1st WORLD CONGRESS ON ANALOGY

Benemérita Universidad Autónoma de Puebla, Mexico

November 4-6, 2015

ANALOGY 2015

HANDBOOK

Edited by
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HANDBOOK OF THE
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www.uni-log.org/analogy2015

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We cry when we do not understand.
Józef Tischner[1]

We know so many things that we do not understand!
José Ortega y Gasset[2]

If two things are analogous, they are different but in some way similar. What kind of similarity is it and what is its value? How can analogy be used to develop knowledge and understanding? These are the sort of questions that will be addressed in the First Congress of Analogy. Well, there is another issue. The following passage is in (Hofstadter & Sander 2013):

> Yes, analogies manipulate us, and yes, we are enchained by them. This is a fact that we simply must recognize. Not only are we prisoners of the known and the familiar, but we are serving a life term. But luckily for us, we have the power to enlarge our prison over and over again, indeed without any limits . Only the known can free us from the known. [3]

So the question arises: are we really enslaved by analogies? Or maybe the situation is completely different, and the processes of analogy-making should be considered rather as ways of liberating human minds, and our culture in consequence? After all,

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1 (Bonowicz 2010: 5)
2 (Ortega y Gasset 1963: 38)
3 (Hofstadter & Sander 2013: 315)

studies on analogy in science, art and philosophy could fall within the general science of love (*la ciencia general del amor*) in the sense of José Ortega y Gasset.[4]

The congress wants to promote interdisciplinary investigations, discussions and writings about analogy. It is of interest for all people dealing with analogy in one way or another: philosophers, logicians, mathematicians, biologists, artists, computer scientists, linguists, psychologists, etc.

There are many definitions and conceptions of analogy, but it is always considered as a universal tool that enables us to discover, explore, compare, understand and show similarities and differences. Formally speaking, analogy can be defined as a relation between relations; it is connected with proportions and remains pervasive in science, art and religion.

If we agree that inter-cultural, inter-ideological and inter-religious dialogue is a crucial issue, the humanistic approach to analogy seems to be of the greatest importance. Hence, we have to go back to (Hofstadter & Sander 2013) again:

> Our natural inclination to relate to stories told by other people by converting them into first-person experiences dredged out of our dormant memories – this propensity to make analogies that link us with other people, or, more generally, to interpret any new situation in terms of another similar situation that comes to mind – is omnipresent, because doing so fulfills a deep psychological need.[5]

But it should be emphasized that Edith Stein contrasts "inferences by analogy" with procedures of so-called "analogizing". She wrote in *On the Problem of Empathy*:

> The interpretation of foreign living bodies as of my type helps make sense out of the discussion of "analogizing" in comprehending another. Of course, this analogizing has very little to do with "inferences by analogy".[6]

Analogy avoids generalization but remains universal. It helps retain differences while showing similarities and common characteristics which can be transformed into the background of a real dialogue. In a dialogical situation above all we want to know, explore, understand and compare before taking decisions, judging and acting. Therefore, it is without any doubt a very fascinating topic and we will reflect on it from the viewpoints of philosophy, logic, sciences, theory of literature, theory

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[4] (Ortega y Gasset 1914:28).

[5] (Hofstadter & Sander 2013: 153)

[6] Cf. (Stein 1989: 59). The original German text reads as follows: *In der Auffassung der fremden Leiber als demselben Typ wie der meine angehörig ergibt sich uns ein guter Sinn der Rede vom „Analogisieren", das im Erfassen eines andern vorliegt. Mit „Analogieschlüssen" hat dies Analogisieren freilich wenig zu tun.* Cf. (Stein 1917: 66)

of culture and many more. All these interdisciplinary investigations, exchanges and perspectives are very promising.

This event is being sponsored and organized by the Meritorious Autonomous University of Puebla (BUAP), Adam Mickiewicz University (UAM Poznań, Poland) and the Popular Autonomous University of the State of Puebla (UPAEP) in Mexico. It is not a coincidence that the First World Congress on Analogy is being organized as a Polish-Mexican collaboration, as both countries have made great contributions to the theory of analogy. There is a Polish tradition in logico-philosophical studies on analogy. Józef M. Bocheński (University of Fribourg), Mieczysław Albert Krąpiec and his collaborators (John Paul II Catholic University of Lublin) and Włodzimierz Ławniczak (Adam Mickiewicz University) elaborated original approaches to analogy in logic, metaphysics and art history, respectively. In Mexico there are many very interesting approaches based on analogy, and one of the greatest examples is Mauricio Beuchot's analogical hermeneutics. We are extremely happy and proud that he is one of the Congress invited speakers, and interestingly enough, he has been is inspired by the works of Józef M. Bocheński.

Although the primary focus is philosophical reflection on analogy, we are planning to have an artistic event accompanying every edition of the Congress. During the First World Congress on Analogy, we will have the opportunity to attend an exhibition of Catherine Chantilly's paintings. (for more information, see page XX).

The Congress will otherwise have a standard structure: plenary talks by invited speakers, specialists on the subject from around the world, every day of the event, and sections of contributed talks. We are planning the Second World Congress on Analogy at Adam Mickiewicz University (Poznań, Poland) in 2017, and would like to meet every two years at different academic centres around the world. We will have a permanent website for the event with current information and contacts, so we cordially invite any suggestions and comments concerning this or future editions of the Congress. On the website, we will also publish information concerning publication of the proceedings and other texts on analogy that can be of particular interest to participants.

We wish you a very interesting and inspiring congress.

Let us all enjoy the First World Congress on Analogy!

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3. Plenary Lectures

Mauricio Beuchot

Analysis of the Analogical Discourse

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This paper tries to establish the semantics of analogy, which is an intermediate way of signifying between the univocal and the equivocal. Analogy does not share the accuracy of the former nor the ambiguity of the later. It tries to share the seriousness of the univocal and the openness of the equivocal, but neither accepting the excessive opening of the equivocal nor the rigid closure of the univocal.

Some logicians have attempted to formalize analogy, building a logic of analogy or an analogical logic, as I.M. Bochenski did, for instance, in his book The Logic of Religion; there he applied it to religious knowledge.

Others have dealt with analogy within a less demanding formalism, as James F. Ross did in Portraying Analogy. Some others have seen analogy as an isomorphism, and have looked for its syntax, expressed in the formalism designed to capture it.
We look for a middle way. We are not looking for a formal semantics of analogy, but one that from ordinary language is able to account for the richness of this mode of signifying which at the same time is a way of knowing. The Schoolmen and mystics used analogy for the knowledge of God, but it can also be used for knowing natural things, where this concept of analogy shows its fruitfulness, and how useful it can be for philosophy today.

Jean-Yves Béziau

The Logical Hexagon of Analogy: Structuring the Relations between Difference, Identity and Similarity

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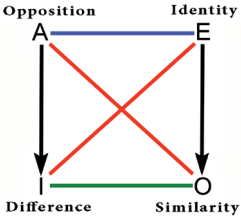
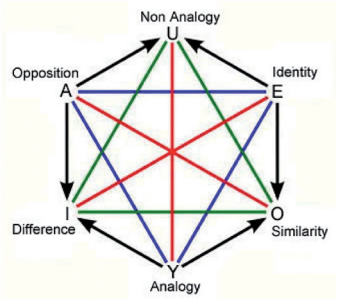
In this lecture we try to understand what analogy is by relating it to other concepts using the theory of opposition.

We first construct a square of opposition where identity and difference form a contradictory opposition crossing another contradictory opposition encompassing opposition itself: opposition vs. similarity. We then naturally consider that opposition implies difference and identity implies similarity. We have therefore a square of opposition where opposition is contrary to identity (two opposed things cannot be identical, but two things can be neither opposed, nor identical) and difference subcontrary to similarity (two things can both be different and similar, but they cannot be neither different, nor similar).



We go on, using the idea of Robert Blanché, by extending this square into a hexagon where analogy is defined as different but similar, in the same way that optional is defined as allowed but not obligatory in the deontic hexagon.



Within this hexagon, analogy forms a blue contrary triangle of opposition together with opposition and identity. This means in particular that two things cannot be analogous and identical but can be neither analogous, nor identical, when they are opposed.

Keywords: Analogy, Similarity, Difference, Identity, Square of Opposition

Walter Redmond

Edith Stein and Thomas Aquinas on Analogy

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ἐν ἑνὶ γάρ...
τὰ ὄντα πάντα καὶ προέχει,
Dionysius the Areopagite

Deus in se praehabet
omnes perfectiones creaturarum
Thomas Aquinas

...daß alles Endliche
--sowohl das, was es ist, als sein Sein--
in Gott vorgebildet sein muß
Edith Stein[7]

Edith Stein (1891-1942), a member of the early circle around Edmund Husserl, worked out her own phenomenological view of the *analogia entis* in the context of doctrines of St. Thomas Aquinas and the commentaries of the Neo-Thomist scholar Joseph Gredt. Her study of analogy, contained in her major work, *Endliches und ewiges Sein* (finite and eternal being), is an example of her dual purpose to "search for the meaning of being" and to "fuse Medieval thought with the lively thought of today". I believe Stein's original insights have a contribution to make to current discussions of analogy (of which this Congress is a notable example).

Analogy received its classical statement in the Middle Ages from Aquinas and John Duns Scotus, and was later "commented on" by Cajetan (Thomas de Vio) and others in Renaissance Scholasticism and more recently by Neo-Scholastics like Gredt-- and Edith Stein herself. The basic question is how --or whether-- we may validly use the same names of both God and creatures. The approach is then linguistic (about *words*), but also noetic (about *concepts*) and ontological (about the analogy of *being*).

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[7] Dionysius, "for in one all beings are pre-had", *De divinis nominibus*, c.5; Aquinas, "God pre-has all the perfections of creatures in Himself", *Summa Theologiae* 1:13:2; Stein, "everything finite --both *what* it is and its being-- must be pre-patterned in God", *Endliches und ewiges Sein*, 290.

The last century saw two of the most remarkable debates on analogy since the time of the Renaissance. The first arose within German Christendom in the early 1930s shortly before Edith Stein lost her teaching position due to Nazi anti-Semitic legislation and entered the Carmelite monastery in Cologne. The second developed a half century later in the "theological turn" within French phenomenology. Both arose when certain philosophers accused others of debasing God by enclosing Him within a univocal notion of being.

The *Analogia entis* (1932) of Jesuit philosopher Erich Przywara, touched off the first debate. Stein mentioned that in their association (1925-31) they mutually influenced one another in their approach to analogy. Przywara's theory --he took analogy to be the basic paradigm of Catholic theology-- was angrily repudiated by Swiss Protestant theologian Karl Barth, as "the invention of the Antichrist", and Barth countered it with his own "analogy of faith" (1932). The controversy spawned consideration of many kinds of analogy and continues today.

The second controversy over analogy emerged later within postmodern phenomenology. A book by French philosopher Jean-Luc Marion with the provocative title *Dieu sans l'être* (God without being) caused an uproar in the early 1980s. For, just as Barth had said Przywara's analogy was invented by the Antichrist, Marion called Aquinas an "idolater" for his doctrine of analogy which he, Marion, felt was an example of the "onto-theo-logy" criticized by Martin Heidegger. Marion, however, soon acquitted Thomas of the charge, pointing out that, for the saint, *esse commune* (common being) does not include *esse divinum* (divine being). Thomas's analogy, he said, is "apophatic"; instead of "building a bridge" between creation and God, it "digs a gulf" (*goufre*) between them. Stein pointed out that Gredt's transcendental concept of being as being (ens ut ens, ὄν ᾗ ὄν) is general enough to include both created and uncreated be-ings, and she asks whether, or how, we are warranted in forming such a concept. Like Marion, she sees analogy as an "infinite gulf" (*Kluft*) between created and divine being.

