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NAIVE ARCHITECTURE, ITS DECORATION AND GEOMETRY[1]

Gunter Weiss[2]
Graciela Colagreco[3]

Resúmen: Arquitectura Ingenua significa edificios planificados y realizados por personas y artesanos laicos, que en su mayoría siguen construyendo de acuerdo a tradiciones y normas. Arquitectura Ingenua utiliza formas y objetos geométricos simples, que CAAD-lenguaje llama "primitivos". La fachada principal de este tipo de edificios muestra, a menudo, decoraciones basadas en adornos geométricos, como frisos y rosetas. Una decoración de este tipo se dispone de tal manera que las diferentes distáncias de visión enfatizan diferentes detalles y motivos. Tal "ornamentación multinivel" tiene mucho en común con los fractales. En esta presentación queremos señalar que, a pesar de las diferencias culturales, las abstracciones geométricas de las formas de las casas y adornos de todo el mundo son exactamente lo mismo. Por otra parte nos centramos en el hecho de que la Arquitectura Ingenua se realiza en gran parte sin representaciones gráficas y que la capacidad espacial virtual fue y es entrenada por operación con verdaderos objetos 3D reales. En contraste a esto, hoy en día, la ingeniería de la educación de gráficos, sigue el enfoque inverso comenzando en primer lugar con los gráficos de la realidad virtual proporcionado por los modernos medios de comunicación gráficos. Pero el éxito de este método actual de la educación para aumentar las habilidades espaciales es bastante cuestionable.

Palavras-clave: Arquitectura Ingenua, adornos geométricos, educación gráfica

Abstract: Naïve architecture means buildings planned and performed by laypersons and craftspeople, who mostly follow building traditions and standards. Naïve architecture uses simple geomnetric forms and objects, which CAAD-language calls “primitives”. The main façade of such buildings often shows decorations based on geometric ornaments, like friezes and rosettes. Such a decoration is arranged such that different viewing distances emphasize different details and motifs. Such “multilevel ornamentation” has much in common with fractals. In this article we want to point out that, in spite of cultural differences, the geometric abstractions of house forms and ornaments worldwide are quite the same. Furthermore we

[1] This article presents a lecture given at the Geometrias & Graphica 2015 and it repeats and extends the proceedings article to this conference, c.f. WEISS G. & COLAGRECO G.
[2] University of Technology Vienna, Austria / weissgunter@hotmail.com.
[3] University of La Plata, Argentina / colagrecograciela@yahoo.com.ar.

focus on the fact that naïve architecture is performed largely without graphics representations and that virtual spatial ability was and is trained by operation with real 3D-objects. Contrasting to that, nowadays engineering graphics education follows the reverse approach beginning at first with virtual reality provided by modern graphics media. But the success of this actual method of education to increase spatial abilities is rather questionable.

Keywords: Naïve architecture, geometric ornaments, graphics education

1 Introductory statements

A) "Naïve Architecture" - we use this more telling term instead of "vernacular architecture" [see VERNACULAR ARCHITECTURE] - mainly means country side buildings performed by people who are more or less autodidacts. They start as collaborators and craftspeople in teams leaded by competent craftsmen and learn by doing. This results in buildings the layout of which is strongly dominated by traditions, purpose, usability and economics. There occurs only small variation due to culture and climate differences.

From the abstract geometric point of view "naïve" buildings worldwide persisten- tly show box shapes with saddle roofs and cylindrical shapes with conical roofs. CAAD software handles such geometric objects as "primitives". Freehand formed details of such naïve buildings (see e.g. Figure 7) often show what has to be called "freeform surfaces" and the analytic description of these parts as a combination of spline surface patches is not at all an easy task and had to be based on a 3D-scan of the object.

B) Human visual perception focusses on objects and details in relation to the distance from the viewer and a correct interpretation of a visual impression corresponds to this relation of details and their distance tot he viewer. From far away it is the skyline of a city and, a little bit closer, it is the impression of the building ensemble along a road or around a city square. Coming even closer to one of the buildings, we concentrate on the distribution and arrangement of windows in the façade and finally smaller decorations and ornaments grab our attention. Roughly speaking, it is sort of a "fractal approach" in the way we recognize, even we cannot speak of self-similarity of the considered objects. But this habit inherited from prehistoric ages explains, why naïve architectural objects very often show ornaments and other decorations, which are only recognizable at close range (see Figure 2). It also explains, why we get a groovy feeling when visiting old city centres providing us, like nature, with an optical manifold at any distance level, c.f. the following typical multilevel pattern system in nature and e.g. the famous paintings of G. ARCHIMBOLDO (Figure 1).

…
Landscape
Forest
Tree
Branching pattern
Branch
Leaf or flower
Flower leaves
Stamina
….

