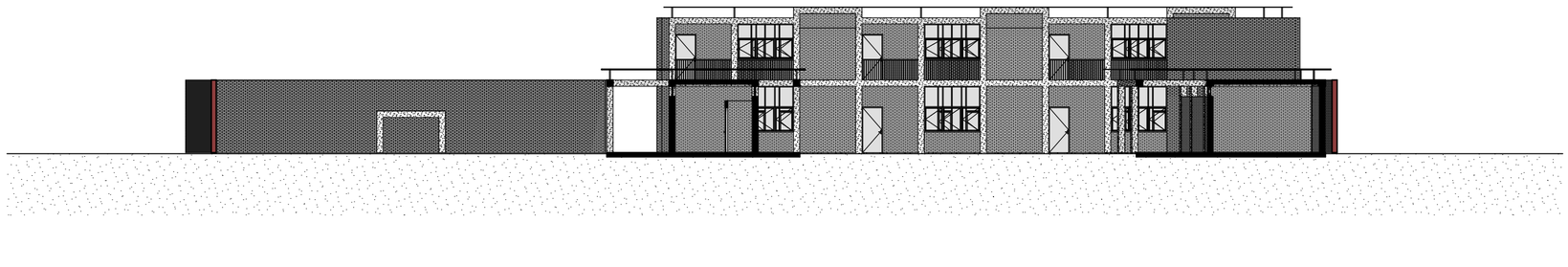

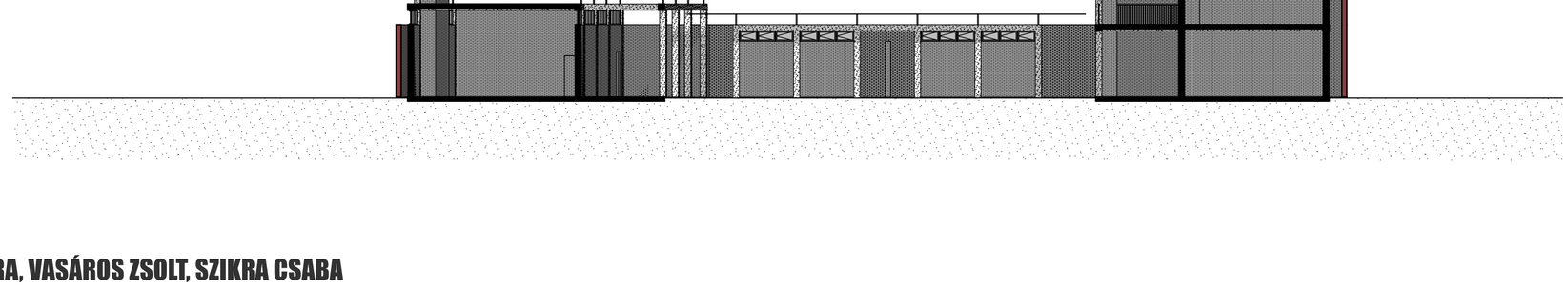

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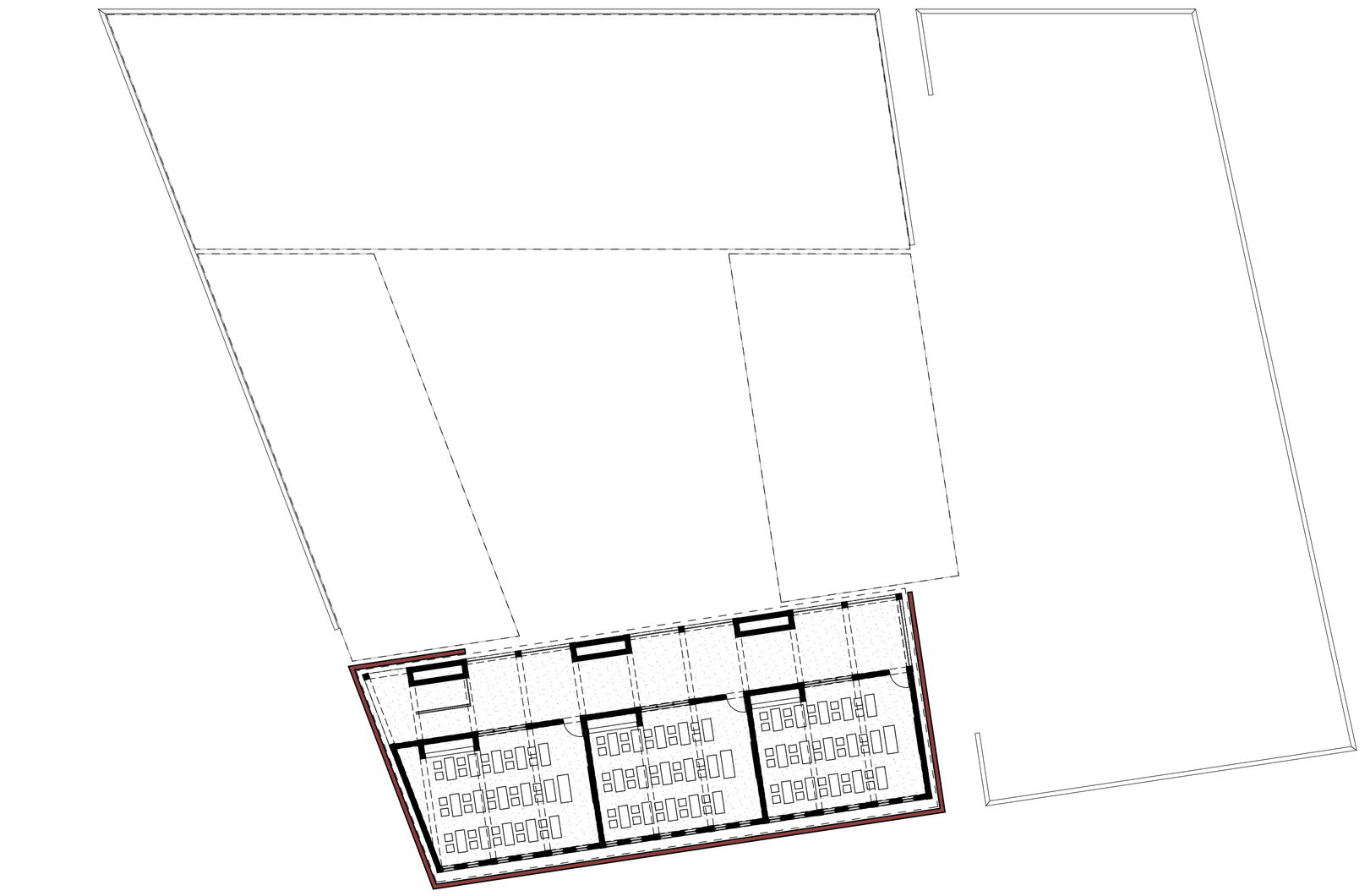