Stein analyzes two kinds of analogy treated by Thomas: one involving a proportion and the other often called "attribution". She argued against Gredt's interpretation of the first kind ("the creature is to its being as God is to His") but retained Thomas's general approach. She did, however, apply the notion of proportion to her theory of "essentialities" (*Wesenheit*): "meanings" like the Plato's εἴδη, οὐσίαι.

Thomas himself held that we may not say that God "is" or "is good" if these words have different meanings (if they entail agnosticism) or if they have the same meaning (if they entail pantheism). His "apophatic" approach recalls the view of Dionysius the Areopagite (c. 500) that perfections "pre-exist" in God and are "pre-had" by Him (προεῖναι / προέχεσθαι = praeexistere / praehaberi). It also forms part of the "exemplarist" tradition of thinkers like Augustine and Bonaventure, founded upon two asymmetric relations to God (1) "being patterned after" (μίμησις / μέθεξις; *imitatio* / *participatio*) and (2) "being-made-to-be" (*creari*). The statement "God is

good" conveys that there is some creature having goodness such that God is the unknowable source (*principium*) of its meaning and the reason (*causa*) why the creature has it.

Analogy for her as for Thomas is an "agreement" (*Übereinstimmung – convenientia*) of creature with God, a relation (*Verhältnis, Beziehung – ordo, proportio, relatio, habitudo*) of image, likeness, copy (*Abbild*) to its "original", archetype (*Urbild*), but where the image is like, but much more unlike, its archetype (*Aehnlichkeit / Unaehnlichkeit = similitudo / dissimilitudo*).

Stein's view of analogy is also "apophatic"; she cautions that we have no insight into a be-ing whose being is its essence. All we can say is that "everything finite --both what it is and its being-- must be "pre-sketched-out" (*vorzeichnen*), "pre-patterned (*vorbilden*) in God, since both derive from Him"-- a notion recalling Thomas's *"praeexistere"* and *"praehaberi"*.

[Interestingly, recent epistemic logic (the logic of knowledge and belief) offers an insight into this paradox of why it sounds odd for me to say "God's being is His essence but I do not know this" (E∧~KE) is that saying this is *epistemically* (not logically) inconsistent for me. And this means that it would be *logically* inconsistent for me to say that I *know* (K) that God's being is His essence but I do not know that it is"-- K[E∧~KE] (generally then, ~K[p∧~Kp] is a truth of logic). Parallel statements hold in doxastic logic, "I *believe* that..." (B)-- E∧~BE (~K[p∧~Bp] and ~B[p∧~Bp] are also truths of logic). St. Thomas indeed claims that if I hold a proposition on faith, then the proposition is true but I do not *know* that it is true.]

Analogy, the "infinite gulf" between finite and divine being, signals the "objective" distinction between a being that is "something but not everything" and the being that is "everything". Stein's distinction goes back to Dionysius, whose words Thomas quotes in support of his own view that every perfection must pre-exist in the Pre-existent who "is neither this nor that...; He is rather, as the cause of everything, everything".

Stein uses her theory of *essentialities* to interpret analogical relations such as from image to archetype or from "only-something" to "everything". Her theory is linked to Plato's οὐσίαι and to the Scholastic *possibilia* ("possibles"; possible essences or natures), *quidditates*, which Stein renders as *Washeiten*, "whatnesses". Stein claims Thomas's support here: essentialities are in the mind of God not as a creature but as a "*creatrix essentia*", which Stein translates as "creative essentiality". Such essentitial being, timeless meaning, grounds the being of things, grounds our experience and understanding of them, gives meaning to our words. Essentitial being, then, corresponds to *ideatio* in the traditional dual relation of creature to God's mind and to His will: *ideatio* and *creatio*, source (being-pre-patterned-after, being-pre-sketched-out-in), and cause (being-made-to-be-actually).

Stein calls upon religious tradition to clarify her view of analogy. She collapses statements like "God is His living" into a simple *"sum"*, I-am: the name of God,

"ɔehyeh" (הְיֶה־אֲ). Essentitial being is Thomas's *ars divina:* eternal being timelessly shaping eternal forms within and, timefully, bringing these forms about in the world. As a translation of "ἐν ἀρχῇ ἦν ὁ λόγος" she prefers Faust's *"im Anfang war der Sinn"* "in the beginning was the Meaning".

To spell out what she means, she uses a word from an early Christian hymn, "συνέστηκεν" (from συνιστάναι, *constare*), which she translates as having "coherence and constancy". "Coherence" (*Zusammenhang*) means that each thing stands in a array of causal relations to all other things, determined by a "private" meaning all its own. All beings are pre-patterned, "pre-sketched-out" (*vorzeichnen*) as a great work of art, the *ars divina* of St. Thomas (or the *ars aeterna* of St. Bonaventure). Still, what I understand of "the meaning of things" is but "a few forlorn notes of a symphony played far away, borne to me on the wind".

"Constancy" (*Bestand*) means that all things abide, *live*, in the Λόγος, not in their own actual being but in their *essentitial* being. Their meaningfulness, "not come to be", is "at home" in the Λόγος. The essentialities, "at rest" in themselves, become, through the Λόγος, "effective", actual, "creative"-- source and cause. God "pre-thinks" (*vorausdenken*) actual being, His mind spans all things possible, whether or not they will have become actual. Such are the Scholastic *possibilia*, "possible essences". "The finite is in the eternal" means that all meaningfulness is encompassed by the divine mind and that every be-ing has its archetypical and causal ground in the divine essence. God then, is

> nicht nur Herr des Seins, sondern auch des Sinnes,

"not only Lord of being but also Lord of meaning".

Commenting on Heidegger's work, *Kant und das Problem der Metaphysik*, Stein asks whether, as he claims, we must renounce the "arrogance" of wishing to speak of the "being-in-itself". By recognizing our very "being-but-something", she answers, we break through to the "everything"; but "analogically": as *magis ignotum quam notum*. She quotes John of the Cross:

Qué bien sé yo la fonte	Oh, I know Source,
que mana y corre,	welling, running;
aunque es de noche.	although by night.

Jan Woleński

On Analogical Concepts (Transcendentalia)

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The adjective "transcendental" has two different meanings. In Kant's philosophy, it means "transcending all possible experience". It is a epistemological meaning. The method of transcendental deduction was proposed by Kant to copy with problems of *quid jure* in our concepts. Quite another sense of the adjective "transcendental" was (and still is) associated with scholastic (neo-scholastic) philosophy. The schoolmen say *ens omnia genera transcendit*. It means that the concept of being is transcategorial, where "categorical" refers to categories in Aristotle's understanding.

One theory of transcendentalia, developed in the most mature form by Thomas Aquinas, distinguished several transcendental concepts, in particular, the mentioned *ens*, further, *verum* (truth), *bonum* (goodness), *res* (thing), *aliquid* (something), *unum* (unity) and, sometimes, *pulchrum* (beauty). The general principle is such:

(*) if t and t' are transcendental concepts, they are co-extensional.

This rule can be illustrated by the following examples: *a* is a being if and only if *a* is true; *a* is a being if and only if *a* is good; *a* is good if and only if *a* is true. On the other hand, transcendentalia differ in their intensions.

There are some important consequences of this theory. In particular, since they are the most general concepts, they cannot be defined by *genus proximum et differentiam specificam*. In a special terminology, transcerndalia are predicated not univocally, but analogically (this mode is different from ambiguity). Furthermore, if *t* is a transcendental, not-*t* is not a transcendental. Other theory of transcendentaila was developed by Duns Scotus. He distinguished transcendentalia equivalent with ens (form instance, *bonum* and *verum*) and so-called disjunctive transcendentalia (necessity, possibility).

The theory of *transcendentalia* leads to many interesting logical and ontological problems which can be analyzed by tools derived from logic and set theory. Clearly, *ens* is the most important transcendental concept. Is the collection of beings a set or a proper class? Or perhaps a category in the mathematical sense? Other question pertain to truth. Is it ontological or epistemological concept? How to interpret the idea that the essence of truth consists in a correspondence of truth-bearers and the reality? Ad far as the issue concern *bonum*, is it really co-extensional with ens and *verum*. The paper tries to answer these questions.

3. Abstracts of Contributors

Pavel Arazim

Analogous Surprises in the Development of Logic and Geometry

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Kant offered an overall model of our cognitive faculties in which geometry and logic were given quite a special place. And not only his view of geometry and logic are analogous but also their subsequent development. A development which was very surprising from the Kantian point of view.

Geometry, according to Kant, describes the essential structural features of our intuition which make perception as a kind of cognition possible at all. Similarly logic describes the essential features of our conceptual cognition. Both are thus given a very prominent status, they in an important sense precede all the other disciplines. Indeed, they form the very foundations of our knowledge. It thus appears to be as good as impossible to somehow radically change them on the basis of needs of a different discipline. As they are the sources of the very possibility of knowledge, it can hardly happen that any other discipline could exercise any authority over them. In addition to that, geometry and logic are concerned with two radically different cognitive spheres, the sensory and the conceptual one and therefore they cannot interfere.

Yet, as is well known, the time brought quite a surprising development of both these disciplines. First the hyperbolic and elliptic geometries were developed as unexpected alternatives to the Euclidian geometry. Later on, logic saw the Fregean revolution and then the emergence of non-classical logics which has not stopped yet, as new logics are constantly being developed.

It would be simple to say that Kant was simply proven wrong by the history. In fact, despite the facts just mentioned, his views still seem to point to some of the important characteristics of both these disciplines. I would like to attempt at showing how can the pluralism in geometry and in logic be reconciled with Kant's most germane insights which do not deserve to be simply put aside.

Daniel Barron

Travelling as Loving? A Critique of María Lugones

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María Lugones' "Playfulness, 'world'-traveling, and loving perception" offers a powerful model for resisting oppression by way of joining with others in genuine solidarity that is not itself oppressive. However, I find her central concepts of 'world'-travelling and playfulness problematic. I provide both a critique of these concepts and a modified version of Lugones' model, arguing that her use of 'world'-travelling as a figurative interpretation of Marilyn Frye's "loving perception" ultimately leads to preconceptions of particular divisions, rather than an awareness of plurality. Such entrenched divisions may serve to reinforce rather than mitigate the agonistic playfulness that Lugones seeks to avoid. These consequences are not compatible with our goals for resistance and liberation. My model dispenses with 'world'-travel, reformulates playfulness as "openness to self-construction" and increases focus on loving perception. Openness to self-construction and loving perception partially define and guide each other as practices, without the inherent limitations of the 'world'-travelling metaphor. Together they allow for an increased awareness and appreciation of the plurality of social constructions and possible social constructions; an ability to explore this plurality is central to Lugones' practice of resisting oppression. I place greater emphasis on an awareness of plurality as the necessary driving force behind a reflexive and collaborative means of resistance and liberation.

Keywords: Oppression Theory, Solidarity, Spatial Analogy, Otherness

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Analogy and Quantification

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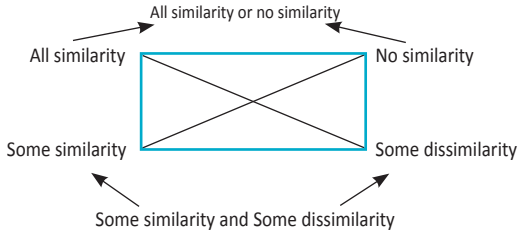
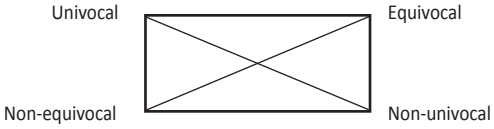
Analogy involves some relationships (similarity and difference) and degrees between them. It seems they may be quantified, since we can say, about two things A and B, that they completely resemblance each other, or that A and B display no similarity. Moreover, we can say that they bear some similarity and they bear some dissimilarity, i.e. some non-similarity. We thus have universal and particular sentences which may be arranged into a hexagon of opposition. Analogy is to be placed at the bottom, as a conjunction of particular affirmative and particular negative sentences (just as contingency is the conjunction of sentences like Possibly P and Possibly not P). The contradictory of the analogy corner is the negation of that conjunction, at the top of the square; we thus obtain a hexagon of similarity to convey analogy.



