Transactions of The Luventicus Academy

supplement dedicated to the dissemination of the works of Juan José Luetich

ISSN 1666-7573
Online version: www.luventicus.org/transactions/jjluetich

Volumen I – Issue 1 Rosario – May 10th, 2012

To be or to be not, that is the dilemma.

The basic function of the human mind is to concentrate its attention on a part of the whole. It is like this because, on the one hand, the human being can only be conscious of what he perceives with his senses and, on the other hand, the human brain has dimensions that allow it to consider a limited number of entities. As of that moment, those entities or *elements* constitute his *universe.*

Take the following universe, defined by the *enumeration* of its elements.

$$\mathscr{U} = \{2, \triangle, 6, 1, \curlyvee, \square, 4, \times, 3, 12, \mathit{three}\}$$

In enumerations, the order is not important but the total number of elements is: it is called the *cardinal number of the universe.* In this case, $\#\mathscr{U} = 11$.

After fixing his attention on certain elements, the human mind finds similarities between them, causing it to group some together and divide the universe into parts. The outcome of the action of grouping elements is called a *set.*

$$A = \{1, 2, 3, 4, 6, 12\}$$

A is the set of natural divisors of 12 (expressed formally).

Different people may use different characteristics to find similarities between these elements as might the same person under different circumstances. For example, other characteristics of the elements of $\mathscr{U}$ can lead to form the following set.

$$B = \{\triangle, \curlyvee, 3, \mathit{three}\}$$

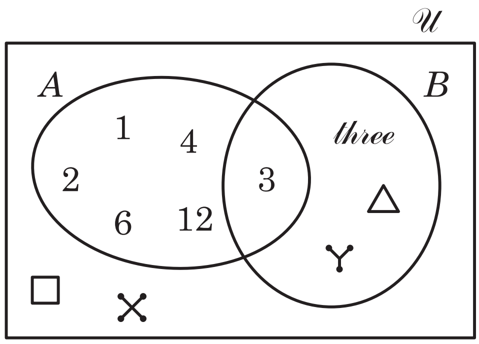
B is the set of elements that could represent the number 3.

When the elements in a set are selected for a common characteristic it is said that a *selection criterion* has been applied. Such criterion can be used to define the set without the need to enumerate its elements, which is practical, especially when dealing with numerous elements. If the elements were grouped without applying any criterion, the only possible way to define it is by enumeration. However, the criterion is not always something easy to discover. Take the following set.

$$C = \{3, 6, 12\}$$

At first glance, these numbers are not the result of applying a criterion. However, they arise from multiplying the remaining elements in A (1, 2 and 4) by 3. The usefulness of a criterion often depends upon the subject being studied: the A set may be of interest when studying the divisibility of numbers; B, when studying numeration systems; C, when studying recursive definitions.

The relationship that links an element to a set is called *membership.* For a given universe and a given criterion this relationship is *binary,* that is, an element either does or does not belong to a set. Thus, the elements in $\mathscr{U}$ could, or could not, belong to set A, the natural divisors of 12. A set is precisely defined, leaving no room for ambiguous terms. Because of that, universe and sets are represented in diagrams like the following one.



In these diagrams, know as *Venn diagrams,* (in honor of the British mathematician and logician, John Venn, 1824–1923), elements may not be located over the delimiting lines of the sets.

An element's membership in a set may be formally expressed as: $6 \in A$. It should be said that the notation: $\mathit{three} \notin A$, has also been used to show that an element does not belong to a set. However, the two expressions are not comparable: to say that an element belongs to a set is to give affirmative information; saying that it does not belong is to leave open the possibility that it could belong to any other. But, since all of the elements belong to the universe $\mathscr{U}$, this difficulty could be avoided by writing: $\mathit{three} \in {\sim}A$. This last one being the set of elements that do not belong to A:

$$\sim A = \{\triangle, \curlyvee, \square, \times, \mathit{three}\},$$

or better yet, the set that is formed when the elements from A are removed from $\mathscr{U}$, which is called the *complement* of A.

(continued on page 2)

MAIN ARTICLE

Ontology and Dialectics

The subject of being as being, in its different levels of abstraction (an entity, certain entities, the entities, the entity), is the subject of ontology, the “first philosophy.” An entity is something when it belongs to the universe and a selection criterion has been applied. Multiple criteria within the same universe lead to confront concepts. This is the subject of the “second philosophy,” dialectics. Together with logic, these form the nucleus of Western philosophy.

(page 2)

HISTORICAL NOTE

The Eleatic School

In a Greek colony in what is now the region of Campania (Italy), Parmenides began a way of thinking based on the entity (that which is), opposed to that of the writers of myths, who used a language of multiple meanings, the poetic language. Parmenides' ideas are in direct connection to the basic premises of the set theory.

(page 3)

BACK PAGE

INTERVIEW WITH JOTAJOTA

Why publish?

In a typical researcher's office, filled with books, papers and computers, Juan José Luetich speaks to us about his writing techniques and the reasons for making his work known to others.

BIOGRAPHICAL SKETCH

Juan José Luetich

A multifaceted public figure, the creator of cultural trends, his natural propensity for thinking and writing, together with his work as an educator have turned him into a worshiper of clarity.