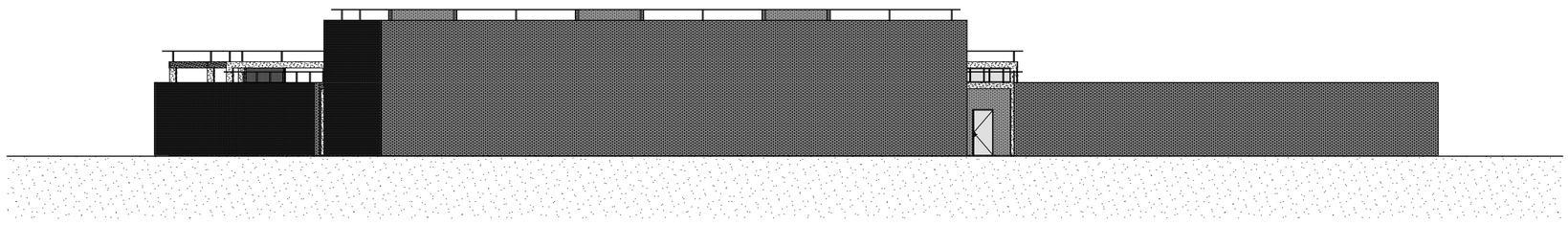

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A PLACE TO STAY – designing a school in New Gourna