So far we are talking about things, but analogy also refers to terms. Indeed, we say that terms may be analogous, equivocal or univocal terms. The square of terms is this



Which can be extended into a hexagon, as we have seen. Analogy is out of the square, at the bottom, and implies the "particular" corners. Universal corners imply the contradictory of analogy, at the top of the square.

Notice that we have three term-negations in these squares ("dissimilarity", "non-equivocal" and "non-univocal") and this could bring about some problems for we

could have two negative corners where there should be only one negative corner and two affirmative corners where there should be only one affirmative corner. We might explore other expressions, as Jean-Yves Béziau does, to "square" analogy; he uses "difference", "opposition" and "identity" as well.

Now, two things may be totally or partially similar to each other regarding *some* property, which means we need another quantifier for this property. Let us take the sentence "A and B are completely similar regarding to C", and explain it in a very informal way like, for instance: "Men and Women are completely similar to each other regarding to their being a Human". "Human being" here is a term applied to men and women "by the same reason", in the same way and constitutes a univocal term. "Similar to each other" constitutes a symmetrical relationship. The sentence "A and B are completely different" may be understood as "There is no similarity between A and B", in which case we need no further properties. For instance the word "well" in this compounded sentence "Something is well and something is a well" is equivocal since it shows no similarity, it refers to completely different things in each case.

In this paper we try to explore the possibilities of quantifying over expressions related to analogy. We will use squares, hexagons and octagons of equivalence and opposition. We also show certain ideas on univocal, equivocal and analogous terms from New Spain Logicians, Tomas de Mercado (1525-1575) and Alonso de la Veracruz (1504-1584).

Keywords: Analogy, Quantification, Univocal, Equivocal, Analogous

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David Botting

The Cumulative Force of Analogies

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Of what kind is an analogical inference: deductive, inductive, or some other? In Botting (2012b) I put forward a way of construing analogical inferences as confirmation relations from particular to particular that did not use a universal generalization explicitly, although it remained in the background without needing to be definitively formulated. I did not really prove that all analogical inferences were like this, however, but settled for showing that the claim that analogical inferences were *sui generis* with their own conception of 'validity' and methods of evaluation is inadequately motivated.

In this paper I want to argue that my analysis is indeed the correct, general analysis of analogical inferences, by arguing that there are features of these inferences that are difficult to make sense of if these inferences and arguments are not fundamentally inductive. One is that it seems to me that we make analogical inferences stronger when we add more cases or more points of similarity between analogous cases into the argument, and it is not just that by having more arguments for our claims we make them dialectically more difficult to overturn; my intuition is that the inference is actually stronger, that analogies have a cumulative force, that the more analogies we can add makes the truth of what we are inferring more likely. This would not be the case if each analogical inference was deductive, for then some version of Theophrastus' Rule would apply and we would, for example, take the strength of the analogical inference as determined by the strength of the closest analogy we offer, leaving the other analogies without an inferential role to play (though they may have other roles to play).

This would show that analogical inferences are not deductive, but perhaps it does not show specifically that they are inductive. To do this I want to show that sometimes we use analogy in a non-inferential way to explain what we mean by the predicate that we ascribe to the target. These explanations *could* be used as arguments concluding with the analogon. This equivalence between the explanation and the argument mirrors Hempel's deductive-nomological account of explanation, in which the fact that the event explained has occurred serves to confirm the universal generalization featuring in the explanans. My conclusion is that ascription of the concept or property in the source confirms the universal generalization and, given other conditions, also confirms the logical consequences of that universal generalization; in particular, ascription of the concept or property in the target. This explanatory function seems to lead to an inductive analysis of the analogical inference.

Jarrod Brown

True, Non-Trivial Analogies, the Metaphysics of Similarity, and Culturally Embedded Ways of Knowing

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If some analogical arguments are true and contentful, what must be the case? This paper argues that in order for analogical arguments (in the form of simple similes such as "He is like a bulldozer," simple similarity claims such as, "The rose is like the carnation," to more complex forms such as, "A fish is to a school like a tree is to a forest," or, "The Theban war on their neighbors, the Phocians, was evil; so, too, would an Athenian War on the Thebans be evil"), a number of presuppositions are required. These presuppositions are:

1. The existence of relations (similarity is a relation)
2. An ability to individuate relations (picking out "similar" from "smaller than")
3. Some fact that entails the similarity relation obtains (the "truthmaker")
4. Non-triviality (the statements are contentful and not vacuous)
5. That there are well-formed similarity claims
6. An ability to be aware of or attuned to the relation in order to recognize whether it obtains or not

Any satisfactory account of similarity claims must also be able to give an account of these six conditions. The implication is that when one invokes analogical reasoning, one is assuming a metaphysical and epistemological system in which all six conditions hold.

Reflecting on Satosi Wanatabe's work on the so called "Ugly Duckling Theorem," this paper argues given that analogical arguments operate outside a purely formal space, and given predication we can make well-formed and informative analogical claims. In his work with Boolean lattices, Wanatabe demonstrates that within this formal space all objects will share an identical number of similarities with all other objects. Hence, not only is everything similar to everything else, but it is as similar to the same magnitude. We do not find that to be the case in our experience of the world in which we do find a non-biased inferential basis of discrimination girding our ability to make true and informative similarity claims. The implication is that similarity is then not a formal property, but instead a instead a cognitive, cultural, linguistic or

metaphysical feature of our world. When these specifiable and non-formal aspects of similarity are imported into our arguments, similarity claims cease to be necessarily true and similarity ceases to be transitive. We also find, however, that we cannot refer to formal structures to determine what similarities in fact actually hold.

It is the "aboutness" requirement, though, that creates the most practical epistemological (and aesthetic) challenge for the use of analogy. Just as a test taker must be able to identify the relevant relation that holds between fish and schools and trees and forests (a relation of composition), so too the audience of rhetoric, analogical arguments, and artful analogies must be able to identify the relevant respect or relation. Pulling from the classical Indian debates on *pramanas* (sources of knowledge) and rhetoric (*alangkara*) as well as Plato and Aristotle, the paper concludes with an argument that reinforces the conclusions reached from a consideration of the Ugly Duckling Theorem. That is, despite the universalizing metaphysical and epistemological assumptions of making contentful, true analogical arguments, the ability to make apt analogies and to recognize the relevant "aboutness" of analogies is a skill that is culturally embedded in a wider *weltanshauung*. Several arguments are provided based on linguistic classifiers, Malayu *pantun* verse, and "inside jokes." Given the primacy of similarity-based reasoning in all forms of knowing, the embeddedness of analogies should give us reason for pause when we encounter universalizing discourses. It also gives us a schema for thinking about analogies in use and ways of knowing that, although universal, are also culturally situated.

Estelle Carciofi

Differences among Similarities: On Two Insights of the Mysteries of Love

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My proposal is for a work about life and love based on an analogy between two texts. The first is a letter written by the French writer George Sand to her ex-lover, another French writer, Alfred Musset. The second is a poem, "L'évadé (The Escapee)", written by the French poet Boris Vian.

Both texts present a way of life, but each is based on a special conception of love. In these two texts, love is the most important value in the model of a good life. However, behind the obvious common points between them, many differences are hidden.

I begin my work with a definition of "analogy" and a short presentation of the texts and their authors. Next, the similarities and differences between them are discussed. Lastly, I explain how these differences enlighten us about the special message of each text.

[…] L'amour est un temple que bâtit celui qui aime à un objet plus ou moins digne de son culte, et ce qu'il y a de plus beau dans cela, ce n'est pas tant le dieu que l'autel. Pourquoi craindrais-tu de te risquer ? Que l'idole reste debout longtemps ou qu'elle se brise bientôt, tu n'en auras pas moins bâti un beau temple. Ton âme l'aura habité, elle l'aura rempli d'un encens divin, et une âme comme la tienne doit produire de grandes œuvres. Le dieu changera peut-être, le temple durera autant que toi. Ce sera un lieu de refuge sublime où tu iras retremper ton cœur à la flamme éternelle, et ce cœur sera assez riche, assez puissant pour renouveler la divinité, si la divinité déserte son piédestal. Crois-tu qu'un amour ou

[…] Love is a temple a lover builds to whomsoever is worthy of his or her worship to some degree or another, and the beauty of it lies not so much in the god but in the altar. Why would you shrink away from it? Whether the idol stands for a long while or is soon broken, you will have built a beautiful temple. Your soul will have inhabited this temple and filled it with divine incense, and a soul like yours must create great works. The god may change, but the temple will last as long as you live. It will be a sublime refuge where the eternal flame will ignite your heart anew – a heart that will be as rich and powerful as to find a new divinity when its predecessor has been toppled from its pedestal. Do you think one or

deux suffisent pour épuiser et flétrir une âme forte ? Je l'ai cru aussi pendant longtemps, mais je sais à présent que c'est tout le contraire. C'est un feu qui tend toujours à monter et à s'épuiser. Peut-être que plus on a cherché en vain, plus on devient habile à trouver ; plus on a été forcé de changer, plus on devient propre à conserver. Qui sait ! c'est peut-être l'œuvre terrible, magnifique et courageuse de toute une vie. […] C'est un sentier dans la montagne ; dangereux et pénible, mais qui mène à des hauteurs sublimes et qui domine toujours le monde plat et monotone où végètent les hommes sans énergie. Tu n'es pas de ceux qu'une fatigue vaine doit décourager ni qu'une chute peut briser. Tu n'es pas destiné à ramper sur la boue de la réalité. Tu es fait pour créer ta réalité toi-même, dans un monde plus élevé, et pour trouver tes joies dans le plus noble exercice des facultés de ton âme. Va, espère, et que ta vie soit un poème aussi beau que ceux qu'a rêvés ton intelligence. Un jour tu le reliras avec les saintes joies de l'orgueil. Tu verras peut-être derrière toi bien des débris. Mais tu seras debout et sans tache, au milieu des trahisons, des bassesses et des turpitudes d'autrui. Celui qui s'est toujours livré loyalement et généreusement peut avoir à souffrir, mais à rougir jamais, et peut-être que la récompense est la tout entière. Jésus disait à Madeleine : « Il te sera beaucoup remis, parce que tu as beaucoup aimé. » […]

Lettre de George Sand à Alfred Musset
Venise, le 15 juin 1834

two loves are enough to exhaust and consume a strong soul? I also used to think so, but now I know I was wrong. Love is a fire that will grow and wear away. It may be that the more you have searched in vain, the more likely you are to find it; the more you have had to change, the more apt you may be to keep it. Who knows! It may be the dreadful, beautiful and dauntless work of a lifetime. […] It is a path in the mountain – a difficult one, full of pitfalls, that leads to sublime heights and always towers over the flat and dull world where spiritless men languish. Vain weariness should not daunt a man of your kind; nor should a fall wreck you. You were not destined to wallow in the mire of reality. You are made to create your own reality, in a more elevated world, and to enjoy your own joys through the noblest exercise of your soul's faculties. Go full of hope, and may your life be as beautiful as the poems your intelligence has devised. One day you will reread this poem with the holy joys of pride. You may leave many a *débris* behind you, but you will stand unsullied, amidst the betrayals, meanness and turpitudes of others. He who shows his heart candidly and generously may have to suffer, but need never blush with shame – and here, perhaps, ultimately lies the reward. As Jesus told Magdalene, 'You have loved so much that you shall be highly rewarded.' […]