Figure 1 - A natural multi-level system and G. Arcimboldo's "summer" [ARCHIMBOLDO], an example of paintings with (at least) two visual levels

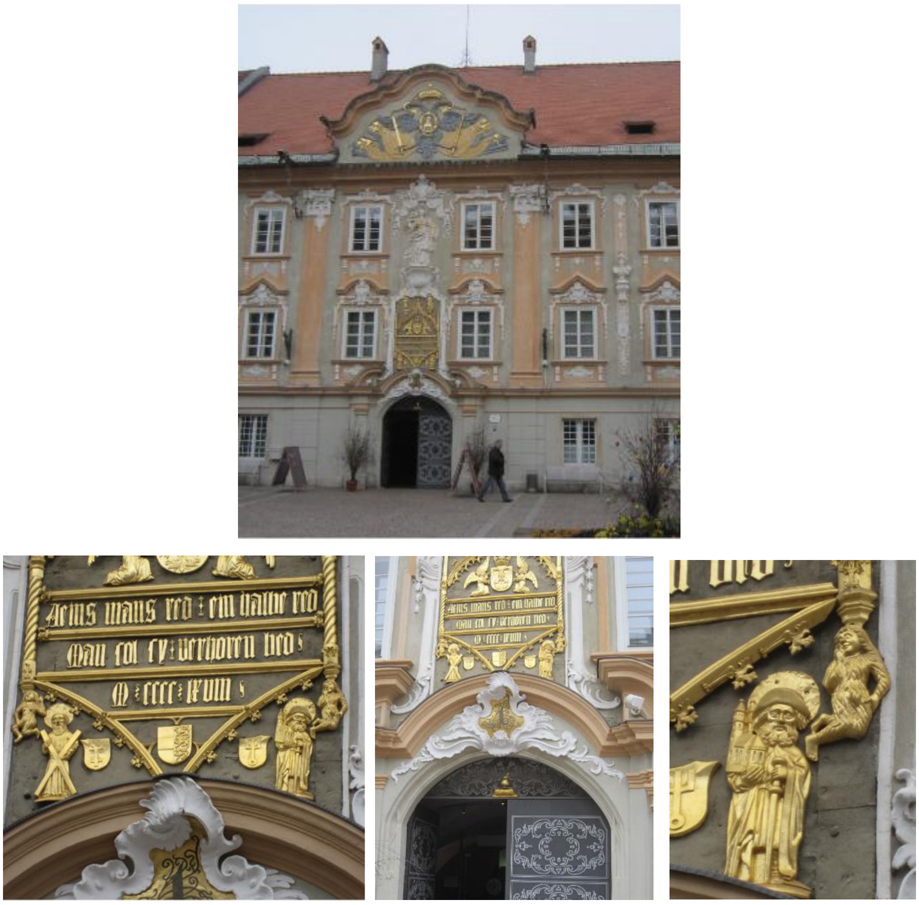

Figure 2 - The town hall façade at St.Veit, Carinthia, Austria and ist details at different levels, an example for distance dependent "fractal" attention levels (photos G. Weiss 2015), as sort of a „plagiarism of nature"

Contrasting to that the impression of some modern, less structured buildings is rather that of giant sculptures with little appeal from nearby (see e.g. Figure 3).

Figure 3 -„Ginger & Fred“ (Frank O. Gehry), Praha, Czech Republic, (https://commons.wikimedia.org/w/index.php?curid=1589583) and „Hypo Alpe Adria bank building“ (Thom Mayne), Klagenfurt, Austria (Kärnten News ORF 31.10.2014)

In contrast to multilevel decoration, actual decorationless facades seem rather cool, repellent, at least empty and featureless. They cause a feeling of tension. For a fortress or an anti-aircraft tower this effect might be intended (see Figures 4 and 5).

Figure 4 - Left: City fortification at Khiva (Usbekistan); right: Anti-Aircraft Tower, Vienna, (Austria); (photos G.Weiss 2014)

Figure 5 - “Naked“ facades and entrances in Vienna, (Austria), (photos G.Weiss 2015)

Figure 6 - Richly decorated entrances found in Usbekistan and Vienna (photos G.Weiss 2014)

C) Throughout history friezes, rosettes and wallpaper ornaments were and are used to decorate buildings and articles of daily use. Also an alley along a country-side road can give us an impression of a frieze in nature! The geometric classification of such decorations is a well-known topic, c.f. L.M. FEIJS (2012) and the well-known classification scheme Figure 7.

