

## AUSTRONESIAN AS RATIONALE FOR REGIONAL ARCHITECTURE IN THE PHILIPPINE CORDILLERAS

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### Abstract

The subject of vernacularism as basis for local character in the Philippines’ Cordillera region and its Igorot culture groups remains an elusive topic in this nation which has gone thru three centuries of Spanish and half a century of American colonial rule. Language-wise however, and compared to countries with similar histories with a past western colonizer (like most of Latin America wherein the indigenous languages have almost been completely obliterated by the past colonizer’s introduced language), it is clear that the Philippine languages including those of the Cordilleras, remain relatively intact and in active use.

The disparity between the Cordillera peoples’ arrested state of architectural development vis-à-vis the active state of their mother tongues is the inspiration leading to the locus of this study. Based on the premise of the Austronesian heritage of selected Cordillera culture groups and their native languages, a lexicostatistical database was gathered to determine how divergent each culture group has wandered away from the mother tongue. The extracted language variables per respective culture group yields mathematically operable parameters for quantifying culture, despite perceived intangible attributes. Analyses of visible elements of the indigenous dwellings of the culture groups, on the other hand, were the bases for extracting likewise operable parameters to represent the tangible aspect of culture. The mathematically-derived fusion of the native language and native architectural values thereupon produced what may be promoted as an architectural anthropology template applicable for building programs in selected sites within the Cordillera region of the Philippines.

A definitive application of this culturally-sensitive building program is exemplified thru a proposed fundamental social infrastructure in the City of Baguio, which serves as the regional hub of the Cordillera Administrative Region (CAR), with further impetus for its implementation on the grounds of the City recently being accorded the recognition of “Creative City” by the UNESCO. The City itself was founded as a hill station during the colonial days of American rule. Therefore this architectural anthropology undertaking shall also serve as a symbolic gesture of the long overdue sovereignty of the indigenous Cordillera peoples and the whole Filipino nation over their past colonizers.

**Keywords :** architectural anthropology, Austronesian, Cordillera, Igorot, thermodynamic analogy, shape grammar, lexicostatistics, pattern language, community architecture, kit of parts

### 1.0 RESEARCH BACKGROUND

The Philippines’ CAR (Cordillera Administrative Region) was established as a separate administrative region on accounts of its distinctive cultural and physical setting. Compared to the typical Philippine lowland- based mainstream cultures of the country which other than their divergent languages is relatively androgynous amongst their lowland physical and traditionally Hispanized Christian cultural settings, the CAR continues to hold on to its own unique character as regards natural and built environments despite the onslaught of present day pressures.

The peopling of this region falls within the Austronesian stream of populations (Bellwood, Fox and Tryon, 2006) which is the world’s most widely dispersed culture based on a language base (Blust, 2009). Continuing studies on how the CAR was populated increasingly point to the ethno-linguistic ties that the Cordillera peoples have with the rest of the pan-regional Austronesian community (Bellwood and Sanchez-Mazas, 2008).

