An Outline of the Siumatgwoon
初論兆物觀

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Epigraphs

> Learning the Chinese language requires bodies of iron, lungs of brass, heads of oak, hands of spring steel, eyes of eagles, hearts of apostles, memories of angels, and lives of Methuselah.
>
> —William Milne, who first translated the Bible into Classical Chinese in 1816.

> ... the Chinese [as] a people [are] characterised by a marvellous degree of imbecility, avarice, conceit and obstinacy...
>
> —James Matheson, cofounder of Jardine Matheson & Co, 1840s.

> China has no philosophy, only thought.
>
> Jacques Derrida, 2001, Peking University.

> Writing as late as 1898, Huang Qingcheng 黃慶澄 (1863–1904) placed the only Chinese monograph on logic available at the time in the category of books on “dialects” (fangyan 方言), that is, foreign languages, and Liang Qichao 梁啟超 (1873–1929), who was considered one of the foremost authorities in matters of new knowledge, listed the same text as a work “impossible to classify” (無可歸類)—alongside museum guides and cookbooks.
>
> —The Discovery of Chinese Logic, Joachim Kurtz

Let us calculate! When controversies arise, there will be no need for dispute between two philosophers. It will suffice to take up their pens, sit down at their slates, and say to each other: Let us calculate!

—Leibniz, *De Arte Combinatoria*, 1666

You savages of the further seas have waxed so bold, it seems, as to defy and insult our mighty Empire. Of a truth it is high time for you to "flay the face and cleanse the heart," and to amend your ways. If you submit humbly to the Celestial dynasty and tender your allegiance, it may give you a chance to purge yourself of your past sins. But if you continue and persist in your path of obstinate delusion, your three islands will be laid waste and your people pounded into mincemeat, so soon as the armies of his Divine Majesty set foot upon your shores.

– Lin Zexu, the Hokkien Qing Imperialist, in Manchu occupied Canton, to HM Queen Victoria's Government, 1839

Examples of Siumatgwoons

What are some examples of Siumatgwoons?

The Chinese Characters, 字

The Chinese characters, which inspired this whole mathematical exercise, is clearly a Siumatgwoon. If we exercise the synonym exchange of "Siumatgwoon" with "Metaphysic", this is to say, that the Chinese characters is a Metaphysic. Unfortunately we can't really prove that the Chinese characters are indeed a siumatgwoon, given there's an infinite number of them, and we do not have a generating rule for all Chinese characters. However, the fact that any subset of Chinese characters is a siumatgwoon in of itself, lends us confidence - perhaps there's a theorem there waiting to be proved?

The Roman Numerals $\mathfrak{R}$

One can clearly see that Roman Numerals $\mathfrak{R}$ are a Siumatgwoon. However, to appreciate the characteristics that make it a Siumatgwoon, let us consider the subset of Roman Numerals from 1 to 10, which we shall show to also be a Siumatgwoon.

$\mathfrak{R}_{1,10} = \{I, II, III, IV, V, VI, VII, VIII, IX, X\}$

We will say that for two elements $a, b \in \mathfrak{R}_{1,10}$, $a|b$ iff the glyph a appears in b. As such, we can say $I|II$ and $I|III$ as an example, and that $V|IV$ and $X|IX$.

For any elements $a, b \in \mathfrak{R}_{1,10}$, if the glyphs ab so written together forms a glyph that also appears in $\mathfrak{R}_{1,10}$, then we'd say that $a * b \in \mathfrak{R}$.

Now, it's clear that Ax 1 is satisfied trivially.

Ax 2 is also satisfied trivially.

Ax 3 is also satisfied.

Ax 4 is also satisfied. As an example: $I|III, III|VIII$ and we have $I|VIII$.

So therefore, $\mathfrak{R}_{1,10}$ is a Siumatgwoon.