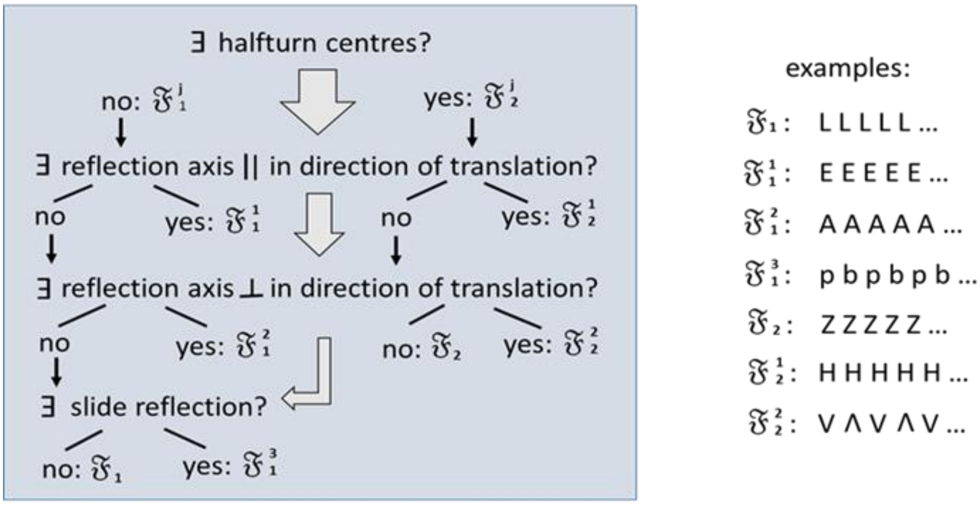

Figure 7 - Classification scheme for friezes $\mathfrak{F}_i^j$

For the seventeen wallpaper groups and for rosettes there are similar classifi- cation schemes, c.f. G. GLÄSER (2011) and especially H. HEESCH & O. KIENZLE (1963). But of course it grasps too short, when reducing harmonic proportions and ornaments to their geometric properties alone. There is always also a symbolic and/or a religious meaning packed into the formed or depicted patterns, which is not obvious to the usual observer. To decode this content would need detailed knowledge of religion and culture of the people the architectural remains are looked at. In this article we emphasize only the geometric properties of ornaments. One might notice that the geometrically idealised constructions of such ornaments and of naïve architectural objects seem to be the same all over the world.

Remark: The geometric concepts “frieze” or “fractal” cannot be thought without the concept and an imagination of “infinity”, but we understand these mathematical objects already by their finite visualisations. We sloppily call the visual result of three or four stages of a fractal construction already a “fractal”, and similarly we recognize the complete infinite wallpaper decoration from just a piece of it as soon as we guess the construction method of it.

D) Even there is much ado about the Golden Proportion in nature and aesthetics, it turns out that floor plan and wall rectangles of naïve houses, at which continent ever, hardly show golden proportions (c.f. Section **3.C)**). Of course, with some used force one may declare some of the occurring proportions as rough approximations of the Golden Proportion. But there is no hint in related references to discover that naïve “architects” intended to use the Golden Mean as design principle. The occurrence of the Golden Mean in Architecture seems to make the difference between Naïve Architecture and “advanced architecture” based on architectural theory, c.f. Vitruvius, Palladio or le Corbusier.

We might speculate about the absence of the Golden Mean in Naïve Architecture: Buildings are designed to be practical according to the old saw “form follows function” and they are optimized for a certain purpose. Their purpose and their human related measures as well as size and form of the building place copes with the economic use of material and its static properties. The intended forms and decorations mostly are geometric abstractions which are simple and highly symmetric, and which can also be used as plane and space filling modules. Here the square and its octagonal derivatives as well as its affine transformations stand centrally. Still the everyday speech term “quadrangle” means a square! Besides the square also the equilateral triangle and the regular hexagon and their derivatives occur and are used in wall decorations as well as in Architectural Design. Of course one can find the Silver Mean (e.g. V.W. de SPINADEL (2008)) realised in octagonal buildings, as it can be defined as the ratio of a regular octagon's side to its second diagonal. This ratio occurs automatically, but one can hardly say that naïve architects used it consciously and without the regular octagon as basis figure, which again is derived from the square.

E) The construction of the mentioned basic figures involves the use of ruler and compass and the elementary geometric concepts "circle" and "conguence transformation" (e.g. "translation" and "rotation"). Especially rosettes are connected with regular *n*-gons and according to the limitation of construction tools to ruler and compass early masons found approximate constructions for e.g. the 7-, 9-, and 11-gon with practically sufficient accuracy (see e.g. X. ZAHLER (1892), M. LUNDY (1998) and Figure 8). Such practical recipes show the inventive genius of people having to cope with the restriction of drawing tools to ruler and compass only!

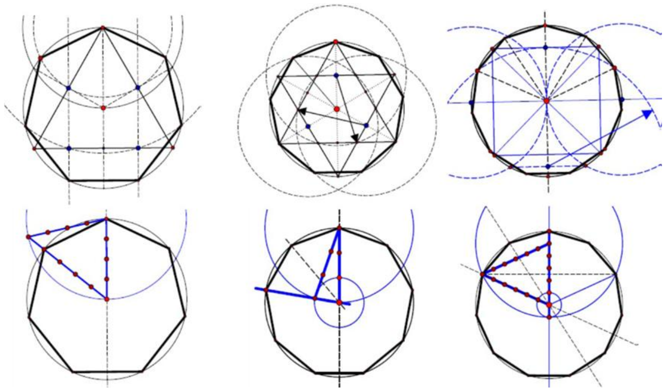

Figure 8 - Approximate ruler and compass constructions of the 7-, 9- and 11-gon (1st row), and construction by a string with equidistant knots (2nd row), (c.f. also X. ZAHLER, M. LUNDY and G. Weiss)

The frieze - and lattice - like decorations of Naïve Architecture evolved from two sides: from the large via the module structure of the building caused by column and window arrangement, and from the small via basketry, weaving and finally pottery. The occurring geometric transformations are translation, symmetry and rotation, while dilatations are more or less extraordinary and might perhaps have the modularised branching pattern of plants as an antetype. Spiral arcs mostly are freeform curves or circular C^1-bi-arcs repeating the design of snail shells (logarithmic type) or coiled up snakes (Archimedian type). Like faces, which never are exactly symmetric, also handmade ornaments get their charm from inaccuracy and disturbance of pure regularity.