George Sand, letter to Alfred de Musset
Venice, 15th June 1834

DE MUSSET Alfred, SAND George, 2014: *Ô mon George, ma belle maîtresse, Lettres*, éd. présentée et annotée par Martine Reid, Paris, Gallimard (Folio 5127), pp. 85-87.
English translation: Barbara Schmidt – Université de Lorraine (France)
Proofreading: Matthew Smith – Université de Lorraine (France)

Il a dévalé la colline
Ses pieds faisaient rouler des pierres
Là-haut, entre les quatre murs
La sirène chantait sans joie

Il respirait l'odeur des arbres
De tout son corps comme une forge
La lumière l'accompagnait
Et lui faisait danser son ombre

Pourvu qu'ils me laissent le temps
Il sautait à travers les herbes
Il a cueilli deux feuilles jaunes
Gorgées de sève et de soleil

Les canons d'acier bleu crachaient
De courtes flammes de feu sec
Pourvu qu'ils me laissent le temps
Il est arrivé près de l'eau

Il y a plongé son visage
Il riait de joie, il a bu
Pourvu qu'ils me laissent le temps
Il s'est relevé pour sauter

Pourvu qu'ils me laissent le temps
Une abeille de cuivre chaud
L'a foudroyé sur l'autre rive
Le sang et l'eau se sont mêlés

Il avait eu le temps de voir
Le temps de boire à ce ruisseau
Le temps de porter à sa bouche
Deux feuilles gorgées de soleil

He hurtled down the hill
Rocks sent flying with every step
Up high from those four walls
The siren sang without joy

He breathed in the scent of the trees
With his body like a forge
The light followed his form
Making his shadow dance

If they could just give me time
Bounding across the grass
He picked up two yellow leaves
Soaked with sap and sun

The steel blue guns spitting
Rapid bursts of fire
If they could just give me time
He reached the water's edge

He plunged in his face
Laughing with joy he drank
If they could just give me time
He raised himself to jump

If they could just give me time
A bee of hot copper
Struck him down on the facing bank
Blood and water ran together

He'd had the time to fill his eyes
Time to drink from the creek
Time to bring to his lips
Two sun-soaked leaves

Le temps de rire aux assassins
Le temps d'atteindre l'autre rive
Le temps de courir vers la femme

Il avait eu le temps de vivre

«L'évadé», Boris Vian (1954)

Time to reach the other side
Time to laugh at his assassins
Time to run towards the one woman

He'd had the time to live

The Escapee, Boris Vian (1954)

VIAN Boris, 2004: «L'évadé» in *Textes et chansons*, textes choisis, mis en forme et annotés par Noël Arnaud, Paris, Christian Bourgois éditeur, pp. 133-134.
English translation: Aimée Orsini – independent translator, Nancy, France

José Martín Castro-Manzano

Diagrams and Analogy

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In order to represent knowledge we use internal and external representations. Internal representations convey mental images, for instance; while external representations include physical objects on paper, blackboards, or computer screens. In general, we can identify three external artifacts for knowledge representation: texts (sentential representations), pictures (pictorial representations), and diagrams (diagrammatic representations).

Diagrams are particularly interesting because they are *between* texts and pictures in the field of artifacts for knowledge representation. They are (dis)similar from texts and pictures with respect to features of representation and information: diagrams are more or less arbitrary/homomorphic with respect to the facts they represent, and more or less conventional/correspondent with respect to the information they convey. These (dis)similarities suggest a *mapping* like the following, where texts and pictures are extrema in the representation/information interval:

Artifact	**Text**	**Diagram**	**Picture**
Representation	More arbitrary		More homomorphic
Information	More convention	More or less diagrammatic	More correspondence
Analogy	More equivocal		More univocal

After taking into account some logical attributes of diagrammatic reasoning, and with the previous mapping in mind, we suggest some logical attributes of analogical reasoning: *i)* that analogical reasoning provides a heuristic; *ii)* that analogical reasoning supports a variety of *visual* inferences; and *iii)* that it grants the possibility of applying operational constraints by providing algorithmicity.

Finally, we give some examples of how the above attributes of diagrammatic reasoning can be used to understand analogy in philosophy (hermeneutics), artificial intelligence (machine learning), linguistics (pictographic Esperanto), electronics (hardware design), software design (programming), mathematics (category theory), logic (diagrammatic reasoning), problem-solving (mechanical reasoning), liberal arts (music and labanotation), and board games (chess).

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Analogy and Reasoning

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In history of science we find various ways of reasoning from a source to a target: among deduction, induction, and abduction there is also analogy, e.g.: If A is similar to B and B has property C then A has property C. Aristotle said that "fish differs from bird by analogy (for what is feather in the one is scale in the other)." (On the parts of animals, 644) Since the ancient times and till this day various interpretations of analogy appeared, as logical or probabilistic or psychological inference. In this paper we will delineate the development of this way of ordinary reasoning.

Ordinary reasoning is seen as one of the manifestations of the natural brain phenomenon of thinking. Namely, reasoning is seen as the natural way of conjecturing and refuting, with conjectures classified in the three disjoint classes consisting in consequences (giving raise to deduction), hypotheses (giving raising to abduction), and speculations (giving raise to induction). At its turn, this last type of conjectures is classified in deductive speculations and inductive, or creative, speculations. All this is shown out of strong mathematical structures as they are, for instance, Boolean, Orthomodular, or De Morgan, algebras; it is simply presented through a very simple mathematical symbolism. Once representing, or defining, analogy by means of inference preserving mappings, it will be shown that these mappings only can conduct to either refutations, or consequences, or hypotheses, or deductive and creative speculations, and depending on just the characteristic properties those mappings can exhibit. In addition it will be proven that the conjunction of a speculation with the premises is an hypothesis, and its disjunction is a consequence. To finish, some comments on metaphors will be done. To summarize, this part conducts to point out that analogy is not offering, in itself, a different type of reasoning than conjectures and refutations, but a natural tool for conjecturing and refuting, that is, allowing natural rational thinking or ordinary, not necessarily deductive, reasoning.

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Most ordinary reasoning predicates are graduate predicates, predicates in which the degree of truth belongs to a continuous, not a discrete, scale. If you want to build an acceptable model to reasoning with analogy it will be necessary to consider such predicates. Basic Fuzzy Algebras (BFA) are a formal framework of reasoning that considers graduate predicates as its basic elements. In this third part, it will be showed as the classification of predicates in a BFA with respect to an initial framework of knowledge: refutations, consequences, hypothesis, and speculations can be made in this context of reasoning with graduate predicates. Modeling of reasoning by analogy in this context will be studied and the results of Part 2 will be generalized.

Laurent Dubois

Analogies in Power Tests

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What is a Power Test ?

This is an IQ test more difficult than a classical IQ test but without time limit to find the solution of the items and not supervised. The first Power test has been created in the years 70 by an American called Ron Hoeflin. He created the Mega test, the "test of the million" intended to serve as an admission test to a society for IQ Above 176 in deviation 16, in other words, a very selective High IQ Society. Remember that the minimum score required to be admitted to the Mensa society, the 1st high IQ society, historically and quantitatively, with hundred thousands of members across the world, is 132 in deviation 16. The mean IQ in the general population is 100.

The most commonly used IQ tests for admission in Mensa are the Cattell and the Raven. In all cases, the tests used should be official. The Mega test is not an official test. It has been published in the popular magazine Omni.

The principle of the Power Tests has been relayed in Europe by the Dutch tests designer Paul Cooijmans. He created the "Test for genius" and a multitude of other tests. A default of most Power Tests, and of the IQ tests in general, is their cultural bias.

The 9I6 test, put online in 2000, is one of the least biased Power Tests and has become a reference test in the underground so called High IQ community. Another popular Power test created by Laurent Dubois is the Concep-T test. It contains a lot of analogies.

Analogies are often used in Power Tests as they subsume subtle mechanisms in short sequences.

Here is the principle of an analogy:

1 : 2 :: 3 : ?

What number must logically replace the question mark?

The answer is 4. The complete analogy is :

1 : 2 :: 3 : 4

it must be read as this :

4 is to 3 as 2 is to 1 or 4 is the successor of 3 as 2 is the successor of 1 or even 4 is the closer even number to 3 greater than 3 as 2 is the closer even number to 1 greater than 1.

There are numerical, spatial, verbal analogies. Here is an example of a verbal analogy :

Nowhere : Now :: Never : ?

This talk will present and solve some kinds of analogies called Logico-Divergent items like the following one:

Whole : Whole : … :: Hole : :: Hole : ?

It will be the opportunity to illustrate the concept (and neologism) of Logico-Divergence: standard process that leads to non-standard conclusion(s). A bridge between logics, linguistics and philosophy.

Reference: http://remuemeninges.chez.com/scalef.htm

David Ellerman

The Two Dual Fundamental Logics

The dualities/analogies between (Boolean) subset logic and partition logic

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Two logics of subsets and of partitions:

- Boolean logic correctly specified as the logic of subsets, with "propositional logic" as a special case (i.e., subsets 1and $\varnothing$ of the one-element set);
- The notion of a "subset" has the category-theoretic dual of a "quotient set" or equivalently, an "equivalence relation" or a "partition."
- Hence there should be (and there is) a dual logic of partitions that is built on a whole set of analogies between subsets and partitions.
- The basic analogy is between an *element u* of a subset $S \subseteq U$ of the universe set *U*, and a *distinction* (or "dit" for short) of a partition $\pi = \{B, B', ...\}$ on the universe set *U* which is an ordered pair (u, u') of elements $u, u' \in U$ in different blocks of the partition π.

Table of analogies between subset logic and partition logic

	Subset Logic	Partition Logic
'Elements'	*Elements* u of a subset S	*Distinctions* (u,u') of a partition π
All 'elements'	Universe set U (all elements)	Discrete partition **1** (all dits)
No 'elements'	Empty set $\varnothing$ (no elements)	Indiscrete partition **0** (no dits)
Duality	*Subsets* are images f() of injections $f:S \to U$	*Partitions* are inverse-images $f^{-1}()$ of surjections $f:U \to T$
Partial order	Inclusion of elements (inclusion order on subsets)	Inclusion of distinctions (dits) (refinement order on partitions)
Formula variables	Subsets of U	Partitions on U
Logical operations $\cup, \cap, \Rightarrow, ...$	Operations on subsets	Operations on partitions
Formula $\Phi(\pi,\sigma,...)$ holds at 'element'	Subset $\Phi(\pi,\sigma,...)$ has member u.	Partition $\Phi(\pi,\sigma,...)$ distinguishes (u,u').
Valid formula $\Phi(\pi,\sigma,...)$	$\Phi(\pi,\sigma,...) = U$ for any subsets $\pi,\sigma,...$ of any U ($\|U\| \geq 1$), i.e., contains all elements u.	$\Phi(\pi,\sigma,...) = \mathbf{1}$ for any partitions $\pi,\sigma,...$ on any U ($\|U\| \geq 2$), i.e., makes all distinctions (u,u').

- Boole developed logical probability theory as normalized counting measure on subsets.
- Follow the analogy to get *logical information* theory as the normalized counting measure on partitions.