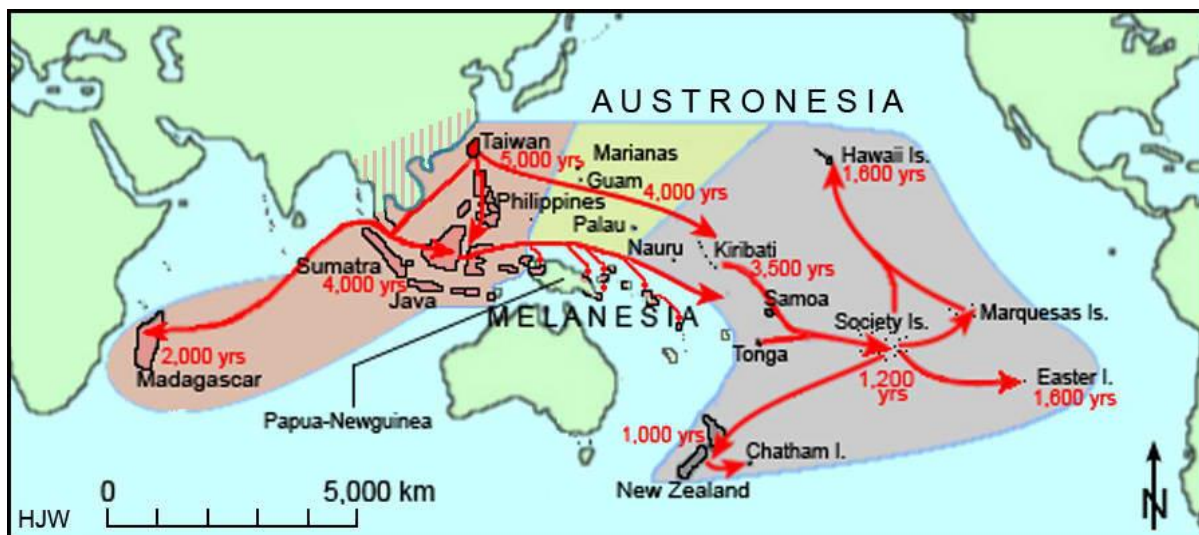


Figure 1. Map of the realm of Austronesian culture  
 source: <http://abagond.files.wordpress.com/2011/02/austronesia.jpg>

Interdisciplinary research increasingly reinforce the Austronesian concept of population migrations to the Philippines from a northern origin (Blust), which provided the genesis of the CAR and Igorot peoples of northern Luzon.



Figure 2. Map showing CAR in relation to the other Philippine regions.  
 source: [http://4.bp.blogspot.com/-4P1M/UdpQ8fxhUKI/AAAAAAAAAMP4/OtYsFJd6myo/s1600/philippines\\_map.jpg](http://4.bp.blogspot.com/-4P1M/UdpQ8fxhUKI/AAAAAAAAAMP4/OtYsFJd6myo/s1600/philippines_map.jpg)

The Cordillera Administrative Region (CAR) color-coded in gold is clearly shown as the only landlocked region in the Philippines. The Batanes Islands to the north of Luzon were a transit point of the Austronesians from Taiwan (Formosa) en route to the northern shores of Luzon island (Solheim, 2006). What was once thought of as the “2<sup>nd</sup> wave of migration” from Indonesia as the basis of the peopling of the Cordilleras by Prof. Otley Beyer has now been discredited (Zamora, 1967). The Austronesian theory states that the ancestors of the Cordillera peoples came from the north thru the Formosan “aboriginal” peoples who are now considered as the primary source of all Austronesian cultures in the world. Upon reaching the northern shores of Luzon, the Cordillera forebears would eventually settle the central highlands of the island, brought about by pressures from subsequent waves of migration and also the physical environment.

The native dwellings of the culture groups symbolized a historical aspect of the respective ethnic groups where they belong (Waterson, 1993). Language on the other hand being in active use in present times by the ethnic groups symbolizes a descriptive aspect of their intangible cultures. The resultant architectural anthropology values produced from the fusion of the native dwelling values with the anthropology values thru architectural programming produced a building form that subsumed the collective cultures of the nine culture groups. This architectural design phase represented the experimental phase of the study. The architectural outcome therefore- like the native dwellings and the languages of which it was borne out of- aspired to convey messages evocative of the C.A.R. community it represented.



Figure 3. **Administrative Map of CAR (Cordillera Administrative Region) in the context of Northern Luzon.**  
source: [www.traveltothephilippines.info/wp-content/uploads/2011/12/car-map.png](http://www.traveltothephilippines.info/wp-content/uploads/2011/12/car-map.png)

Seven of the nine ethnic groups are within the confines of the political boundaries of the CAR- roughly from north to south: the Apayao, Kalinga, the Tinggian, the Bontoc, the Ifugao, the Kankanaey and the Ibaloi. Two ethnic groups lie in the eastern and southeastern flanks of this only-landlocked region in the Philippines: the Gaddang to the eastern boundaries of Mountain Province; and the Ilongot at the confluence of Nueva Vizcaya and Quirino provinces. Collectively, these nine ethnic groups constitute the Igorot hill tribes of the central mountain range of Northern Luzon (Scott, 1969).