Budapest University of Technology and Economics
Scientific Students' Association's Conference, 2018
Industrial and Agricultural Building Design // Identity and Culture 6 - School for New Gourna

authors: Bence Móré, András Fárizs
consultants: Dr Zsolt Vasáros, Dóra Dávid

TABLE OF CONTENTS

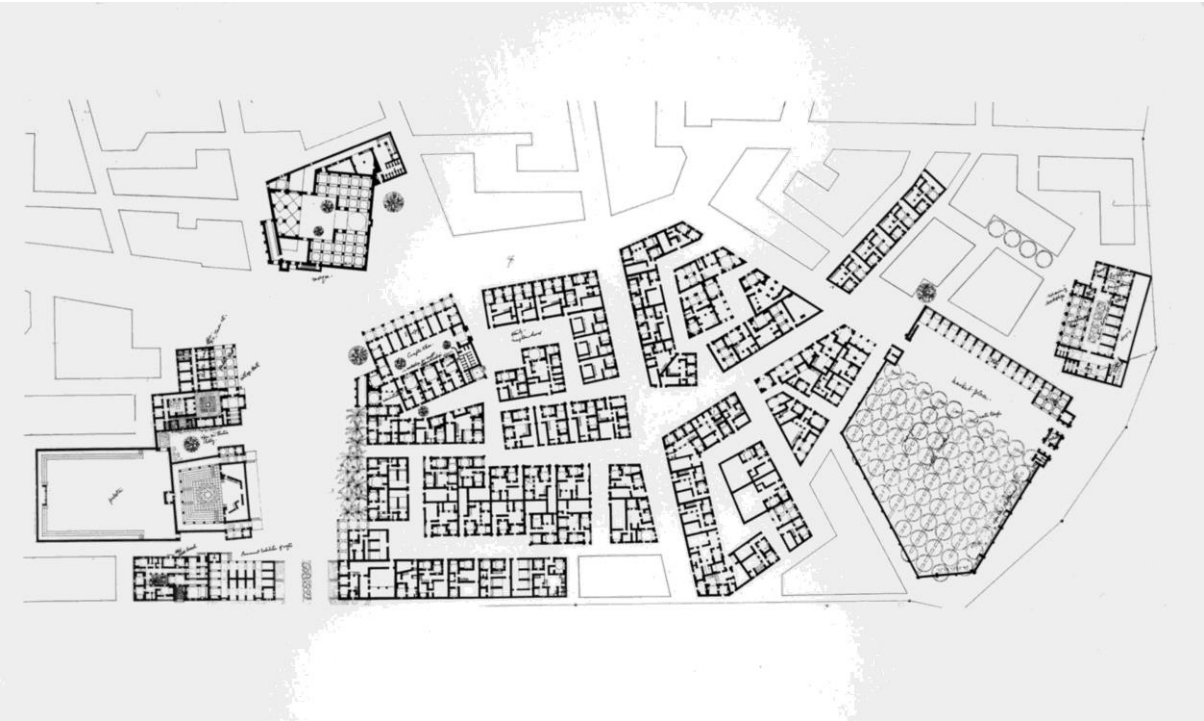
The site - the story of New Gourna

The site is located in Upper Egypt, on the west bank of the Nile at Luxor, in the model village of New Gourna. The first urban-scale, socially driven project of Egyptian architect Hassan Fathy (1900-1989) was under construction from 1945-48. The design of the completely new village was ordered by the Egyptian Ministry of Antiquities at the time, their primary goal was to relocate the residents of (old) Gourna, who lived on the archaeological site of the Cemetery of the Nobles and made a living of systematically looting ancient tombs. Thus, the primary motive to build the new village was to protect the artefacts. However, Hassan Fathy took up on the challenge of creating a pilot project, an example of the optimal synthesis of vernacular and modern architecture, and to create a social framework for the new life that the residents were to live after the relocation. Actually, the architectural recognition he received for this project made Fathy known world-wide, and he published his design process and social plan of the village in his book "Architecture for the Poor"[1] almost half a century later.

Regarding the urban design solutions implemented in the New Gourna masterplan, one can see the designer's aim to recreate the atmosphere of traditional arab streets of organically developed settlements, which means that he understood very well that a settlement can only live and be alive if the owners of the houses feel at home there. He defined small squares between islands of houses that give the masterplan a distinct character much more rich than the orthogonal street systems can provide. Architecturally his work was one of the pioneers who defined vernacular solutions as one of the possible sources of sustainable design, who said that mixing vernacular and modern can provide a good architecture that can both keep the identity of the place and provide development in the living conditions. Socially, he was also one of the first to actually use participative design and he involved the locals in the construction of their new homes, further strengthening a certain sense of identity and ownership in them.