It is also interesting to note that as per the definition of $\mathfrak{R}_{1,10}$, it is not compositionally closed. For example, $II * III$ is not in $\mathfrak{R}_{1,10}$. This makes the Siumatgwoon different from a group, where all compositions are contained inside the group. Intuitively, perhaps this suggests the Siumatgwoon is less rich in structure than the mathematical group? Also, note that what $II * III$ should be in $\mathfrak{R}_{1,10}$ is represented by V. Intuitively, we can feel that in some sense, $II * III = V$ - that they're synonymous, identical, referring to the same referent. This is not unlike the presence of variant characters in the Sinoglyphs, such as 體 (body, object)= 骵 = 躰 = 体, or 信 (trust) = 訫 = 伩 = 䚱 = 㐰…Intuition should hint that this will yield some interesting structures if we pursue the investigation down this path.

Any Numerals System

The fact that the Roman Numerals are a Siumatgwoon should intuitively suggest that any numeral system is a Siumatgwoon. In fact, let us consider the world's many numeral systems, and see if there is one where it is not a siumatgwoon.

	0	1	2	3	4	5	6	7	8	9
唐字數字	〇	一	二	三	四	五	六	七	八	九
唐字數字大寫	零	壹、弌	貳	叄	肆	伍	陸	柒	捌	玖
字喃		𠬠	𠄩	𠀧	𦊚	𠄼	𦒹	𦉱	𠔭	𠃩
蘇州碼子	〇	〡、一	〢、二	〣、三	〤	〥	〦	〧	〨	〩
Roman Numerals		I	II	III	IV	V	VI	VII	VIII	IX
Eastern Arabic	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
Persian	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
Devanagari	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
Gujarati	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
Tibetan	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
Hebrew		⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
Chinese counting rods		⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧	⌧
counting 正		⌧	⌧	⌧	⌧	⌧	⌧⌧	⌧⌧	⌧⌧	⌧⌧
Tangut		⍰	⍰	⍰	⍰	⍰	⍰	⍰	⍰	⍰

I don't think there's a single one that's not a siumatgwoon! Most of them are pathological for sure, in the sense that nothing is constituted by anything else, but none of them violate the Siumatgwoon axioms!

The case of the numerals as a Siumatgwoon, or a Metaphysic, is interesting. Numerals all refer to the same referents, the same "things" or "objects", namely, numbers. However, the glyphs in a given numeral system are themselves imbued with a particular set of metaphysical prejudices and judgements. Under the Roman Numeral Metaphysic, the number 3 is composed of 1 and 2, or composed of three 1s. 4 is composed of 1 and 5, but not 3 and 2.

The Polygons $\mathcal{P}$

Consider the following graph. If we take all the polygons, convex and star, as elements in a set called $\mathcal{P}$, we can see that it forms a Siumatgwoon. We state this without formal proof for the infinite set $\mathcal{P}$, but from the subset displayed in the graph below, we can see it is indeed true. A polygon a constitutes polygon b if a appears in b. $\{3\}$, the equilateral triangle, appears in $\{6/2\}$, the star of David, and so $\{3\}|\{6/2\}$

The Schläfli symbol is a recursive description, starting with $\{p\}$ for a p-sided regular polygon that is convex. For example, $\{3\}$ is an equilateral triangle, $\{4\}$ is a square, $\{5\}$ a convex regular pentagon, etc.

Regular star polygons are not convex, and their Schläfli symbols take the form $\{p/q\}$, where p is the number of vertices and q is their turning number. Equivalently, $\{p/q\}$ is created from the vertices of $\{p\}$ by connecting