2 Examples of naïve architectural forms

With the following images we want to support the statements of the former section.

A) From Terra del Fuego until Alaska, from Bretagne until Wladiwostok one can find a common archetypical house: the gable roofed house, a simple prismatic building with a saddle roof and chimneys just as children draw them. Even these buildings seem to be influenced from European building traditions one can also find such houses in non-European cultures. For example, tents of nomadic people in the Arabic countries show this archetypical form, too. Most of these buildings show symmetry at least at the entrance facade and often they are based on a modular design (Figure 9, left). At medieval European towns the gable front often shows to the city square or main road and in most cases it is decorated, too (Figure 10).


Figure 9 - Cape Province Farmhouse (left, G.Weiss 2013); backside view of an ensemble of barns of a one-street village in Lower Austria (right, G. KRÄFTNER (1994), p. 38)


Figure 10 - Houses with decorated gable fronts: historic ensemble at Sulików, Dolnoslaskie, Poland (left, L. LÖWE (1963), p. 152) and Cicmany, Trencin, Slovakia (right, photo V.J. SAMUEL (1984)

B) One should keep in mind that former time's masons and carpenters communicated *verbally* and maybe used just *freehand sketches* for graphic communication. Scaled graphics constructions were hardly used. Angle gauge and compass were tools designed for 1:1 - scale use. Carpenters knew by heart how to make timber joints, however complicated they are (Figure 11) and craftspeople learned this by doing. This gives a hint about the then well-developed spatial representation. And it could (should?) have impact to actual graphics education of engineers and architects: We can only interpret visualisations properly, if they cause a detailed 3D-model in our mind and this is not only a matter of the visualisation, but a matter of our pre-experience and ability to handle objects virtually in our mind. To foster this ability of a human being one had to start at very early age with producing real models and dealing with real materials. "Virtual reality" alone is not enough, c.f. G. MARESCH (2013).

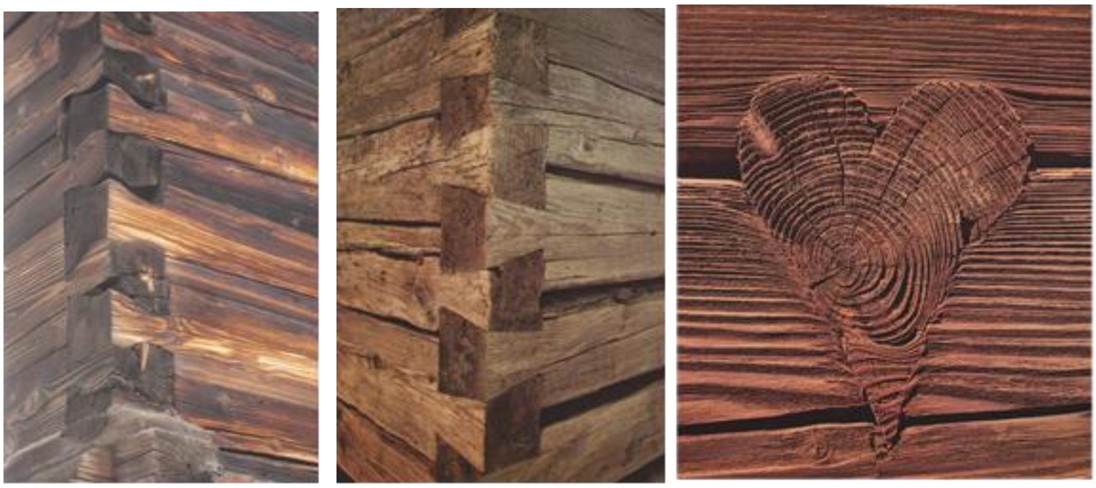

Figure 11 - Detail of an Austrian block houses with standard and special timber joints forming a vertical frieze; (photos G.Weiss 2015 (left) and F. HUBMANN (1979) (middle and right))

C) The cube and the prism are basic house forms in the Arabic countries as well as in parts of Africa (Figure 12 showing photos by R. WILLAERT of the Royal Village Tiébélé, Pays Gourounsi, (Burkina Faso) as well as of Sanaa and Shibam (Jemen), see P. MARÉCHAUX & M. MARÉCHAUX (1993), p. 205 and p.220). By using adobe the "naïve architects" smoothen sharp edges of the buildings. The freehand formed transitions at the entrance or the windows can indeed be called "freeform surfaces" (see Figure 13).