[1] FATHY, Hassan, *Architecture for the Poor,* American University in Cairo Press, 1973

However, due to various reasons the only about 10% of the original design was completed, and because of the rapid social and technological changes there are very few residential houses standing in their original condition, most of them have been completely demolished, some of them are dramatically changed, though the system of plots of the original plan is still dominant in the settlement. Still, along the main entrance to the village we can still find public buildings - the theatre, the mosque and the khan. The main square of the village is defined by the khan, the mosque and the design site, which is one of the original plots of the New Gourna Masterplan. Thus, the school is to be located in the heart of the settlement, which is probably the rightful place of an institution of such great importance.



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[2] Masterplan of New Gourna. Source: The American University in Cairo – Rare Books and Special Collections- Hassan Fathy Archive

About Egypt

The climate

Due to its location in the area of the Tropical Cancer, Egypt has a desert climate, it is an extremely dra area. The average temperature is outstandingly high, in the summer in can often reach 45°C as well, meanwhile the average annual rainfall is minimal, in the Luxor region it is only 2mm. It is also due to the geographic features that in June the maximum angle of incidence of the Sun is 88°, which means that around noon the Sun rays hits the ground almost perpendicularly. Almost the entire area of the country, cca. 96% is uninhabited desert - the majority of the population, cca. 95% lives in the narrow fertile strip of land of Nile Valley[3]. The Valley is approximately of the size of Hungarian Transdanubia, and this small piece of land secures the living area of the population and is the only area suitable for agricultural production as well. Since the construction of the great Asswan Dam in 1970[4], the river does not flood the valley twice a year which means that the agricultural land is not sufficiently recharged in spite of the intense exploitation. The country is more and more dependent on the import of various victuals, whereas some decades ago it was basically self-sufficient.

[3] source: The CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html)
[4] source: Rubicon online magazine (http://www.rubicon.hu/magyar/oldalak/1970_julius_21_elkeszul_az_asszuani_gat/)

Social conditions

The phenomenon aggravating the dire conditions is the incredible rate of population growth. The population of Egypt grows by cca. 2 million a year, as of 2018 it has almost reached one hundred million inhabitants. As a consequence of the population growth, the country loses huge agricultural areas to satisfy the housing needs, which further decreases the chance of creating an efficient and good agricultural system. Despite of this, a considerable part of the working population (26%[5]), especially rural population is making a living of agricultural production, which is obviously does not contain any opportunity for breakthrough in the general living standard, considering the situation described above. In the past couple of decades there has been considerable growth in several industrial branches[6], however, to secure development there is a desperate need for a better quality in education. In 2008 Egypt spent only 3.8% of its GDP on education, which made it only the 117th in the world.[7]

Education expenditures:
3.8% of GDP (2008)
country comparison to the world: 117
Literacy:
definition: age 15 and over can read and write
total population: 73.8%
male: 82.2%
female: 65.4% (2015 est.)
School life expectancy (primary to tertiary education):
total: 13 years
male: 13 years
female: 13 years (2014)
Unemployment, youth ages 15-24:
total: 30.8%
male: 27.2%
female: 38.5% (2016 est.)
country comparison to the world: 32 [8]

[5] source: The CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html)

[6] see previous
[7] see previous
[8] data on and reflecting Egypt's educational system. source: see

School system, current practice

Due to the population growth, there has been a general shortage of educational facilities in the country. Authorities tried to resolve this situation with deploying schools all over the country according to a type plan, which is unfortunately not fit for the climatic conditions of the area, they lack shading and reasonable orientation as well. In many cases, in order to avoid overheating in the classrooms, teachers try to block direct sunlight by painting the windows black, which is obviously a bad solution in every way[9]. Thus, the need for good school buildings is further increased by the fact that many of the schools in use today are perfectly unfit for education. [10]

[9] In preparation for the present competition the research team of the Hassan Fathy Survey Mission of the Department of Industrial and Agricultural Building Design has interviewed a local teacher based in Luxor to get some insight in the education system of the country and the school buildings. This description is based on the content of that interview.
[10] A school building in the desert. Photo by Dóra Dávid, 2018.

[11] Kids of Egypt. Photo by Dora David, 2018

The design proposal

Objectives

Based on all these, the topic of the competition seems to be a front worth opening, and by which we could get closer to relieve a grave and complex social problem.

Regarding the role of the school we pinpointed three objectives: education, nurturing and architectural model.