## ■ 2.0 PURPOSE OF THE STUDY

This study was conducted to advocate a regional character of CAR architecture based on selected cultural variables, by presenting a logical basis for promoting a pattern language (Alexander, 1977) symbolic of the unique Cordillera culture and environment. The CAR is unique among all the regions of the Philippines, culturally and geographically (Peralta, 2001), and it is about time that the emancipated peoples of the Cordilleras also have an equally emancipated tangible expression (Rapoport, 2005) of their unique identity thru what may be considered an architectural antidote to the prevailing colonial mentality. Specifically, the study sought to address the following challenges:

1. To determine how divergent selected CAR and Igorot ethnic groups have drifted away from the base Austronesian culture hearth by correlating selected cultural variables of these ethnic groups vis-à-vis the Austronesian benchmark;
2. To utilize these selected cultural variables of the CAR and Igorot ethnic groups as architectural tools to derive a viable design for a built structure evocative of the unique cultural and environmental contexts of the region;
3. To promote an advocacy for CAR architecture which is evocative of the CAR ethnic groups' unique cultural and physical contexts derived from the distillation of the chosen cultural attributes and to further determine whether physical factors influence cultural elements in the production of architectural design; or whether cultural factors influence physical elements in the production of architectural design; or is it an iterative syllogism.

## ■ 3.0 LITERATURE REVIEW

Architectural anthropology (Egenter, 1992) under the premise of logical argumentation (Groat and Wang, 2001) was the underlying design of this study in between a purely cultural research and a mathematical study. Nine Cordillera culture groups' languages (Peralta, 2001) and their respective native architectures (Sato, 1991) were treated as independent variables based on the values which were extracted from their respective formulae (Salingaros, 1997).

Language, particularly linguistics of the phonetic type (Gudschinsky, 2015), which is a basic element of (nonmaterial) culture symbolizes "community", the social dimension of shelter. And architecture, particularly native architecture, represents material culture (Rapoport, 2005) which symbolizes "housing", the physical dimension of shelter. Thus, the two variables taken as a composite will be a viable determinant for CAR culture and its relation to the larger cultural context of the Austronesian realm.

## ■ 4.0 METHODOLOGY

Establishing quantifiable parameters of "architectural anthropology" (Egenter, 1997) in this study were determined by two main variables, one each representing culture and architecture, representing the nine culture groups of the Apayao, Bontoc, Gaddang, Ibaloi, Ifugao, Ilongot, Kalinga, Kankanaey and Tingguian.

The variable that represented the culture groups' intangible element was spoken native language, analyzed thru phonetic lexicostatistical processing. To quantify the native languages for mathematical operation, values were assigned as regards their phonetic distance from a control Austronesian benchmark from a database of 100 words.

Color index	Phonetic approximation assessment	Value assignment
red	Phonetic sound the same as the Austronesian term	1.00
gold	Phonetic sound almost the same as the Austronesian term	0.75
tan	Phonetic sound near the Austronesian term	0.50
light yellow	Phonetic sound very slightly near the Austronesian term	0.25
no color	Phonetic sound no similarity at all to Austronesian term	0.00

Table 1. Value Assignments for Cross-Linguistic Translator Analysis thru Phonetic Approximation vis-à-vis Austronesian Language Base

Color coding was introduced aside from the numerical values for the phonetic proximities to aid in visually assessing the results of the master worksheet especially when all entries for the 100 words have been encoded. The clustering together of similar colors over an area of the worksheet aided in instantaneously identifying at a glance which group of words were already showing tendencies of proximity to the base Austronesian language hearth.

The variable that represented the culture groups' architecture (representing the groups' tangible element) was their respective native dwellings (Rapoport, 2005), that were analyzed thru thermodynamic analogy of aesthetics assessment (Salingaros,1997). This thermodynamic model borrows also on the ideas of pattern languages (Alexander, 1977) to estimate these intrinsic qualities of a building as if it were a thermodynamic object. The architectural temperature T is defined as the degree of detail, curvature and color in architectural forms; and the architectural harmony H measures the degree of coherence and internal symmetry. Thus these two variables were utilized to predict a building's emotional impact as experienced by an onlooker visually assessing the building from the outside, as if it were an art object.

According to Dr. Salingaros, the impression of how much "life" a building has is measured by the expression

$$L = T*H$$

where L = architectural life  
 T = architectural temperature  
 H = architectural harmony

and the perceived complexity of a design is measured by the expression

$$C = T*(10-H)$$

where C = architectural complexity  
 T = architectural temperature  
 (10-H) = architectural entropy

The independent variables each produce their own respective values which subsequently pass thru their own assigned mathematical operations thereby becoming dependent variables: native language values are extracted thru lexicostatistical computations (Gudschinsky, 2015) and native architecture values are extracted thru thermodynamic computations (Salingaros, 1997).