Figure 12 - Left: Cubus house in Tiébélé, (Burkina Faso), (photo R. WILLAERT), middle and right: Sanaa and Shibam, (Jemen), P. MARÉCHAUX & M. MARÉCHAUX (1993), p. 205 and p.220)

Figure 13 - "Free formed surfaces" and their ornamentation: houses at Tiébélé, Burkina Faso (photos R. WILLAERT)

D) Other archetypical architectural forms are the cylinder of revolution and the cone of revolution. It occurs as yurt and tent having the advantage of mobility. Europe influenced (naïve) Architecture sometimes uses the cylinder of revolution (or a part of it) for towers and as apsides. Both applications demonstrate that the respective building is extraordinary such that it justifies its many disadvantages concerning modularisation and usability. Examples are the medieval St. Kevin's Church at Glendalough, Eireland (Figure 14, left) with its little cylindrical tower and conical stone roof, the late-Romanesque ossuary at Greutschach, Austria (Figure 14, right) with its co-axial gothic tower over a square, which causes the main roof to consist of conical and triangular parts. As a third and recent example we show the big stable building belonging to the Shaker settlement Hancock (Figure 15). African examples are shown in Figure 16.

Figure 14 - Left: St. Kevin's Church, Glendalough (Eireland) (see ref. KEVIN'S CHURCH), Ossuary at Greutschach, Austria (right, photo G. Weiss 2015)

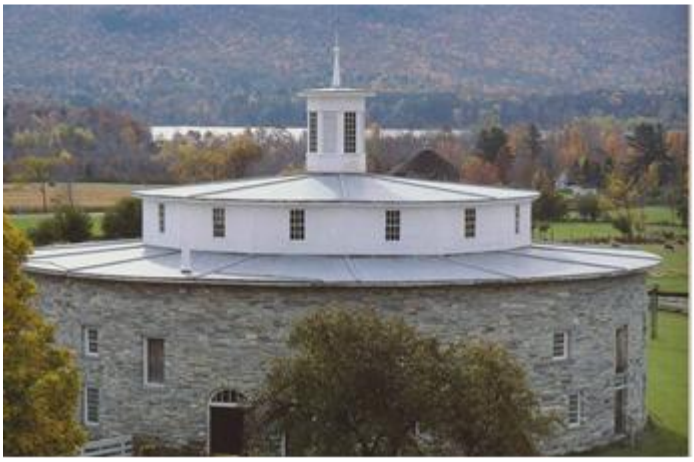

Figure 15 - Shaker stable building (Hancock, USA) J. SPRIGG & D. LARKIN (1987, p.143).

Figure 16 - African cylindrical and conical adobe houses again of Tiébélé, Gourounsi, (Burkina Faso) (photos R. WILLAERT)

E) Rotational symmetry and egg shape occurs at ancient and modern Trullis (see e.g. G. COLAGRECO & G. WEISS (2014) and Figur 17) This archetypical form occurs also in African adobe buildings (Figure 18, left) and in Persian cistern roofs, the geometric form of which mostly is part of a sheet of a two-sheeted hyperboloid, see e.g. the *Ab Anbar* cister, *Nain-Mohammadie*, *Nā'in*, Iran (Figure 18, right).

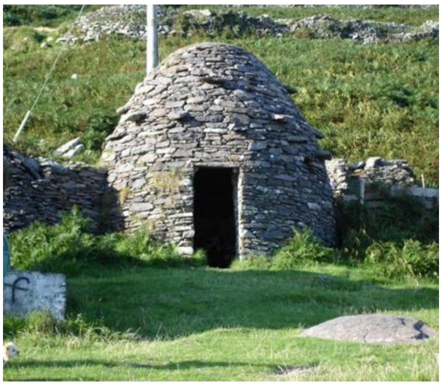

Figure 17 - Beehive trulis, Ireland (see COLAGRECO & WEISS (2014))

Figure 18 - Left: Stores in Tiébélé, Gourounsi, (Burkina Faso), (photo R. WILLAERT), right: Ab Anbar cister, Nain, (Iran), (photo N. e PINA)

The roof of the cister at Abbasabad, Sharud, Iran (Figure 19, left) has an external staircase following curves of constant slope. Contrasting to that the staircase on the minaret of the Great Mosque of Samarra (c.f. T. COPPLESTONE & B. S. MYERS or and Figure 15, right) follows a so-called "heli-spiral", the intersection of a cone of revolution with a co-axial right helical surface and therefore it is not of constant slope, see G. GLÄSER (2011)9 The usually imprecise description of the minaret (Figure 19, right) as "spiral" can be mis-understood as meaning a self-similar curve having a logarithmic spiral as top view projection, while G. Gläser's heli-spirals (c.f. G. GLÄSER (2011) have Archimedian spirals as top view projections.

Figure 19 - Left: Carawanserai and cister at Abbasabad, Schahrud, Iran, (T. COPPLESTONE & B. S. MYERS (1967), p. 101), right: "Great Mosque of Samarra" (photo K. NEMECEK (1983))

Increased complexity occurs, when masons start to build vaults. But also here, inspite of some variability, one follows well-tried forms and structures, see Figure 20. Towers and columns with entasis optimize static behavior, but are surely found as a result of a trial and error process and not via mathematical reasoning (Figure 21).

Figure 20 - Medieval Arabic vaults, Bukhara (Usbekistan), (photos G. Weiss 2014)

Figure 21 - Medieval vaults and towers in Khiva and Bukhara (Usbekistan) with ornamentation by brickwork and glazed ceramic tiles (photos G. Weiss 2014)

Spherical domes or shells can also be found e.g. as yurts (Figure 22, left), and even there seem to be a clear objective to receive a so well regular as aesthetic building, natural resources and material restrictions determine the final result. A similar and striking case is the porch in Figure 22 (right).