The basic function of the building does not need further explanation, as a school, its first and foremost purpose is to secure a suitable place for the classroom education of pupils.

Besides this we believe it is imperative, especially in this environment, that the school provides a certain nurturing system for the kids as well, which reaches further than the timeframe and location of a class and make this an important part of their lives. Majority of the kids in this area grow up basically on the streets besides the couple of hours spent in school, without any special attention from the parents or anyone else, which means that nobody really pays attention to their specific development. That's why we decided that the educational institution needs to provide opportunity and space for occupying the kids outside of the classroom time, that can have a beneficial effect on their personal development.

We want to create a safe place for development that can be an important part of kids' lives besides the routine of attending classes.

And last, but not least, we attempt to elaborate a new architectural model, honouring the legacy of Hassan Fathy.

Design references

The question is given, whether it's possible to create a sort of a contemporary synthesis of the overlapping layer of the history of Luxor, in a way that it started to take shape in Fathy's design in the beginning of the 1950's.

During the course of design and the formation of the concept a number of architectural references were inspiring us regarding use of materials, shaping, spatial structure and structures. One of these was obviously the peculiar vernacular-modern design of the New Gourna Model Village, described in the first paragraph, where the school is to be located. Fathy himself was utilizing many of the traditional arabic architectural elements, primarily in the architectural responses to the climatic conditions and in the creation of the culturally very important intimate spaces. These are the *majaz* (entrance), the *sahn* (internal courtyard), the *takhtabush* (in-between space between two courtyards), the *malquaf* (ventilation system with wind catch towers), and the *mashrabiya* (wooden shading structure in wall openings)[12]. This architectural toolkit that was perfected for centuries is perfectly fit for the various climatic, functional, social and aesthetic needs of the housing in the region.

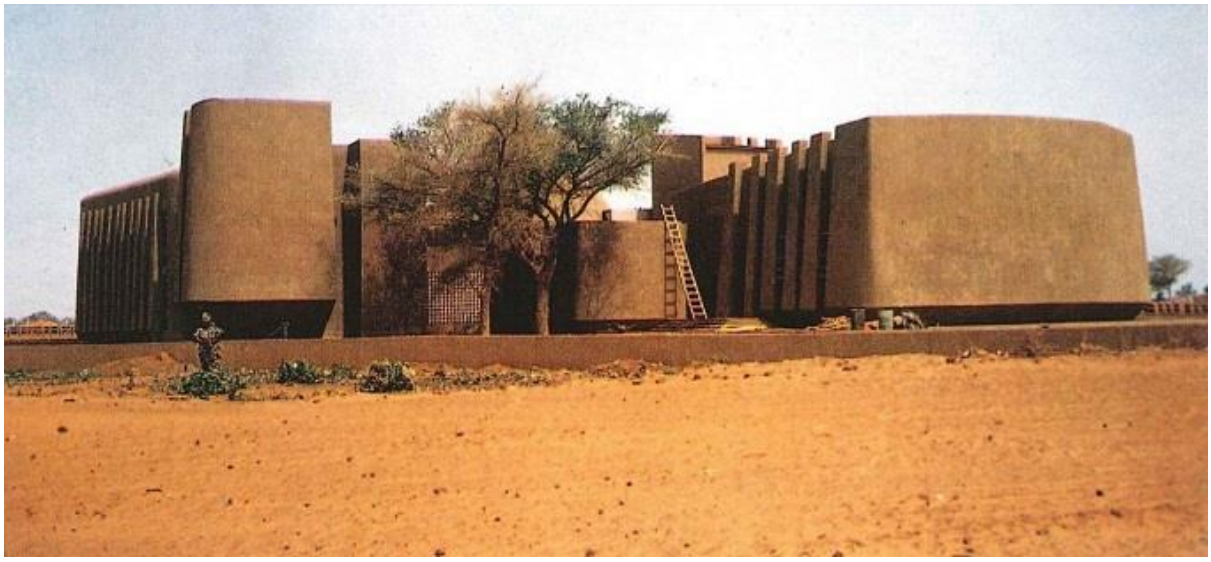
Cost-efficiency of (public) buildings have always been of crucial importance in the developing world, which means that the large proportion of African schools is strictly functional and does not keep aesthetic considerations in mind. The work of Laszlo Mester de Parajd in various African countries is a good example of extremely cost-efficient, yet completely functional school buildings that can satisfy the needs for school of probably a vast number of people. [13] The schools of Diébédo Francis Kéré in Central Africa are a good example of using the