The two extracted dependent variables will thus be combined thru a formula which represents a viable proportion of nonmaterial versus material culture for the respective CAR ethnic groups. Thence, the nine composite values representing the nine CAR groups will produce a pattern language which when manipulated thru shape grammar will produce a pattern language that will be a foundation, literally and figuratively, for CAR architecture with regional character.

In order to fuse together the two variables of native language and native architecture towards a quantifiable architectural program, ratios were assigned according to the researcher's perception of what constitutes culture as regards material and immaterial aspects, thus:

	Aspect of Culture	Variable	Quantifying tool and procedure	Percentage as regards Cultural Composite whole	Cultural composite (variable 1 + variable 2)
Variable 1	Nonmaterial	Native language	Lexicostatistics thru Cross-Linguistic Translator	0.80	1.00
Variable 2	material	Native architecture	Thermodynamic Assessment	0.20	

Table 2. Assigning ratios for Anthropology vis-a-vis Architecture

The choice of native language and native architecture to represent variables for nonmaterial and material culture respectively from an Asian/ non-western perspective were based on indicators from NUS/ National University of Singapore. *The Elements of Culture*. retrieved from <http://courses.nus.edu.sg/course/socsja/SC1101/CultureTAB.html>

Thereupon, composite values extracted from the merging of anthropology and architecture (thus "architectural anthropology") would then be subject to a "kit-of-parts" analogy for architectural form generation (Stiny, George, 2006) based on the dominant elements of Igorot vernacular building traditions. A matrix of patterns ("pattern language") is presented according to the nine culture groups:

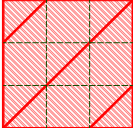
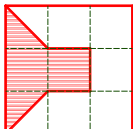

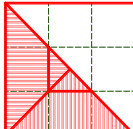
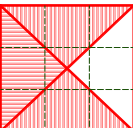
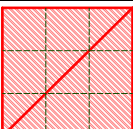
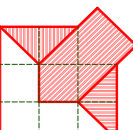
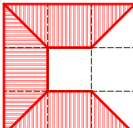
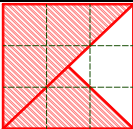
Culture group	Shape grammar	Brief description
APAYAO		Based on the gable-roofed, boat-like "binuron" which makes it the most "Austronesian" of all the CAR native dwellings)
BONTOC		Based on the "fay-u" with the semi-pyramidal roof which gives a hint of the nested granary in the middle of the house cavity. This was the prototype case study Koji Sato presented representing the CAR.
GADDANG		Based on the "kulub" whose roof form is a fusion between oblique and normal roof alignments
IBALOI		Based on the "dema" whose roof sports a dual sloped profile with a steeper hip girdled by a shallower skirt roof. Next to the Apayao "binuron", this is the next closest to the prototype Austronesian roof
IFUGAO		Based from the popular "fal-e" roof which is basically a square-based pyramid which has been stereotyped as the icon for Cordillera architecture
ILONGOT		Based on the gable-roofed "qabung" which among the CAR ethnic groups is the simplest, similar to archetypal lowland farmstead structures
KALINGA		Based on the octagonal planned but basically gable-roofed "binalyon" which has the most complex shape among all the nine CAR groups' native dwellings, for both the native and the extracted genres
KANKANAHEY		Based on the "binangiyan" whose roof is similar to the Bontoc "fay-u" but whose nested granary inside has its own roof- a subtle "house within a house"
TINGGUIAN		Based on the tiered gable-roofed "abung" which, because of their proximity to the Ilocano culture hearths, is similar to their "kalapaw"

Table 3. Summary of native architecture alignments and geometries to building form template: shape grammars for the nine CAR ethnic groups

## ■ 5.0 RESEARCH FINDINGS

The results of the nine CAR ethnic groups' selected cultural variables' correlation to the Austronesian benchmark indicate in quantitative terms their divergence away from the control. Further compounding of this cultural divergence was done by multiplying each respective culture group's language and architecture composite with their respective population figures. This composite quantified language\*population anthropological value would thus give an indication of the number of people possessing this cultural attribute based on Austronesian. This quantified anthropological value which is a mathematical expression of a culture trait and an extract of demographics represents the number of humans with this attribute. This anthropology value for the ethnic groups conceptually represented the relative weight of the ethnic groups versus the whole CAR region's anthropology attributes.