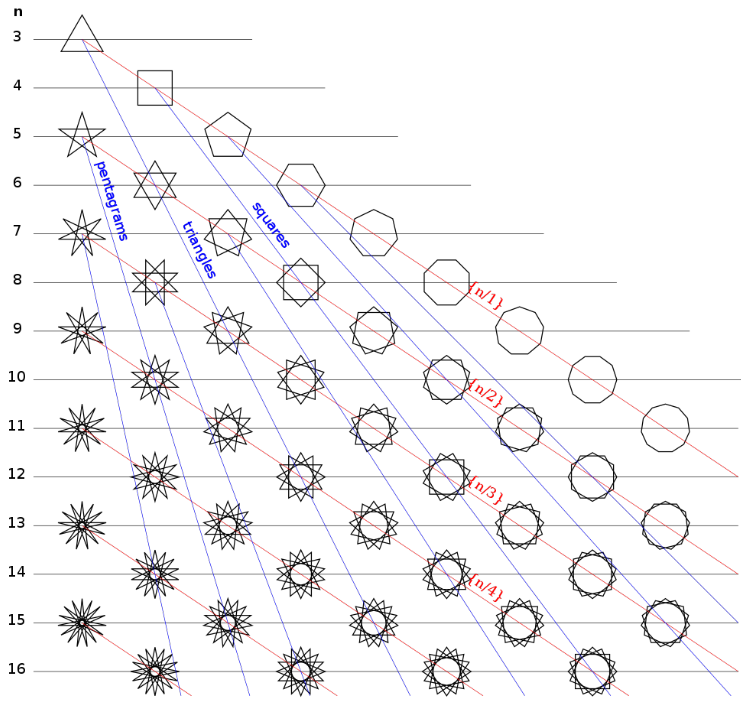

圖 1: A graph of the polygons

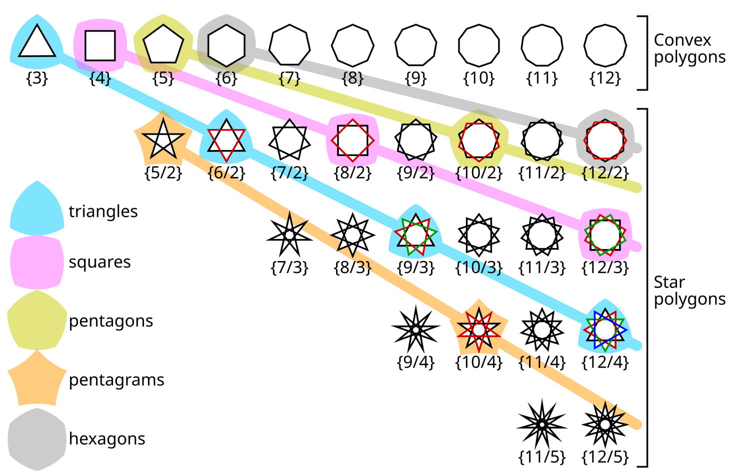

圖 2: A graph of the polygons

every qth vertex. For example, $\{5/2\}$ is a pentagram, while $\{5\}$ is a pentagon.

Note that p and q must be coprime, or the figure will degenerate, in which case we have the following theorem:

$\{p/q\} = d\{\frac{p}{d}/\frac{q}{d}\}$, where $d = \gcd(p, q)$.

Let us define for any Schläfli symbol $\{p\}|n\{p\}$ for any n. It is intuitively true.

Then clearly axiom 1 is satisfied. Axiom 2 is also satisfied.

Propositional Logic

There are 3 flavors of $*$ in Propositional Logic: $\wedge, \vee, \rightarrow$.

And we define $\phi|\psi$ if ϕ appears in ψ, for any wff ϕ, ψ.

Then clearly all 4 of the core siumatgwoon axioms are satisfied.

1. Trivial that all $\phi|\phi$
2. Also trivial that for any ϕ, ψ, either $\phi|\psi$ or $\phi \not|\psi$.
3. Trivial as well that for any $\phi, \psi|\phi * \psi$.
4. Also trivial that if $\phi|\psi$ and $\psi|\theta$ then $\phi|\theta$.

Propositional Logic as a Siumatgwoon has multiple interesting properties:

1. It is compositionally complete.
2. It is also constitutionally complete.
3. Is it a simple siumatgwoon? Are decompositions finite? Yes. Are decompositions unique? Yes, up to reordering. So yes, it's a simple siumatgwoon.