	Logical Probability Theory	Logical Information Theory
'Outcomes'	Elements $u \in U$ finite	Distinctions $(u,u') \in U \times U$ finite
'Events'	Subsets $S \subseteq U$	Dit sets $dit(\pi) \subseteq U \times U$
Normalized counting measure	$Prob(S) = \|S\|/\|U\|$ = *logical probability* of event S	$h(\pi) = \|dit(\pi)\|/\|U \times U\|$ = *logical entropy* of partition π
Interpretation equiprobable outcomes	Prob(S) = probability randomly drawn element is an element in S	$h(\pi)$ = probability randomly drawn pair (w/replacement) is a distinction of π

Results of elements-distinctions analogy

- The elements-distinction analogy hence gives
  - the logic of partitions dual to Boolean subset logic;
  - logical information theory dual to logical probability theory.
- Publications in journals:
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Luis Estrada-González

An Analogical Argument at the Foundation of Universal Logic

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Jean-Yves Béziau has put forward a number of arguments for the following claim (cf. [2-5]):

Axiomatic Emptiness: A logical structure can be defined without appealing to any axioms

which is one of the central features of his version of Universal Logic. In this talk I will focus only on one of those arguments, which is analogical:

(P1) A logical structure is similar to an algebraic structure.

(P2) An algebraic structure can be defined without appealing to any axioms.

(C) Therefore, a logical structure can be defined without appealing to any axioms.

It can be, and has been, contested whether the similarity between logical structures and algebraic structures is strong enough to warrant even claims less controversial than *Axiomatic Emptiness* (cf. [1], [7], [8]), and this undermines the overall plausibility (cf. [9]) of the argument.

Béziau himself seems to strengthen his argument by the following methodological principle:

Jump into Abstraction: If a more abstract notion of the *x*'s allows a more general, unified theory about the *x*'s, then that more abstract notion should be adopted.

Thus, a more abstract notion of logical structure, sufficiently similar to that of algebraic structure, will allow a more general and unified theory of logics, that is, Universal Logic, just like a more abstract notion of algebraic structure allowed a more general and unified theory of algebras, that is, Universal Algebra. The problem is that if this is the defense of *Jump into Abstraction* for the case of logic, it rests again on an analogical argument which depends on a still unwarranted analogy between logical structures and algebraic structures.

I will argue that *Axiomatic Emptiness* could be defended on better grounds, either by a direct argument or through an argument from Jump into Abstraction to the principle

Subject-Matter Emptiness: A logical structure is just a mathematical structure, not a model, nor a codification of a kind of reasoning.

This could serve to justify better (P1), or at least to block all the usual misgivings about it. But in the presence of either the direct argument for *Axiomatic Emptiness* or *Subject-Matter Emptiness*, no analogical argument invoking algebra is needed to

arrive at Axiomatic Emptiness, at least at the justificatory level (it might well play other roles).

As I see it, this proposal is a return to the roots of Béziau's Universal Logic (as in [2], [3]), rather than continuing his more recent version in which reasoning plays a central role (see [5], [6]).

Keywords: Universal Logic, Algebraic Analogy, Analogical Argument, Axiomatic Emptiness

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Katarzyna Gan-Krzywoszyńska and Piotr Leśniewski

Analogies between People

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On September 13th, 2006 the Gallimard Publishing House published a novel by Jonathan Littell *The Kindly Ones* (*Les Bienveillantes*). While visiting Auschwitz, Max Aue notes: So, I came to think: *Wasn't the camp itself, with all the rigidity of its organization, its absurd violence, its meticulous hierarchy, just a metaphor, a reductio ad absurdum of everyday life?* [*The Kindly Ones*, London 2009, Vintage Books, page 622].

We know, at least from Hans-Georg Gadamer (and Robin George Collingwood), that the logic of humanities is the logic of question. Is Littell's question well founded then? It appears that the answer to this question may be affirmative. It is even more so, if we assume – following the thesis on a dialogue society formulated by Józef Tischner, a Polish philosopher and the first chaplain of the Solidarity trade union – that the truth about social life is revealed before *every thinking citizen*. Consequently, an adequate theory of social structures and their dynamics should be developed. Therefore, the issue of appropriate models of other persons – in other words, 'the propensity to make analogies that link us with other people' [see D. Hofstadter, E. Sander, *Surfaces and Essences*, Basic Books, New York 2013, page 153] – seems to be one of the very greatest importance both from the theoretical and practical standpoint. But it was Edith Stein who contrasts "inferences by analogy" with procedures of the so-called "analogizing". She wrote in *On the Problem of Empathy: The interpretation of foreign living bodies as of my type helps make sense out of the discussion of "analogizing" in comprehending another. Of course, this analogizing has very little to do with "inferences by analogy"* [ICS Publications, Washington 1989, page 59]. Hence our aim is to develop the very foundations for the procedures of "analogizing". Following Reyes Mate, the author of the *Treatise on Injustice* (2011), it is assumed that the reconstruction of the historical perspective of the aggrieved and the embittered marks the beginning of a long-term process, whose aim is first compensation and then reconciliation. It is assumed that to *love* someone is to desire that person's good and to take effective steps to secure it. Consequently, to *hate* someone is to desire that person's detriment and to take effective steps to achieve it. Finally, to be *indifferent* (to someone) means neither to love (that person) nor to hate (that person). Let us suppose that these three binary relations hold between two different persons. A rational individual maximizes his or her self-interested

preferences. Yet love consists in wanting goods for someone else. Therefore, the one who loves is a nonrational person. Here the term *counterrational* is used. Thus also a hater turns out to be a nonrational person – namely an *irrational* one.

The following hexagon of oppositions is developed (Fig. 1):

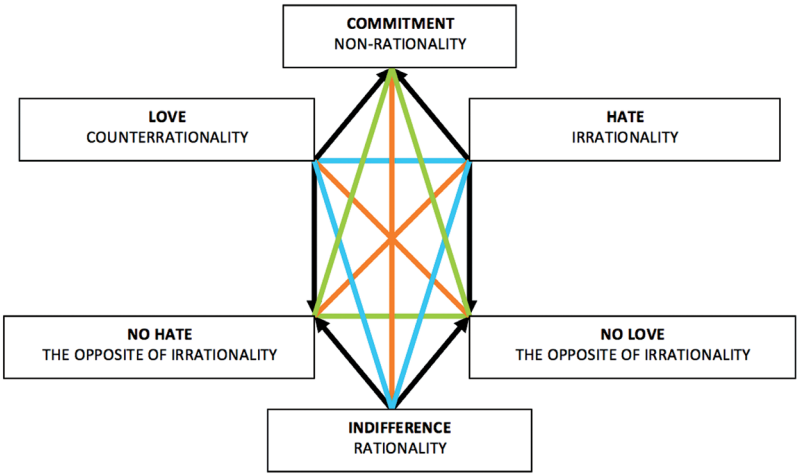

Fig. 1.

The model of a compassionate individual – a model referred to here as Homo compassibilis – results in the following hexagon (Fig. 2):

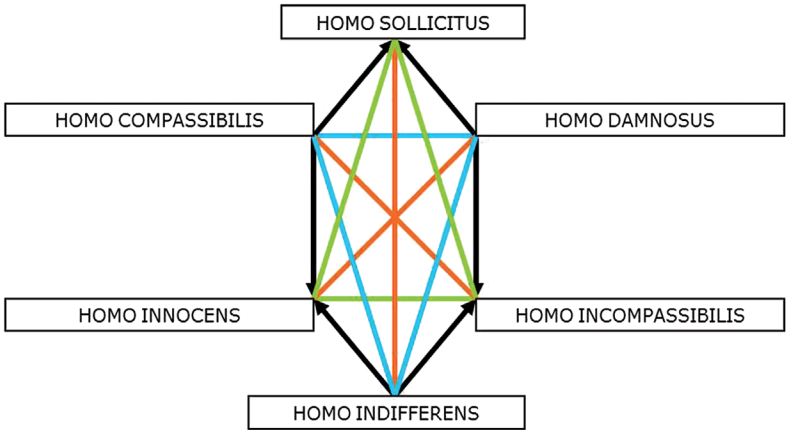

Fig. 2.

The question posed by Littell in Les Bienveillantes – following the guidelines by Theodor Adorno, Giorgio Agamben, Zygmunt Bauman, and Tadeusz Borowski – should be then considered as a measure of the issue of cultural responsibility and/or responsibility in culture.

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On Analogies in Zoology

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The development of zoology is largely the history of different types of reasoning referring to analogies discovered in nature. It is impossible to imagine zoology without the systematizing function and recognizing the structural similarities and differences between observed animals. Biological classifications of living organisms are the standard examples of systematization in natural sciences.

In zoology analogy has a number of complex cognitive functions. There are fields of zoology in which preliminary assumptions can be proved only by means of analogy. It can be achieved by a comparative analysis of certain relationships between phenomena belonging to research areas under investigations and the relationships between the phenomena in other, better known research areas. For example, one can draw conclusions about biology of animals in ancient geological epochs on the basis of the knowledge of modern animals or make inferences about the course of a developmental process in a given group of animals on the basis of the development of a single model species, which has been thoroughly described. Experimental data on some processes or phenomena in animals are frequently used to draw conclusions about their applications in humans. Therefore, it is through analogy that one can draw conclusions about the potential effects of drugs, various chemicals, mutagens, teratogenic agents etc. Most of innovative operations are first carried out in animals before they are performed on humans.

What is more important, some fields of zoology – such as comparative anatomy and morphology or taxonomy – heavily rely on analogical reasoning. Evolutionary and phylogenetic studies also rely on the comparison of the characteristics of different organisms in search for similarities which provide evidence for affinities between organisms.

Although analogical reasoning is so essential in zoology, the term 'analogy' has been associated with the pre-Darwinian concept of similarity between traits of organisms. Two hundreds year ago É. Geoffroy Saint-Hilaire made attempts to find similarities in all animals, which he described using the concept of 'analogy' that corresponds to the modern concept of 'homology'. In more recent studies the concept of analogy is generally ignored.

The concepts of analogy and homology are presented – their history, definitions and examples of their application and importance for the research and investigations carried out in zoology today.

Keywords: Analogy, Homology, Zoology, Natural Sciences

José David García Cruz

Analogy in a Temporal Sense: The Analogical Time Proportions

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In (Prade and Richard, 2009) a restricted study of analogy was developed through the notion of analogical proportions, i.e. sequences of inferences of the form *a is to b as c is to d*. They define three kinds of *analogical proportions*: analogy, reverse analogy, and paralogy. In (Prade and Richard, 2013) and (Prade and Richard, 2014) four kinds of analogy are defined: analogy, paralogy, reverse analogy and reverse paralogy. In all of these works analogy are analyzed in a Boolean sense taking an account of analogy in a logical terms.

Our hypothesis is that if we take the restricted notion of analogy in the sense of the mentioned works, analogy could be seem as a modal operator. We proceed as follows. First we define a modal propositional language with four basic modal operators. In the second place we define a model based on a relational structure with four types of relations defined as the four *heterogeneous analogies*. Our technique is to interpret the analogical proportions as fourfold relations between temporal points. In this sense, the formulas related by the analogical temporal operators are truth in points that hold some analogical proportion.

One of the main results of this approach is that we could dualize the analogical proportions and define a strong notions of analogy, paralogy, reverse analogy, and reverse paralogy, respectively; that means that there could be not only four analogical proportions but eight. Another result is given by the properties of the four analogical proportions. We analyze it in terms of modal formulas and to conclude we present the graphic interpretation of them based on the relations of temporal points.

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Ana Luisa García Gómez

«Seeing as»: Wittgenstein on Analogy and Metaphor

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In this paper, we discuss the relationship between analogy and metaphor in light of Wittgenstein's later philosophy. Wittgenstein bequeathed to us the methodological concepts of "language-games", "family resemblance" and "forms of life". We will use these concepts to explore the notions of analogy and metaphor and the relationship between them. With help of Wittgenstein, we will clarify their meaning, as well as the meaning of words and propositions that depend on their use in specific contexts. We examine selected examples of the use of analogy and metaphor in poetry, a genre where they are often found.