The findings for the native architecture value from the thermodynamic analogy calculations of the native dwellings were produced using the thermodynamic analogy procedure for each of the nine ethnic groups' native dwelling compared to the Austronesian native dwelling. The native anthropological value fused with the native architectural value resulting to architectural anthropology value will then determine to what vertical extrusion each ethnic group's building block will reach.

The outcome of fusing together the anthropology (from language) and architecture (from native dwellings) value extraction procedures were then distilled to produce an architectural anthropology composite. The technique of "kit of parts" is the procedure for distilling the CAR native language and native architectures to produce the "pattern language" for the subsequent full architectural translation. Kit of parts is defined in the operational definition of terms to be a metaphor between how the composition of buildings is akin to the composition of biological organisms. Thus if a biological organism's "kit of parts" is comprised of cell to tissue to organ to system to full organism, how this may be applied to the architectural translation of this study is:

- a. Cell : the native language and native architecture components
- b. Tissue : the shape grammar derived for each ethnic group
- c. System : the pattern language derived for each ethnic group
- d. Organism : the full architectural composition

	Anthropology Value Transmuted	Architectural Life Transmuted	Architectural Complexity Transmuted	Architectural Anthropology Composite
	80	10	10	100
Kankanaey	80.00	5.37	3.54	89
Ifugao	76.75	6.61	2.02	85
Bontoc	49.28	4.34	4.80	58
Kalinga	46.13	7.13	6.44	60
Ibaloi	44.83	8.33	2.96	56
Tingguian	26.45	7.81	4.60	39
Ilongot	22.37	3.60	1.67	28
Apayao	20.23	8.33	2.96	32
Gaddang	16.71	5.58	3.28	26
Austronesian	Not applicable	10.00	10.00	Not applicable

Table 4. Summary of ethnic groups' anthropology and architecture values to produce architectural anthropology composite

Initial results show that the Kankanaey architectural anthropology composite is highest, mainly by virtue of their large population. Initially the Gaddang had the highest figures as regards proximity to the Austronesian control variable, meaning they came closest to a purified Austronesian culture, language wise but were offset by a low population count.

## ■ 6.0 DISCUSSIONS

In evaluating the results and findings of the study, the same three objectives mentioned earlier have to be addressed. It can be said that the first and the second objectives have been substantially answered because of the quantitative procedures utilized. Extracting results from large amounts of numerical data from otherwise qualitative variables like language and native architecture is deemed more reliable and bias-free compared to arbitrary selection from unscientific procedures.

For the third objective, it can be said that it can only be answered partly because the aspect of community involvement still has to be tested in further studies emergent from this current study. In fact, its partial answering of this objective might even be advantageous as it is the intention of the researcher to provide only the basic core and shell of the building should

there be an actual implementation of the architectural design phase of this study. The community shall take part already in filling up the deliberately vacant spaces within the shell provided by the roof and the service cores. This is borrowing on the current philosophies of architects Aravena (2014) and Ingels (2012), and the emergent paradigms of evolutionary architecture (Spuybroek, 2009).

Anticipated opposition to the nature of the study might include the enforcement of putting a numerical value on qualitative attributes like language and aesthetics. The researcher is in agreement however with the philosophies of the likes of physicists like Dr. Salingaros who argue that even subjective fundamentals of architecture like beauty can indeed be quantified. Consequently, it is a known fact already that even biological species have mathematical attributes within their morphologies. The Fibonacci number series for example are found in the composition of nautilus shells, pine cones and daisy florets. Reliance on numbers in this study therefore negates the tendency of subsequent architectural decision-making based on whim.

Another anticipated disagreement as regards the advocacies of the study include opposition from conventional architectural practice regarding involving the community in the planning and development of the subsequent implementation phase. Conventional architectural practice is mainly premised on a single-authority design procedure pitting the dominance of the architect versus the captive community (who will be using the facility anyway).

Subsequent arguments regarding the procedures and outcomes of the study will be safely answered by the researcher's thrust for community architecture infused in the title of the study itself.

The implications of the results and findings are evident in the study's reiteration of its community-based advocacy. An indication of the success of the study will include a built fruition of its architectural treatise meant for its intended subjects and its examiners.

Anchored on the syllogistic nature of logical argumentation (Groat and Wang, 2001) as defense against all possible disagreements, the "formal/ mathematical" aspects of the study was done thru lexicostatistical processing and thermodynamic analysis for language and architecture respectively. The "cultural" aspects of the study were carried out with advocacy treatises. And the conjoining dimension in between the quantitative phase of the forma/ mathematical vis-à-vis the qualitative phase of the cultural was carried out with the architectural design procedures of kit of parts, shape grammar and pattern language.