[12] see in details in: TIBAI, Friderika, VERES, Laura, *Hely, udvar és tér. / Vernakuláris építészet és modernizmus Észak-Afrikában (SSAC Competition Essay, consultant: Dr Zsolt Vasáros),* Budapest, 2016

[13] see in details in: TIBAI, Friderika, VERES, Laura, *Kultúrák között – magyar építészek Észak-Afrikában. Kritikai esettanulmány Parajdi Mester László munkásságáról (SSAC Competition Essay, consultant: Dr Zsolt Vasáros),* Budapest, 2016

available materials in a creative way to create good spaces and a higher architectural quality, yet the complexity of the design probably makes it unfit for mass production.

The common feature of their design is the creative sun protection and the multilayered and/or elevated roofs with ventilation to reduce the heat that gets in the structure.



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15

[14] The ONERSOL building in Niamey, Niger, 1981 by Laszlo Mester de Parajd.
[15] School building by Francis Kéré in Burkina Faso

The “new vernacular” architecture of Egypt

The spontaneous urban growth has other negative effects as well, besides the very low architectural quality there are serious problems rotted in the structural deficiencies of the undesigned buildings. The “new vernacular” practices basically ignore climatic conditions, which means that the houses in almost every case need air conditioners to avoid overheating, which is not a viable, sustainable or even sufficient solution.

The architecture of today’s Egypt is defined by the quick construction and the most easily available materials, which enable the continuous vertical growth of the buildings. Since mudbrick construction takes a lot of time and cannot be used for multi-storey buildings, moreover, its use is banned because it is basically fertile soil, the only option seems to be burnt red bricks. This is the face of the “new vernacular”: reinforced concrete frame with burnt red brick infill, all houses seem to follow this pattern. This outstandingly raw, yet somehow regular solution is present on all facades, highlighting the primitive structural background of the houses that seems to be the most efficient solution of the housing situation of the country.

[16]

[16] construction site in Egypt, somewhere around Asswan. Photo by Dora David, 2017

Design process

The goal of design is to create a plan of a school on the site nearby the mosque, partially or fully answering the questions asked above. To achieve this, besides learning prefigurations during the research it was important to find and pinpoint the most important design principles and respect and synthesise them to achieve the best possible solution.

From the objective side, to achieve suitable thermal comfort, climate was the most important factor, therefore the annual solar radiation, temperature, moisture and humidity, and the prevailing wind direction. The angle of the incoming solar radiation ranges from 88° in July to 44° in December, whereas the average temperature similarly ranges from 40 C° to 23 C°. This plays an important role in designing the structures of the building. The wind, as typical to the Nile Valley blows from the North, which significantly influences the orientation of passive cooling systems. As for the selection of materials it was important to choose easily accessible solutions, which are both structurally and thermodynamically favourable.

From the subjective side, it is important that the building is loveable. To achieve this, it is crucial to pay respect to the existing building environment, including the urban fabric, the original plot structure and the buildings laying in it. It is also important to culturally fit into the environment when embedding the function into a building, for example in the design of a room for praying, or retaining due privacy of certain places. Besides we would like to hold ourselves to the global norms of architecture, such as building aesthetics or the pleasant experience of space and light.

The building

Urban connections and plot use

The building takes up the entire area of the plot, keeping and respecting the urban fabric and streets designed in the 1940's by Fathy. We can access the facility through three points: the educational function is reachable from the main square through an "ante-chamber", while the freetime playground opens from the streets to the north and the south. This latter one has a direct connection to the street, since it is a semi-public space, from the southern entrance one can directly see the entrance of the library, emphasizing its more public purpose as well.

As we emphasized before, we want the building to be able to secure a space for the more constructive freetime activities of the kids besides the strict educational function, opening a wider perspective in the lives of the future generations. This is why there are some auxiliary functions that can be accessed regardless of education time and without having to enter the classroom area. These functions are the library and the large open-air playground. The latter one is completely merging into the street, it does not have closeable doors or gates, the kids can use the durable playground any time. The library is open during all three educational shifts of the day, thus the kids out of class can have a calm, secure environment for writing homework and to study if needed, or to read according to their field of interest, since most probably at home they don't have the space to do that. Similarly to the library, all areas of education can be closed by sliding gates out of school hours.