Figure 22 - Left: Nomande yurt in Northern Afghanistan (A. STEINMANN (2003)); right: Porch construction of a house at Tiébélé, (Burkina Faso) (R. WILLAERT)

3 Examples of decorations of naïve architectural objects

A) Now we turn towards ornamentation, see Section **1, C)** and **E)**: Most of the already presented figures show symmetry and/or are decorated by segments of friezes as well as rosettes. Often a three- or four- fold translative repetition of a generating element, the "fundamental domain" in terms of Geometry, is enough to recognize a decoration as a frieze.

Occurence of *symmetry* is one oft he most used design elements in naive architecture, see Figure At rural areas in central Europe one still finds barn buildings as typical, purpose dominated naive architecture, which in most cases show symmetry. The first floor of such a barn houses farm animals, while the second floor and the loft is used for storage of hay and crop and the bedding straw. These buildings had a drive-up ramp leading centrally into the barn from the backside and which originally were dimensioned for horse carriages. The front facade of the barn turns, if possible, to the south and it shows a module structure with an rough overall symmetry oft he building as decorative elements (Figure 23). Sometimes the wall openings, which ensure the necessary air circulation to the stored hay, are closed by a lattice-work of rough bricks. Such use of rosettes and wallpaper ornaments by bricks occurs also in industrial buildings oft he 19th century (Figures 24 and 25).

Figure 23 - Typical Carinthian combined stable and barn buildings showing mopdule structure as well as over all symmetry (Carinthia, Austria. Fotos G. Weiss 2015)

Figure 24 - Combined stable and barn with later adaptations, showing symmetry and lattice-work of bricks in ist wall openings. (Klein St. Paul, Austria; photo G.Weiss 2016)

Figure 25 - Ruin of a furnace from the 19th century in Lölling, Austria. It shows rosette decorations made of bricks similar to barn decoration. (photo G.Weiss 2016).

Actual developments in farming replaces the necessity of storing hay and provender in barns by hay bales enveloped in silage film and stored outside. As also modern farming machines, as e.g. rotobalers and harvesters, are much broader and havier than horse carriages, the classical barn buildings are no longer optimal and a new style of farm buildings must be developed. Figure 26 shows such an example.

Figure 26 - Modern stable at Wieting, Austria, still showing module structure, but less charming as the old, no longer optimal barns of Figure 23, (photo G. Weiss 2016)

B) As already mentioned in Section **1**. **C)**, an alley along a road gives an impression of a "natural" frieze and it seems that friezes are indeed stimulated also by nature: a group of dancers (Figure 27 left) repeats in a greek temple frieze and similarely Jemenite ibexes act as antetypes of a frieze.

Figure 27 - Left: "Zervos" folkdance Olympos (Greece); middle: Greek frieze relief, 6th century BC, (P. SAMBANIDES & E. FRAGKIADAKI (1990), p. 60); right: Ibex frieze, Almagah-Temple, Marib Museum, Jemen [P. & M. MARÉCHAUX, p. 323)

One can hardly say that the decoration of the Tiébélé houses in Figures 12, 13, 16, 18 and 22 show wallpaper decorations, even the whole surface is painted. The decorations are vertically arranged friezes in contrast to most Europe and Asia influenced friezes, which occur horizontally. The portal of the 11th century Clonfert Cathedral, Eirland (J.E. WALKOWITZ (2006), Fig. 28, left) is a rare example, where one finds a trianguar piece of a wallpaper ornament. Usually, wallpaper ornaments are found at textiles, (see e.g. Fig. 28, right), occurring as a repetition of friezes.

Figure 28 - Left: Portal of Clonfert Cathedral, (Eireland), showing a wallpaper ornament as well as a rosette (J.E. WALKOWITZ (2006)); right: Rucksack and saddlebag, West- resp. Central-Afghanistan (A. STEINMANN (2003), p. 185 and 159), antique woven examples, where frieze pattern fit to wallpaper ornaments

Also for rosettes one can find human antetypes: Tribe meetings (see e.g. Figure 29, left), the coming together around a fireplace, and the professional mourners around a fu- neral, as can be found at some rural areas in Albania. Figure 29 (right) shows “geometric correct” rosettes carved by the Austrian artist Manfred Penz.

Figure 29 - Left: Meeting at village al-Houssoun, Al-Dshauf (Jemen), (P. & M. MARÈCHAUX 1993, p. 60); right: Chip-carved ornaments with 4-, 5-, 6-, 8- and 9-fold symmetries (artist: Manfred Penz 2002, photo G. WEISS (2015))

Figure 30 shows circular emblems filled with a naïve wallpaper decoration and a (typical Mexican) frieze at a buckler. These examples are “naïve” combinations of different types of geometric ornaments.

Figure 30 - Combination of different types of decorations, medieval fresco at the fortified church Grafenbach, Carinthia, Austria (left, GW2015), ancient Mexican buckler showing the staircase meander frieze motive, (right, [24, p. 209]).

We add further examples of rather advances ormaments, which can be found e.g. in Usbekistan’s silk road cities and also in Austria (Figures 31, 32 and 33).