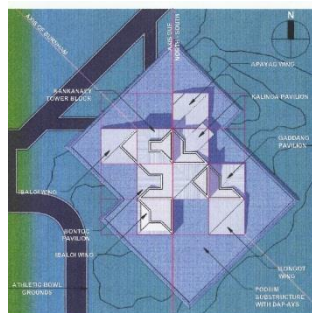


Figure 4. **Composite Plan**  
showing the nine CAR pattern language bundle

The procedures of shape grammar (Stiny, 2006) utilizing extracts from a kit-of-parts architectural palette were the programming elements in carrying over the extracts from the architectural anthropology phase towards form derivation in the architectural design development itself.

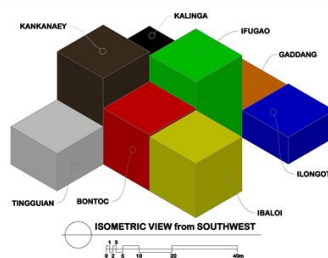


Figure 5. **Isometric view of programmed building cluster from southwest**



Individual heights of the individual ethnic groups' assigned block was determined by values arising from the architectural anthropology extract multiplied by population figures.



Figure 6. **Application of the Architectural Anthropology Study in Urban Design Scale: A Proposed Cordillera Cultural Center as Social Infrastructure for Baguio City, Philippines**

Author's architectural concept based on programming leading to building design through comprehensive extraction of cultural attributes of native language and native architecture

The City of Baguio established as a hill station by the Americans during the early 20<sup>th</sup> century was itself designed by the architect Daniel H. Burnham as a showcase of the "City Beautiful" movement with colonial imperialism itself manifesting up to the present times. The proposed Cultural Center shall serve as a counterpoint to this neo-colonial tendency to adore western ideals by promoting native Cordillera genres of culture.

The advocacy aspect of the third objective was dealt with with community architecture. Borrowing on the philosophies of Pritzker Prize awardee Alejandro Aravena (Aravena, 2014) and the "architect as midwife" advocacy of Bjarke Ingels (Ingels, 2012), the full architectural intent in the implementation stage would be to provide only the basic shell and services of the building and let the community- in coordination with authorities and the architect- subsequently add to the functional areas and spaces identified thru public consultations and incremental community development advocacies. Borrowing on the logical argumentation tactics of Ingels to coin oxymoronic terminologies to advance his philosophies (like "hedonistic sustainability"), the researcher perhaps would be sanctioned in christening this combined approach of architectural system change (Groat and Wang, 2001) as "utopian methodism" or "methodical utopianism".

## ■ 7.0 CONCLUSION

As an objective of this study is to advocate native Cordillera culture thru architecture as a viable engagement in design in different scales, e.g. from furniture design to urban planning- . the hagabi and the ili respectively (Scott), it is essential that the present CAR generations be aware of how their culture was perceived by the Americans, the same culture that supposedly emancipated the Igorots into mainstream civilization. It is an intriguing fact that this white race that the CAR peoples (and most other Filipinos) subordinated themselves to is the same race who would proclaim their superiority likewise thru their brand of "noble architecture"(Catanesse and Snyder, 2006). As a way of proclaiming their supremacy over their captive new colony of the Philippines, they staged an exhibit in the 1904 St. Louis World's fair showcasing their grandiose Neoclassical temples versus the crude Igorot huts (Fermin, 2004).

The City of Baguio particularly is fertile ground for exercising this advocacy especially that there is a bias as regards the grand "Great White City" and "City Beautiful" imperialistic plans of Daniel Burnham, who designed both the layouts of Baguio and parts of Manila. Arguably, although the plans of Burnham may be credited for establishing some lofty noble visions for this mountain hill city, his and the American colonial planners hardly considered the indigenous native aspect of the locale. Examples of how the Americans literally and figuratively purged native Cordillera culture in their plans for the city are featured in selected publications like those of Fermin (2004) and Clevenger (2004).

The researcher goes on in advocating terms to promote emerging treatises in Philippine architecture like "barok" to counter the western mindset in perceiving Spanish Baroque in the country; or most specifically for the contemporary architecture appropriate for the unique physical and cultural context of the CAR- thus "CARchitecture".

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