The main functions are organized around a shaded internal courtyard with palm trees, following the arabic traditions, the playground is attached to that on the eastern side. The classrooms are located in the southern voluma, facing south to ensure the best solar protection via the shading system in the summer, yet to allow sunlight in during the winter. The northern part has the staircase and a shaded, wide corridor. Due to this orientation and the structure of the gaps of the shading wall, there is a sufficient amount of natural light in the classrooms all around the year with the sufficient shading and thermal protection.

The teachers' and director's rooms are in the eastern block, close to the main entrance. In the most wide, northern strip the IT lab, the library are located and the two prayer rooms with separate access points. The Christian room has a central character, while the Muslim room has a well-oriented Qibla wall. This room has an ablution area as well. The rooms of this wing have filtered light from the north and the south, from the upper parts and from the sides to provide even lighting. Toilets are based on the border of the courtyard and the playground.

The general view and character of the building is defined by the shell walls that shield the volumes from the sunlight and the world outside of the school, giving the volumes a common boundary, a link.

The structure

The grid on which the reinforced concrete structure is based is 3mx3m, as typically used in the area, with a red brick infill. The thickness of the walls is at least two layers of brick as opposed to the current practice of one-layer thick walls. This provides a much better thermal capacity to the walls to even the extreme temperatures. The use of material fits in the environment, yet provides a much better solution using the same toolkit.

Thermal comfort and cooling system

The summer heat protection is provided by a passive climatizing system of the double layer roofs and the malquafs. The double layer roof is made of metal plates or other available, light materials, such as woven palm tree leaves that shades the heavy structure most of the day. These structures sometimes reach over the building walls to create external shaded spaces as well. The shell wall has the same climatic function.

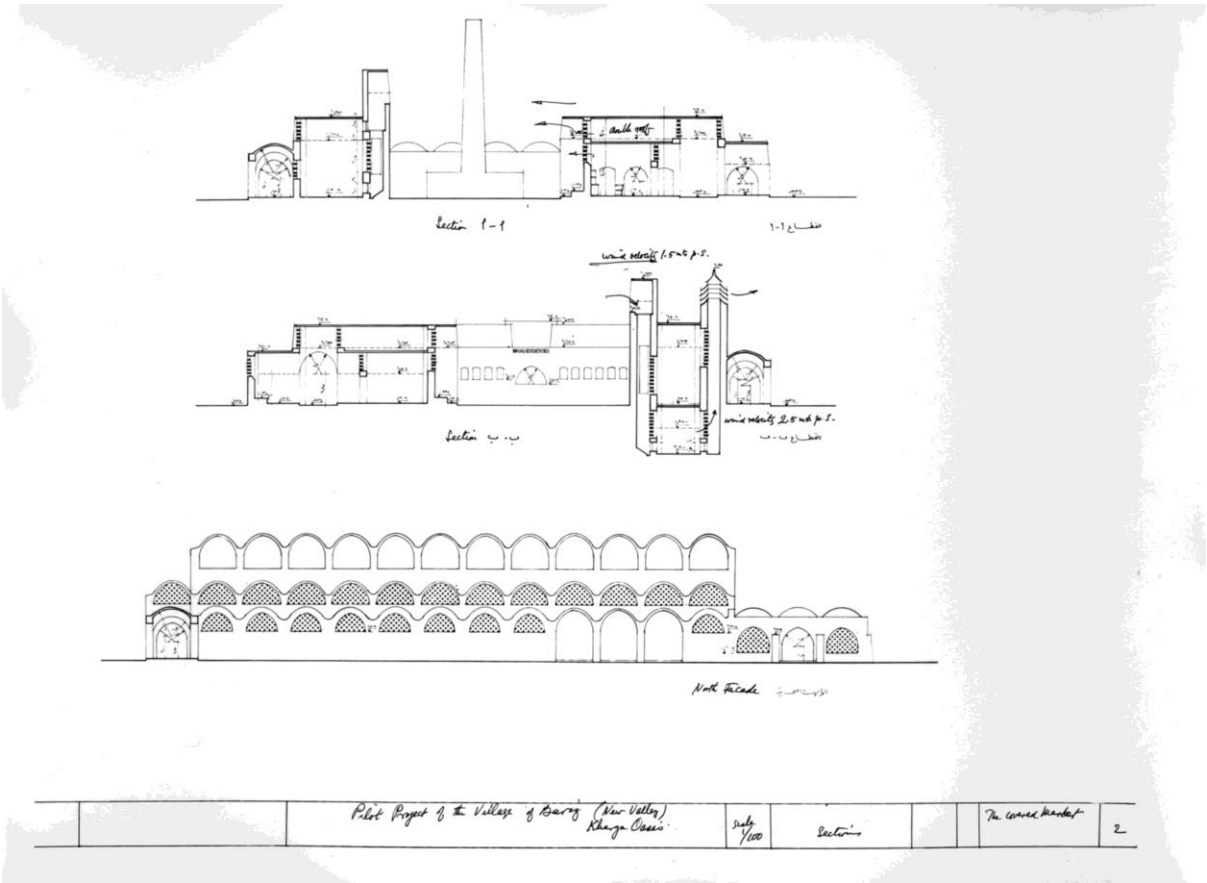
In the rooms designed for longer stay (IT lab, classrooms, library) there is a malqaf system to provide natural ventilation and better air flow. The northeastern wind can get into the malqafs which are facing the prevailing wind, air gets down an air duct with an underground extension where it cools down, and the cool air can come up in the shaft connected to the rooms.