In Part II, Section XI of his *Philosophical Investigations*, Ludwig Wittgenstein asserts that a proper grasp of the concept of perception can elucidate issues related to understanding the meaning of words. The concept of "seeing as" plays an important role in achieving this objective. "Seeing as" will help us establish the rules that govern "language-games" and the meanings we give to the words which are used in them. When the reader of a poem finds a metaphor, an analogy, or both, his perception is altered; the meaning is not literal. "Seeing as" is the modification of meaning and perception. It involves seeing something in a way other than expected: "seeing as" involves the aspect of chance. That is, the experience of "seeing as" is an aspect of perception. It is a new perception that allows for the interpretation, perception and meaning of metaphor and analogy.

In "seeing continuously" there is no chance for perception. "Seeing continuously" maintains the meaning of analogy and of metaphor as nonsense. "Seeing as" figurates the word, the thing. It modifies our (personal) experience.

Finally, we conclude that the clarification of analogy and metaphor allows us to appreciate the importance they have in poetic language and natural language. Analogy and metaphor expand the semantic meaning of words, and modify our perception, interpretation and experience of them.

Keywords: Analogy, Metaphor, "Seeing as", Semantic Perception.

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¿Analogy or Katalogy? Methodological Requirements for Knowing the Person

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From the distinction made by Theology between Nature and Person we can understand human realization as starting from a dynamism with goes beyond potency and act. This is about that potentiality to grow into being in virtue of an *energeia* which comes from the divine reality that transforms the person raising up her to an unprecedented state and disproportionate to her nature. The knowledge of this new reality requires methodological criterion that allows the person, through a leap (as Kierkegaard pointed out), be separated from a certain qualitative sphere to enter a new one. This way, which we might call "katalogical", assumes that the truth of the person is accessible in a movement which goes from top to bottom.

Despite the importance of the katalogical way to recognize the qualitative difference and irreducibleness of different ontological orders, the one-sidedness of this approach could prevent recognition of their possible relationships, marginalizing them to the realm of the irrational and nonsense. To the extent that reality is a unit and polar configured, it should be thought in such a way that its various areas be integrated into the unit. Thus emerges as a methodological requirement to apply the katalogical *via* alongside with the analogical way.

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Truth, Verisimilitude, Refutation and Their Relation with Analogy: Between the Theory of Argumentation of Ch. Perelman and The Dialectics of Aristotle

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The different theories of argumentation created along the twenty Century, have as a fundament the idea of the human agreements can be resolved without arrived in to the violence. In effect, Perelman (1989), Toulmin (2007) and Van Eemeren (2006) pretend that their theorical-methodological proposals being a practical support for the solution of the human conflicts. However, these models of argumentation are not the first into the history that began from the same fundament. In fact, in the born of the dialectic, and the rhetoric, and logic, in the fourth Century B.C., Plato and Aristotle created one argumentative model with the same intention: the solution of human conflicts. One common element in all this subjects is the analogy.

One of the processes who are present in any conception of the argumentation is the refutation. The refutation is presented in all the theories of argumentation because it consist in a rational attack to the arguments of somebody who proposes to support his conclusion. And, the first in theorizing about this topic was Aristotle in his *Sophistic Elenchus*. But Aristole does not began to think about the refutation from nothing. He founded inspiration in the writings of his master, Plato. In this context, we ask: are the theories of argumentation are complitly originals or they take up theorical elements of Aristotle's dialectics?

In this paper, we maintain that: the idea of refutation, in the news theories of argumentation, is focused in new ways; and its conceptualization is original. Besides, we try to set up a relation between refutation and analogy in Perelman theory.

Colin James III

Theorem Prover Meth8 Applies Four Valued Boolean Logic for Modal Interpretation

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A new modal theorem prover is named *Me*chanical *th*eorem in *8*-bits for *Meth8*. A demonstration version is scaled down to process segments for two propositions named (p, q) out of 13 (n, ... , z) and for two theorems named (A, B) out of 13 (A, ... , M). It uses novel technology named sliding windows to parse input strings into logical tokens for antecedent, conditional, and consequent. The tokens then index a lookup table for the pre-loaded results.

Each literal of the 13 literals has 6 modified conditions. There are 4 conditionals, which can be negated, as: & AND; + OR; > IMP; and = EQV. The combinations for an expression of (antecedent * conditional * consequent) are: (13*6) * (4*2) * (13*6) or 46,208 atomic expressions. There are two literal segments and 10 models for 924,160 combinations of expressions. An expression requires 8 bits per row in each of 4 rows of a proof table or 4-bytes per expression. Hence the expressions total 3,696,640 bytes or about 3.6 MB.

The lookup tables can be calculated, loaded, or in ROM. Computation speed is limited in polynomial time by the complexity of the input expression submitted to the parsing engine.

The direct application of Meth8 is for real time situation awareness. Current devices use modal logic but some of their theorems and rules are provably false. To correct this, the back end logical system implemented here in Meth8 is four valued Boolean logic applied to modal interpretation as developed by Garry Goodwin (garry_goodwin@hotmail.co.uk) below.

The modal logic Ł4 is widely deemed implausible. These theorems show problems. Béziau (2011) points out that defending (◊A & ◊B → ◊(A & B)) proved a lifelong nightmare for Łukasiewicz. For example, consider: *If possibly Wilkes Booth killed Lincoln and possibly he never killed anyone, then it is possible Wilkes Booth both killed Lincoln and never killed anyone*. Font and Hájek (2002) find particularly egregious (□A → (◊B → □B)), for example: *Necessarily every coin has two sides implies if possibly the next flip of the coin lands heads, then necessarily the coin lands heads.*

Despite failings of Ł4 , its classical credentials are reason enough to persevere. Our motivation is to find a subset of more plausible Ł4 theorems using additional models. A theorem would be proved in all of our 10 models based on three options: Option 1 for <Contradiction, False, True, Proof>; Option 2 for <False, Contingent, Noncontingent, True>; and Option 3 for <Unevaluated, Improper, Proper, Evaluated>. We believe the correct interpretation of many valued Boolean logic leads to

incompleteness. Thus some arguments which are never false also fail to be theorems. A nuance of necessitation is that if A is any argument, then the following is *not* an inference "where A is true implies □A".

Several K theorems are found false. Hence clearly normal modal logics are not a subset of this variant. The variant seems to tolerate systems T and D. One S4 theorem is found false: 42 (◊A & □B) → ◊(A & □B). Consider this. That possibly Obama was born in Kenya and that necessarily Obama was not born in America, implies possibly both: that Obama was born in Kenya; and that necessarily Obama was not born in America.

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Analogy from the Viewpoint of Logic

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An analogy is a reasoning, in which one builds according to some given inference or statement another inference or statement, structurally identical to former, on another domain. The essence of analogy is the transfer of the logical structure from one inference or statement to another. The word "statement" means here any assertion (we assert propositions), impeling, acceptance of a convention, or value judgment.

Logical structure of an analogy in general case is following. Initially, we have 1) a *problem situation*—a fragment (part) of reality (a mathematical structure) $\mathfrak{A} =< \{\mathrm{A}_i\}_{i\in I}; \{R_j\}_{j\in J} >$ of type τ with basic sets $\mathrm{A}_1, \ldots, \mathrm{A}_i, \ldots$ and main relations $R_1, \ldots, R_j, \ldots$ for some I, J, 2) the set N(L) of well-formed expressions of a given language L, 3) a partial multimap $\varsigma : \mathrm{D} \Rightarrow \mathrm{N(L)}$ (where $\bigcup\mathfrak{A} \subseteq \mathrm{D}$, $\bigcup\mathfrak{A} = [\bigcup\limits_{i\in I} \mathrm{A}_i] \cup [\bigcup\limits_{j\in J} \mathrm{R}_j]$) such that takes every $a \in \bigcup\mathfrak{A}$ to its every name $\boldsymbol{a} \approx \varsigma(a)$ in L ($\approx$ here is *representation*, or "ambiguity equality", since every a could have more than one name in L), 4) some theory Th($\mathfrak{A}$) of a problem situation $\mathfrak{A}$ (Th($\mathfrak{A}$)$\subseteq$N(L)), and 5) a *problematic reasoning (inference)* $\mathfrak{F}_\mathfrak{A} \therefore \mathfrak{G}_\mathfrak{A}$ ('$\therefore$' means "hence") or a *problematic statement* $\mathfrak{G}_\mathfrak{A}$, which have to be justified or refuted and such that $\mathfrak{F}_\mathfrak{A}, \mathfrak{G}_\mathfrak{A} \in \mathrm{Th}(\mathfrak{A})$ and have the form

$$\mathfrak{F}_\mathfrak{A} \equiv \mathfrak{F}_\mathfrak{A}(\boldsymbol{R}_1, \ldots, \boldsymbol{R}_n, \boldsymbol{a}_1, \ldots, \boldsymbol{a}_k),\ \mathfrak{G}_\mathfrak{A} \equiv \mathfrak{G}_\mathfrak{A}(\boldsymbol{R}_1, \ldots, \boldsymbol{R}_m, \boldsymbol{a}_1, \ldots, \boldsymbol{a}_l),$$

where $\boldsymbol{R}_i \approx \varsigma(R_i)$, $\boldsymbol{a}_j \approx \varsigma(a_j)$ for some $R_i, a_j \in \bigcup\mathfrak{A}$ and every $i \leqslant max(n, m), j \leqslant max(k, l)$.

Hereafter the author of an analogy looks for an *analogous to* $\mathfrak{A}$ *situation* $\mathfrak{B} =< \{\mathrm{B}_i\}_{i\in I}; \{P_j\}_{j\in J} >$ of the same type τ and such that i) $\phi(\mathfrak{A}) = \mathfrak{B}$ or $\phi(\mathfrak{B}) = \mathfrak{A}$ for some map ϕ, ii) $\bigcup\mathfrak{B} \subseteq \mathrm{D}$, and some theory Th($\mathfrak{B}$). An *analogy* is a replacement operation of one of the following forms:

I) a *corroborative analogy* is a simultaneous replacement operation of the form

$$\mathbf{C}^{\boldsymbol{R}_1,\ldots,\boldsymbol{R}_{max(n,m)},\boldsymbol{a}_1,\ldots,\boldsymbol{a}_{max(k,l)}}_{\boldsymbol{P}_1,\ldots,\boldsymbol{P}_{max(n,m)},\boldsymbol{b}_1,\ldots,\boldsymbol{b}_{max(k,l)}}\mathfrak{F}_\mathfrak{B} \therefore \mathfrak{G}_\mathfrak{B}$$

or of the form

$$\mathbf{C}^{\boldsymbol{R}_1,\ldots,\boldsymbol{R}_{max(n,m)},\boldsymbol{a}_1,\ldots,\boldsymbol{a}_{max(k,l)}}_{\boldsymbol{P}_1,\ldots,\boldsymbol{P}_{max(n,m)},\boldsymbol{b}_1,\ldots,\boldsymbol{b}_{max(k,l)}}\mathfrak{G}_\mathfrak{B},$$

made, under condition that $\phi(\mathfrak{B}) = \mathfrak{A}$ holds, to a correct (by assumption) inference $\mathfrak{F}_{\mathfrak{B}} \therefore \mathfrak{G}_{\mathfrak{B}}$ or to a right (true, fair, accepted, stated) statement $\mathfrak{G}_{\mathfrak{B}}$ such that $\mathfrak{F}_{\mathfrak{B}}, \mathfrak{G}_{\mathfrak{B}} \in \mathrm{Th}(\mathfrak{B})$ and have the form

$$\mathfrak{F}_{\mathfrak{B}} \equiv \mathfrak{F}_{\mathfrak{B}}(\boldsymbol{P}_1, \ldots, \boldsymbol{P}_n, \boldsymbol{b}_1, \ldots, \boldsymbol{b}_k),\ \mathfrak{G}_{\mathfrak{B}} \equiv \mathfrak{G}_{\mathfrak{B}}(\boldsymbol{P}_1, \ldots, \boldsymbol{P}_m, \boldsymbol{b}_1, \ldots, \boldsymbol{b}_l),$$

where $\boldsymbol{P}_i \approx \varsigma(P_i), \boldsymbol{b}_j \approx \varsigma(b_j), \phi(P_i) = R_i, \phi(b_i) = a_i$ for some $P_i, b_j \in \bigcup \mathfrak{B}$ and every $i \leqslant max(n,m), j \leqslant max(k,l)$; the result of a corroborative analogy is either the problematic inference $\mathfrak{F}_{\mathfrak{A}} \therefore \mathfrak{G}_{\mathfrak{A}}$ or the problematic statement $\mathfrak{G}_{\mathfrak{A}}$;