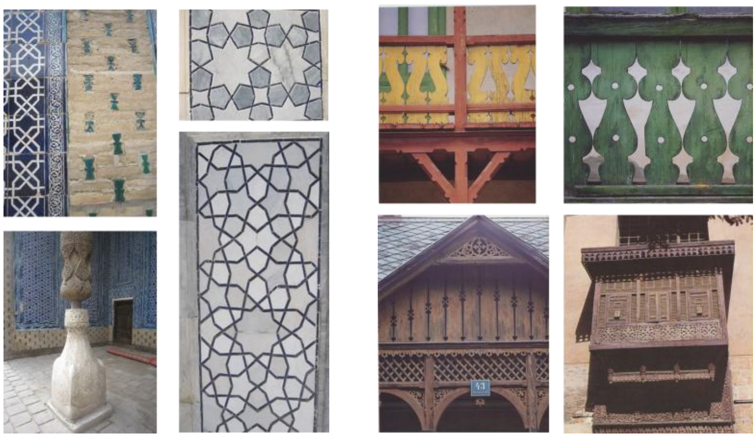

Figure 31 - Wallpaper and frieze ornaments found in Usbekistan's silk road cities and, as wooden balustrades, also in Austria, (photos G Weiss 2014)

Figure 32 - Dodecahedral ornament, ornaments with sevengons – a cubic problem, and helical ornaments, silk road cities (Usbekistan) (photos G. Weiss 2014)

Figure 33 - Further examples of realisations of friezes and rosettes, (photos G. Weiss)

C) Historical and traditional naïve buildings show (roughly) rectangular or circular ground plan, (Figures 34, 35 and 36). When studying the floor plans of European farm houses and those of naïve architectural objects on other continents we found that the predominant majority of rectangles are rather far from Golden Rectangles, see e.g. J. KRÄFTNER (1994), L. LOEWE (1963), H. DOLATSHAHI (2004), H.J. PREM & U. DYCKERHOFF (1986), and G. COLAGRECO (2014).

Figure 34 - Left: Sami hut in Lapland (Norway), (A.l. Christensen (1995), p. 56); middle: Yurt of the Zai Reza Firuzkuhi, Ghor, Afghanistan (A. Steinmann (2003), p.162), right: Reconstruction of a Roman villa,(NERVI & COARELLI (1971))

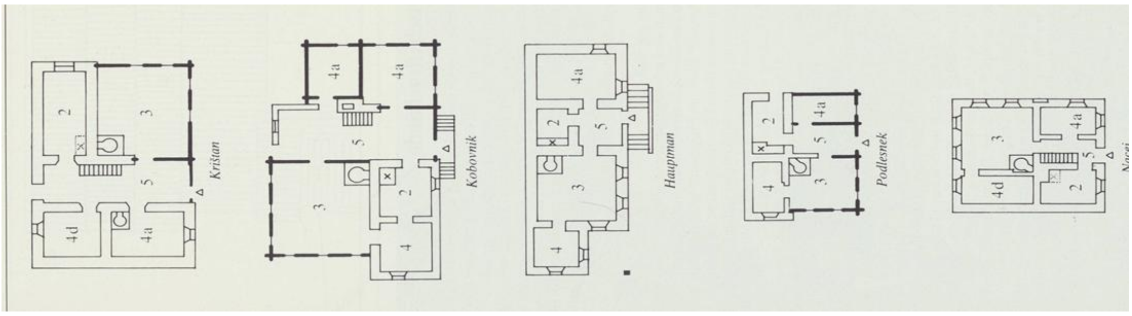

Figure 35 - Ground view projection of old house types in Norway, non of them showing Golden Rectangles; (A.L. CHRISTENSEN (1995), p.87).

For example, ancient Mexican temple and city architecture shows a preference of the square and the circle (Figure 26). The map of ancient Rome's public buildings, in spite of being not at all "naïve", does not contain Golden Rectangles either (see e.g. P.L. NERVI & F. COARELLI (1971) and Figure 34, right). It might be questionable, whether the aesthetics of rectangles is scale dependent. But e.g. the overwhelming majority of book formats or of frames of paintings in museums does not show the Golden Ratio either and a rough testing of (we admit only a few Central-European) people having no geometric education showed a preference of the uprised DIN-format as the best proportioned one different from a square. Maybe this result is culture dependent and caused because the tested sample is used and very familiar with the DIN-format.

Figure 36 - Squares, rectangles and circles as ground plans: Ancient Mexican architecture, temple area at Teotihuacán (up left), pueblo Bonito at Chaco Canyon, New Mexico, (up right), central temple at Malinalco (down), (PREM & DYCKERHOFF (1986) p. 142, p. 387, p. 228)

4 How can "naïve architecture" and its aesthetic be characterized?

Does it mean little or no complexity? Is it the occurrence of rough approximations of simple regular forms? Are simple, handmade decorations characteristics? Is it only "architectural plagiarism" of standards and building traditions with a little bit ad-hoc improvisation? We tried to show that as well fitness for purpose is an appealing feature as also individuality caused by ornamentation, but we cannot give an exact definition of what is meant by "naïve". We noticed that history and cultural and technical development have to be considered, too. One can hardly say that the pre-historic monument *Stonehenge* is naïve architecture in spite of it was performed without the knowledge of graphics tools and Descriptive Geometry. Nevertheless one can find regular geometric forms occurring already in pre-historic times, see Figure 37.