 [17]

[17] The double roof of the Metropolitan house in Luxor West Bank. Photo by Dora David, 2018

In case of the classrooms, the air filters out to the gap between the shell wall and the structural wall through open windows, that provides an uplifting draft for the warm, used air to leave the building. In the library and the IT lab the warm, used air is directed to the gap between the two roof layers, where the horizontal wind generates a draft and drives the used air away.

All shading structures are designed so that in winter months the building can benefit the most of the heat of the sun, and the winter thermal comfort is further aided by the heavy structures of the building.



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[18] The ventilaion system of the New Baris market, designed by Hassan Fathy (1967). source: The American University in Cairo – Rare Books and Special Collections- Hassan Fathy Archive

Bibliography and references

Design references

TIBAI Friderika, VERES Laura: Kultúrák között – Egy magyar építész Észak-Afrikában Kritikai esettanulmány Parajdi Mester László munkásságáról. TDK dolgozat, Ipartanszék 2017
TIBAI Friderika, VERES Laura: Hely udvar és tér. TDK dolgozat, Ipartanszék 2016
BALÁZSIK Stefánia, DÁVID Dóra: Tervezett informális. TDK dolgozat, Ipartanszék 2017
STEELE, James: Architecture for People: The Complete Works of Hassan Fathy. Whitney Library of Design, New York 1997
FATHY, Hassan: Architecture for the Poor: An Experiment in Rural Egypt. University of Chicago Press, Chicago 2000
KÉRÉ, Francis: Radically Simple. Hataja Cantz, Berlin 2017
STOHR, Kate: Design Like You Give a Damn 1. Thames & Hudson, UK 2006
STOHR, Kate: Design Like You Give a Damn 2. Abrams, New York 2012
Studio Basel: Nile Valley – Urbanization of Limited Resources. ETH Studio Basel Contemporary City Institute 2009

Bibliography - printed

FATHY, Hassan, Architecture for the Poor, American University in Cairo Press, 1973
GRIBORIO, Andrea; ADRIA, Miquel: Radical: 50 Latin American Architectures, 2017

Online sources

The CIA World Factbook
https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html)
/last download: 26. 10. 2018./

Rubicon online magazine
(http://www.rubicon.hu/magyar/oldalak/1970_julius_21_elkeszul_az_asszuani_gat/)
/last download: 26. 10. 2018./

TIBAI, Friderika, VERES, Laura, *Hely, udvar és tér. / Vernakuláris építészet és modernizmus Észak-Afrikában (SSAC Competition Essay, consultant: Dr Zsolt Vasáros),* Budapest, 2016
http://tdk.bme.hu/EPK/kortars-kritika/Hely-udvar-es-ter-Vernakularis-epiteszet

/last download: 26. 10. 2018./

TIBAI, Friderika, VERES, Laura, *Kultúrák között – magyar építészek Észak-Afrikában. Kritikai esettanulmány Parajdi Mester László munkásságáról (SSAC Competition Essay, consultant: Dr Zsolt Vasáros),* Budapest, 2016
http://tdk.bme.hu/EPK/Epelm/Kulturak-kozott-magyar-epiteszek-Eszak1
/last download: 26. 10. 2018./