II) a *refutative analogy* is a simultaneous replacement operation of the form

$$\mathbf{C}^{\boldsymbol{P}_1,\ldots,\boldsymbol{P}_{max(n,m)},\boldsymbol{b}_1,\ldots,\boldsymbol{b}_{max(k,l)}}_{\boldsymbol{R}_1,\ldots,\boldsymbol{R}_{max(n,m)},\boldsymbol{a}_1,\ldots,\boldsymbol{a}_{max(k,l)}} \mathfrak{F}_{\mathfrak{A}} \therefore \mathfrak{G}_{\mathfrak{A}}$$

or of the form

$$\mathbf{C}^{\boldsymbol{P}_1,\ldots,\boldsymbol{P}_{max(n,m)},\boldsymbol{b}_1,\ldots,\boldsymbol{b}_{max(k,l)}}_{\boldsymbol{R}_1,\ldots,\boldsymbol{R}_{max(n,m)},\boldsymbol{a}_1,\ldots,\boldsymbol{a}_{max(k,l)}} \mathfrak{G}_{\mathfrak{A}},$$

made, under condition that $\phi(\mathfrak{A}) = \mathfrak{B}$ holds, to the problematic inference $\mathfrak{F}_{\mathfrak{A}} \therefore \mathfrak{G}_{\mathfrak{A}}$ or to the problematic statement $\mathfrak{G}_{\mathfrak{A}}$; the result of a refutative analogy is a wrong (by assumption) inference $\mathfrak{F}_{\mathfrak{B}} \therefore \mathfrak{G}_{\mathfrak{B}}$ or a wrong (false, unfair, rejected, denied) statement $\mathfrak{G}_{\mathfrak{B}}$: $\neg(\mathfrak{F}_{\mathfrak{B}} \to \mathfrak{G}_{\mathfrak{B}}), \neg\mathfrak{G}_{\mathfrak{B}} \in \mathrm{Th}(\mathfrak{B})$.

Finally, the author of a corroborative (refutative) analogy infers as its consequence by modus ponens (modus tollens) that the problematic inference or statement is correct/write (incorrect/wrong).

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Basic Analogies in Latin American and European Direct Democracy

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The aim of the talk is to analyze some basic analogies between institutions of direct democracy in Latin America and Europe. In accordance with contemporary theories of democracy, elections constitute fundamental factor in the functioning of the system, while referenda are regarded generally only as a complementary and supporting element of representative government. However, the referendum, as the most common institution of direct democracy, can express the people's decisions, opinions (means of consultation) and/or support, and also helps to distinguish and characterize the main types of contemporary democratic systems.

In the first part of the talk, we will present several analogies between political systems based on possible uses of referenda, as well as the problems connected with voting in general. Alongside the problem of turnout and threshold within direct democracy, we will place special emphasis on a formal analysis of questions and answers concerning of referendum.

In the second part, we will briefly introduce the historical context of modern democracy, especially the heritage of the French Revolution the independence process in Latin America, and the mutual influences between the two. Subsequently, we will analyse some examples of European and Latin American referenda, from late the 1980s the present time, i.e.: in Poland (1987), France, Netherlands, Spain (2005), Crimea, Scotland, Catalonia (2014), Argentina (1984), Chile (1988), Bolivia (2009) and the Falklands (2013). Some analogies can be observed both in the applications and results of these referenda, which were used to support new acts (e.g. constitution), governments, independence movements or declarations of autonomy, protest against the government or regime, and the rights of minorities; nonetheless, they also served in some cases to underpin non-democratic systems.

Keywords: Direct Democracy, Referendum, Theory of Democracy, Representation

Vladimir Lobovikov

A Structural-functional Analogy between the Classical Physics and a Non-classical Logic of Vector-implication (A generalization of the logic-law of contraposition)

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In "New Paralipomena" Arthur Schopenhauer [2000] summoned to find a fundamental *analog*y between logic and pure knowledge of nature a priori. That summoning had been ignored and forgotten. In this paper I would like to take the remark of Schopenhauer seriously and not as a metaphor but literally.

Let us try to generate verisimilar conclusions from the hypothesis that the *analogy* between logic and a priori knowledge of nature does exist. If so then if the movement in history of physics from taking into an account only *scalar* values to taking into an account also *vector* ones is essential then it is verisimilar that the movement in history of logic from taking into an account only *scalar* logic operations to taking into an account also *vector* ones is essential as well. If this is accepted then one can come to the verisimilar conclusion that it is possible to neutralize the paradoxes of material implication by means of introducing such a vector-implication of which the material implication is a *scalar* aspect (necessary but not sufficient one). However if the notion of implication is significantly transformed then at least some of the notions essentially connected with it are to be transformed respectively. For example, it is relevant to add the vector aspect to the binary operation "correction" which is mathematically dual to the material implication. Both binary operations (implication and correction) are subjected to the logic-law of contraposition. However if the vector complementing them is accepted the definition of the notion "law of contraposition of binary operation" has to be adequately transformed (generalized) to be able to cope with not only purely scalar cases but also with the vector ones.

In this paper I submit a generalized definition of the notion "law of contraposition of binary operation". This generalized definition of contraposition-law works with vector operations as well as with the scalar ones. Applying the generalized-contraposition-law-definition to the two-valued algebraic system of metaphysics as formal axiology [Lobovikov, 2007] I have discovered that in this algebraic system there is such a vector law of metaphysics of nature which is a formal-axiological analogue of the well-known third law of Newton's mechanics [1994]. The Newton's law has the vector aspect, and the formal-axiological analogue of it in the two-valued algebra of metaphysics has the vector aspect too. There is a wonderful structural-functional

analogy between the formal-axiological analogue of the Newton's third law in algebra of metaphysics and the vector form of logic-law of contraposition of the "correction" considered as a vector binary-operation in algebra of logic.

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"Derivation" as the Core of Analogy

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In one of the most mellifluous passages of a philosophical treatise, Descartes waxes words on an analogy, the analogy of wax, to bring home a point on the *nature of the human mind*. Against the received metaphysical or epistemological interpretations of this poetical gem, this paper advances an interpretation, focusing on non-referential aspects of concepts. It, then, attempts to chalk out, building on this specific case, a general account of analogy, in terms of a computational process that is, a non-referential, and stimulus-independent high-level process called *derivation*. It starts by addressing the claim that analogy is the core of cognition, but in contrast to a Hofstadterian claim argues that analogy is central to understanding cognition because it shares some of the core cognitive computational principles with other central systems. A main proposal of the paper is that *a core* of cognition involves high-level computational process, which results in analogy. Arguments in this favor are placed in a broader framework, which claims, though not argued for here, that human cognitive system has at least three computational *cores*, one of them dealing with high-level process of the kind assumed in analogy. Since all instances of human thinking including everyday thinking, artistic insights, and scientific discoveries spring from the same computational mechanism, examples from everyday language use (linguistics), arts (paintings) and science (visual neuroscience) are used to bolster up the arguments. The structure of the paper is as follows. Section 1, takes up a familiar notion of analogy (a reconstruction of Descartes's wax argument) and evaluates the claim that it is the core of cognition (an analysis of Hofstadter's hypothesis). An alternative characterization is offered in Section 2, which argues that a non-referential, stimulus-free computational process is at play in certain forms of higher cognition and instances of analogy make it vividly clear. This process of *derivation* is contrasted, in Section 3, with a low-level process, namely *indication*, and a middle level process, namely *representation*. Section 4 brings out the importance of *derivation* in the logical geography of induction, deduction, abduction and analogy. The final section defends the arguments against certain objections to account of analogy offered here, and briefly touches upon the issue of analogy in non-human animals to argue in the negative, and lays out some possible lines of enquiry ahead.

Keywords: Indication, Representation, Derivation, Heuristics, Isomorphism, Recursion, Merge, Animal Cognition, and Reasoning.

Ricardo Arturo Francisco Nicolás

Similarities and Differences within the Square of Quaternality

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Three squares are presented, though not of main interest, in the paper "The Theory of Quaternality". They are the propositional square, the quantificational square and the square for modalities. Interestingly enough, they are sketched in order to illustrate the structure of a deeper square called *square of quaternality "of which the classical squares of opposition are special cases".* All of them satisfy the contradual, dual and negational rules. However, in spite of that the propositional square do not present immediate problems, applied to the square of predicates the rules are broken in virtue of the conjunction presented in the down edges. That is, the original formula that has an operation of entailment do not have their *dual* in the square. That can be proven since a tableaux for the sentential calculus by the *transpose rule*.

Having said that, I will argue that this particular difference can give rise to a comparison between those squares and for that they only can be said analogical in some aspects. Moreover, adding a explicit quantifier and applying the rules of quaternals, we can get an unusual square (*disparatae)* found in Buridan that do not have the classical relations except the contradiction. The same is hold in the square for modalities with a further operator though it preserves the rules of quaternals.

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Paniel Reyes-Cárdenas

Mathematical Structuralism, Isomorphism and Analogical thought

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The concept of isomorphism is very general, and constantly appears in mathematical thought. The world itself speaks about structures that have some relation of equality and form. The concept of isomorphism is pretty relevant in mathematical practice, but I believe that the concept comes to a unique prominence when it comes down to the Philosophy of Mathematics: the Structuralist stance in mathematics aims to show that what underlies the cohesion and applicability of the same structures all across the branches of mathematics is due not to a miracle, but to the principle that structures pervade mathematics "all the way down". However, when philosophers and mathematicians try to understand the morphism so presented complications arise: are there structures that are prior to others? What kind of structures there are? How structures relate to each other?

Analogical thought coming from philosophy presents us with important conceptual tools to help us clarifying structuralist commitments. The purpose of this paper is to show that the traditional concept of "analogy" (with roots in medieval philosophy) is good enough to account to different kinds of structures and "morphisms" in mathematics, and in such a way be an effective map that preserves sets, relations and properties among elements and structures.

The proposal, thusly, presents the concept of analogy as a second order interpretation of relations between structures, and structures of structures (that can be, oddly, consider further structures). Consequently, the concept of analogy appears promising in the task of describe what actually happens when a structure seems to be iterated or similar to structures of other branches of mathematics, giving us a further philosophical and metaphysical explanation other than: "that's simply the way it is…" The structuralist can use, therefore, the concept of analogy to describe the universe of structures that needs to be ordered and understood and, finally, interpreted.

Keywords: Analogy, Mathematical Structuralism, Isomorphism, Morphism, Mathematical Structure.