Figure 37 - Left: Neolithic settlement in Chirokitia, (Cyprus); middle: Shelters (Iran); right: House altar, Marib, (Jemen)

From early history religion visualized the perfectness of the transcendent by regular architectural objects. The geometric exactness of Egyptian temples was inherited by Christian monasteries, where the "holy buildings" again show perfect symmetry and proportions, while offices and service buildings, representing the human sphere should not be perfect. Examples are shown in Figure 38.

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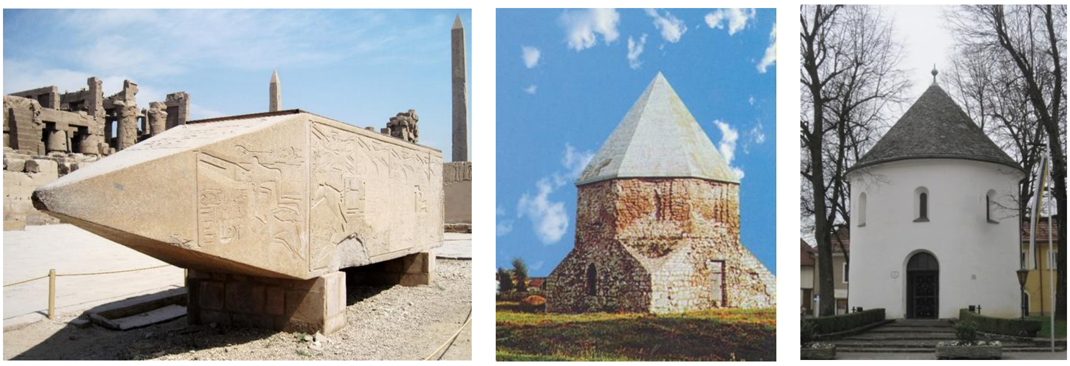

Figure 38 - Egyptian obelisk, Armenian church and Carinthian romanic ossuary, examples of “perfect forms“ visualizing thereligious transcendent perfect world

Obviously different societies and cultures develop their own specific aesthetis. As contrasting examples we present the aesthetics of Shakers and of Austrian rural areas, Figures 39 and 40.

Figure 39 - Examples for the aesthetics of a Shaker society,
(see J. SPRIGG & D. LARKIN (1987))

Figure 40 - Examples fort he aesthetics of rural societies in Austria,
(see J. KRÄFTNER (1994))

5 Conclusion

We presented naïve architectural objects with respect to two aspects: their more or less simple geometric form on one hand and their proportions and decorations on the other. We point out that naive architects intend to perform at abstract geometric forms, because such forms are easy to communicate verbally or by simple freehand sketches. One of the key features of naive architectural objects is *optimal usability* in historical context. Of course culture, building traditions and material have strong influence, too. Also decoration follows the predominant aesthetics and is time-dependent, too. But decoration of naive buildings often shows sort of a fractal structure with distance dependent eye catchers, a principle which corresponds to natural visual habits.

Masons and carpenters mainly followed traditions and methods, which have stood the test of time. In all the architectural objects one finds the intension of making regular and periodic forms, but the Golden Proportion, in spite of ist seemingly frequent occurrence in nature, can hardly be found at naïve architectural objects.

We also point out that former time's masons and carpenters communicated verbally and maybe used just rough freehand sketches for graphic communication. Scaled graphics constructions, which can be called "plans", were hardly in use. The measuring tools were designed for 1:1-scale use. Craftspeople learned by doing and they became experienced without graphic visualisations! But this compelled more or less to building traditions according to the saying: "What worked well for my neighbor will also be a good solution for me." This, besides purpose orientation, restricted the richness and variability of forms.

Dealing with 3D-objects craftspeople apparently gained (and still gain) a well-developed spatial representation without the use of (exact) graphic visualisations. Even some knowledge of top and front view projection developed already at medieval masons' loges, but exact graphics representation methods were developed not before the beginning of the 19th century by Gaspard Monge. Using Descriptive Geometry as a tool during the planning process caused a paradigm shift similar to nowadays new media in Architectural Design. It surely supported already existing spatial abilities and allowed to increase and enrich the complexity of Architecture. But as a tool for developing spatial representation Descriptive Geometry and CAAD - tools are rather questionable.

These facts could (should?) have an impact to actual graphics education of engineers and architects: We can only interpret visualisations properly, if they cause a detailed 3D-model in our mind and this is not only a matter of the visualisation, but rather a matter of our pre-experience and ability to handle 3D-objects virtually in our mind. We should also keep in mind that the key principle of gaining knowledge in times of "no-Monge" and "no CAAD" was learning by doing. By this also material intelligence and flexibility for ad-hoc solutions and improvisation was and is developed. To foster this ability of a human being also nowadays one had to start at very early age with producing real 3D-models and dealing with real materials and keep on with this during the period of education. As already mentioned an das G. MARESCH (2011) stated: Virtual reality alone is not enough!

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