Robin Ann Rice

Analogy's Failure as a Methodology to Achieve Divine Contemplation: Sor Juana Inés de la Cruz's "First Dream"

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Sor Juana Inés de la Cruz (1648-1695) was one of the most gifted New Spain intellectual and literary giants, although she lived the greater part of her life as a cloistered nun in Mexico City. She was self-taught but her literary works show that her writings were influenced by profound and scholarly readings that followed three philosophical lines of thought. The "official" New Spain intellectual trend was Thomistic Scholasticism which is clearly seen in *First Dream* with a marked tendency towards Aristotelianism. Humanistic Renaissance thought was represented in an eclectic mix of Hermetic Philosophy and certain Neo-Platonic Hellenistic doctrines. Because of her close friendships with other Colonial Mexican intellectuals such as Carlos de Sigüenza y Góngora, she also had knowledge of Cartesian Rationalism. *First Dream* is Sor Juana's most personal work which many call a philosophical, spiritual, verse autobiography.

The Melancholy caused by absence or of thwarted efforts to reach the Divine is a constant theme in Early Modern Art and Literature. For example, Panofsky's study of Dürer's *Melancholia 1*, reveals the woeful striving of winged Melancholia to glimpse and take in Saturn's rays which are both the cause of sickness and the cure for the genius's "divine frenzy". In *First Dream*, the poetic subject struggles to overcome her intellectual and human limitations so as to gaze into the eyes of the Supreme. In the first section of the 975 verse *silva*, the subject's inner eye is detained at the edge of the concave sub-lunar world and must devise a way to intellectually pierce that ontological membrane so as to reach the convex spiritual sphere where the unintelligible divine territory begins.

The first part of the poem is developed through a series of analogies between the macrocosm and the microcosm. The attempt to override the material word and use Aristotelian universals as a means to fathom the unfathomable is also another example Sor Juana's use of a methodology based on analogies. The endeavor to gaze into the face of the First Cause cannot be achieved through analogies and the poem ends with the failure of human analogic cognition.

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Arturo Romero Contreras

Analogy and Isomorphism: Philosophy, Mathematics and Space

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In this presentation I aim to show that the classic concept of "analogy" can be interpreted in topological terms. The vagueness of how "alike" two objects are, can be tackled by a consideration of their topological and group properties. That is, two objects can be put in a relationship of mapping, and the likeness would depend on which properties are preserved through the morphism, including their local and/ global character.

The concept of analogy, as it is well known, plays a key role in Aristotle and scholastic philosophy. In the former, being is structured by relationships of genus and species in a vertical tree-like structure. Analogy, however, allows a sort of horizontal linking of beings. Originally, analogy meant so much as proportion, like in the case A is to B as C is to D. Or, in its abbreviated form, as in the so-called golden-ratio: A is to B as B is to AB. But there is in Plato and later in Aristotle´s *Rhetoric* and *Prior Analytics* an "extension" from a pure quantitative to a qualitative use of analogy. Aristotle speaks of two types of analogy: *paradeigma* and *homoiotes*, both capable of being used in deductive arguments.

But we should not interpret analogy in a pure linguistic way. In Aristotle, categories are necessarily both linguistic and ontological. In medieval thought it is clear that some words are *univocal* and some are *equivocal*. But there is a third term, again, between pure difference and identity: analogy. As in Aristotle, analogy allows to link beings in a semi-proper manner. There will be different orders of analogy, types and uses. But beside the more or less reasonable similarities, analogy resembles many types what we could call a metaphor. Now metaphor lacks of scientific rigor. Not because science cannot resort to analogies between realms, but because metaphors cannot be evaluated. There are no objective degrees of likeness or at least criteria to evaluate how adequate or inadequate a metaphor is.

It is in the Renaissance philosophy however, where analogy gains a radically new significance, as it is linked to mathematical *structures*. Indeed, there was surely an indiscriminate use of vague similarities between the farthest regions of being, especially between the macro- and the micro-world, between cosmos and man, where nature would show correspondences in all scales and places. But at the same time, such resemblances were more and more expressed in terms of mathematics. It was not only proportion or metaphor, but a more general term which emerged

progressively, namely, "form". Analogy was not to be settled upon vague and questionable resemblances—of qualitative nature—nor in pure quantitative terms—as in the case of proportion.

Drawing our attention to renaissance painting, one can notice that at first glance, perspective is nothing but an instrument to produce the effect of depth in a painting, it is basically a *trompe l´oeil*. But mathematically there is something different happening. We are projecting, or mapping, our experience-world to a non-Euclidian space, namely that of projective geometry. We should no speak of representation, but of projection. Now, what is the relationship between our lived world—a mixture between Euclidian and non-Euclidian world—and the picture? Can we speak of analogy? Indeed, but in this very special sense of mapping. What is a mapping here? It is a transformation of one figure into another—by rotation, stretching, or putting into perspective—or of one space into another—via immersion or submersion.

We are knocking the doors of topology; for topology establishes—in a pure qualitative manner—if two spaces are the same, i.e., if they are isomorphic (more exactly homeomorphic), when one can be deformed continuously into the other. But one can also produce many "mappings" of one space into another without conserving all the properties. For example, when we project (stereographic projection) a sphere (S2) onto the plane. In this case we assign every point of the sphere to a point on the plane. We know that this procedure produces double points—if we project from the north pole, both it and the south pole will be mapped with a single point—and a line to infinity—the tangent line to the north pole, which is parallel to the plane and for this reason does not appear on it. Now, we can establish not only if and which properties of the topological space are preserved in one mapping, but we can also determine if homeomorphisms are local or global.

We have spoken of topology but also about group theory. In both cases we can interpret the classic concept of "analogy" anew departing from the concept of map. The "quality" of an analogy could be evaluated by analyzing which structural properties are preserved in a mapping. We should remember that a mapping is nothing but a function that sends elements of one set (domain) to another set (codomain). Assumed the key concept of "map", analogies are nothing but transformations between spaces, where not all properties are conserved.

One could advance the thesis that "univocity" means the possibility of a smooth map-preserving transformation. One could add that univocity does not mean a single figure anymore, but a group of possible transformations. "Plurivocity" would mean the break of the function, a non-smooth transformation, like a singularity (double points, function bifurcations, etc.). Analogy would be the in-between, i.e., partial homeomorphisms and mappings that do not preserve all structural information of one space when mapped into another.

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Irina Vulcan

A Favorite Analogy: The Microcosm

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As pre-scientifical cognitive tool, the analogy is very important during the Middle Ages and the Renaissance. Although it underlies the metaphor in rhetorics, the analogy as *similitudo* comes under dialectics, in its theorization of the Renaissance (by Rudolf Agricola or Ramus). This « locus » of dialectical invention allows to build up semantical nets with surprizing extension according to the historical moment. This contribution proposes to study this major theme in its historical changes from the Middle Ages to the Renaissance in the erudite literature, like the *Roman de la Rose* or *Placides et Timeo*, first doxographical dialogue in vernacular language, then in various dialogues of the XVIth century (for example, Pontus de Tyard for the Pléiade or Pierre Viret for the Reformation, among others ; the last author using in his *Dialogues of the desorder* (1545) the mirror of animals for the socratical quest of the self). At least, it shows how this instrument for cognition and for discursive *cornucopia* binds man with cosmos in various beautiful proportions.

5. “Cosmic Fusion” Catherine Chantilly’s Paintings Exhibition

Catherine Chantilly

The Self-Portrait

Catherine Chantilly is a French artist. She lives between Rio de Janeiro, Brazil and Vichy, France, but she is presently in California for 2015 with her fiancé, a researcher in logic. They travel around the world, with her making exhibitions during their journeys in Brazil, Chile, Portugal, France, Poland, Canada, Turkey, and Mexico.

She graduated in fine Art from Ecole des Beaux-Arts de Bourges in France. She also has a master of civilization and literature from the University of Nice. She has organized multidisciplinary workshops on art and creation, in castles in Auvergne, with artists, philosophers, choreographers, writers and musicians.

Catherine Chantilly's paintings are inspired by love. For her – colour – is light, and light is love. She likes to discover new places and feel the atmosphere. Brazil was one

of the most inspiring country for her paintings: she returned to painting after a period of doing installations and video performances. She also was an editor in an another life, but coming back to painting is her connection to innocence linked to the heart of childhood. And this happened in Brazil. She prefers painting in large formats to feel the space of the colours. She also paints on walls: the walls of the city of Rio de Janeiro, the walls of private houses and hotels, and on the walls of castles in France in Auvergne, its original birthplace. For her, art is a spiritual path. She uses colour to reach love, which is a vibration, and tries to capture the essence of love and bring it to painting with colours and symbolic forms.

Katarzyna Gan-Krzywoszyńska & Piotr Leśniewski

Clarity, or the Art of Reconciliation. On Catherine Chantilly's Painting

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*Alle religiöse Rituale auf Kinderspiele zurückzuführen sind.**

There is a very old account to the problem of beauty - according to Aquinas beauty includes three conditions, namely (1) integrity (perfection) [Latin *integritas sive perfectio*], (2) proportion (harmony) [*proportio sive consonantia*], and (3) brightness (clarity) [*claritas*]. [See *Summa Theologiae* I, q. 39, a. 8.] It seems to us that the very last word is a perfect, although only one of the possible keywords, crucial for the interpretation and the understanding of Catherine Chantilly's painting. It should be added that this article of *Summa Theologica* is a part of inquiries in relations between three divine persons.

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* The motto of our sketch, which states that *all religious rituals are attributable to children's games* is the reverse of Giorgio Agamben's view, expressed in an interview given by him to René Aguigah and Jutta Person. It was published in the *Literaturen* journal on 28 October 2009 and titled *Der Papst ist ein weltlicher Priester.*

However, at this point let us consider some of the relations that occur just between people. Let us imagine three situations – three models of encounters. The first type of a situation is encountered when two people meet and each of them responds with equal kindness to the kindness of the other. The reaction to hostility expressed by one person is the other person's hostility. In the other two situations – encounter models – this adequacy of reactions is absent. The first of the models involves enslavement. In this case one of the individuals, the enslaved person [subjugated] [let this person be called enslaved, subjugated], fails to pursue one's own goals – that person's decisions are consistent with the other person's preferences. What is more, that person reacts [responds] with kindness even to hostility expressed by the other person. It should be noted that one can be enslaved of one's own will. In the third situation – call it exasperation – one of the persons, the exasperated person, intends to cause harm [do something wrong, evil] to the other person. In this case the first person reacts with hostility even to kindness expressed by the other.

If one agrees that the adequacy between responses [reactions] to kindness and hostility typical of the first situation is the most desired element of human relationships, then the main question – and a practical problem – related to these two encounter models is to find a way out of enslavement or exasperation. For the enslaved or exasperated person this is also the first step to regain freedom.

It appears that an accurate (or may be just metaphorical) term that reflects the essence of the first condition for regaining lost freedom is the very word *clarity*. First you have to see, recognize your position. To see you need the light, which brings you clarity. This clarity also makes reconciliation possible, as *living in agreement* [harmonious life] is what constitutes our ultimate goal according to the famous work titled *Epitome of Stoic Ethics* by Arius Didymus. By *reconciliation* we mean not only an act of being reconciling or the state of being reconciling, but also the process of making consistent or compatible. Such an act, or state, may occur between two persons. It is worth noting that the reconciliation process can take place not only between two different persons – we are talking also about reconciliation with oneself.

Catherine Chantilly follows the paths of reconciliation – her paintings are the records of the discovered gates and passages, which she wishes to share and open for us.

Stanisław Witkiewicz, in the last paragraph of his letter from Lovran to his son, Stanisław Ignacy Witkiewicz, dated 21 January 1905, wrote, intera alia: “My dear! Kisses – be healthy, clear, and good.” Clarity in Catherine Chantilly's paintings is always, almost naturally, intertwined with goodness.

In the *Introduction* to *Tales of the Hassidim* Martin Buber wrote: *The core of hasidic teachings is the concept of a life of fervor, of exalted joy*. Well, you will see – Catherine Chantilly is a truly fervent human being.

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