PRINTING NOTES

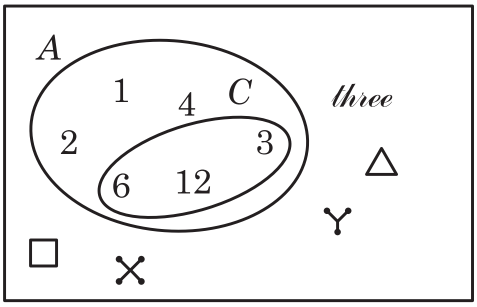
About this publication

Transactions is a serial publication of The Luventicus Academy, an NGO promoting information, education, science and culture. This supplement is dedicated to rescuing the works of Juan José Luetich, which were almost lost in late 2010.

9 771666 757003 01

Ontology and Dialectics

The front page article used a universe $\mathscr{U}$ and three sets, *A, B* and *C,* as examples, of which only two were represented in the Venn diagram. The following diagram shows the sets *A* and *C*.

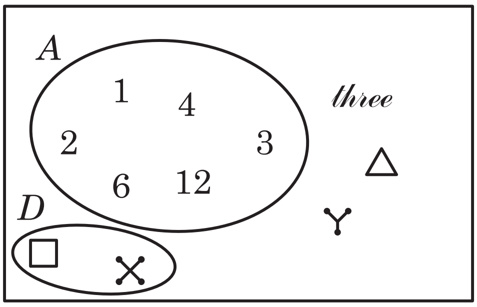


These illustrate the *inclusion relationship,* which links one set to another. Since all of the elements in *C* are also in *A,* it is said that *C is included* in *A* or that *C* is a *subset* of *A*. Formally, $C \subset A$.

In general, for any two sets it could be: that they have common as well as individual elements (the case with *A* and *B*), that only one has individual elements and the rest of them are common (the case with *A* and *C*), or that they do not have common elements. This last one would be the case with *A* and *D,* where *D* is the set of non formal representations of the number 4:

$$D = \{\square, \times\}.$$

Such a situation is illustrated in the following diagram.



The sets of this type are called *disjoint* sets and the criteria used to define them are called *exclusive.* Disjoint sets can also be of two kinds: *non-complementary disjoint sets* (the case with *A* and *D*) and *complementary disjoint sets* (the case with *A* and ~*A*). In this last case, gathering together the elements of both sets, creates a set with all the elements of the universe.

The set that gathers together the elements of two sets to form a new set is called *union* and the operation is denoted as ∪. Thus, for example, $A \cup B = \{2, \triangle, 6, 1, \curlyvee, 4, 3, 12, \textit{three}\}$. The set created from the elements that two other sets have in common is called *intersection* and the operation is denoted as ∩. Thus, for example, $A \cap B = \{3\}$. If there are no elements in common (the case with disjoint sets), it is said that the intersection is *empty:* $A \cap D = \{\}$.

So, based on the above, for complementary disjoint sets we have that:

$$A \cap \sim A = \{\};\ A \cup \sim A = \mathscr{U}.$$

The last of the two conditions will not be true in the case of non-complementary sets. The union of complementary disjoint sets bears a unique result, $\mathscr{U}$; the union of non-complementary disjoint sets could bear many results. And this forces us to express it as: $A \cup D \neq \mathscr{U}$, of which we could say the same thing (nothing good) as what we said about the non-membership relationship. The notation ≠ is the same thing as saying "it is not equal to" and, therefore, it represents a denial.

Ontology deals with exclusive complementary definitions. An ontological problem would be to ask oneself: What is a natural divisor of 12? On to a different matter, ontology could ask: What are sports? What is education? What is science? But most of the times, these questions, and many others, involve concepts that don't have complements which can be given a usual name. For example: What is the complementary concept for "sports?" And the one for "education?" And the one for "science?" In these cases it is often useful to use another concept to contrast it with. Thus, "sports" could be opposed to "game," "education" to "instruction," "science" to "religion." That art, the art of testing definitions whose subject is the entity not as entity but rather in relation to other entities, is called *dialectics,* and it can also be called the *second philosophy* (see the Historical Note). Ontology, dialectics and—as will be seen later—logic, form the basis for the Western philosophical thought.

Ontology deals with defining entities or with discovering the criterion used to define an entity; then, dialectics confronts definitions in the same universe. In the case of the "sports versus game" opposition, that which is understood by sports, and that which is understood by game must be clearly defined at first. For example, to discover what the underlying criterion for the sports set is, an *ontological table:* sports versus not sports, could be drawn first. The elements on both columns are the universe being considered. The column headings are

(continued on page 3)

FRONT PAGE

To be or to be not

(continued from page 1)

The preceding paragraph is filled with subtlety and I invite the reader to read it again. Membership and non-membership have different entities. A membership relationship is an affirmation, while a non-membership relationship is a denial that opens up multiple possibilities. If an element belongs to *A,* there are no doubts: it is a divisor of 12. If it does not belong to *A,* it could be a word, a figure, a doodle… But the solution is found in the problem itself: if an element does not belong to *A,* it is a *not divisor of 12.* An element is a divisor of 12 or it is a not divisor of 12.

Whoever establishes the criterion that defines a set faces a dilemma: If the element does not fall within the set, it remains within its complement. But this fact should not torment him—as the existential question did the Prince of Denmark in Shakespeare's tragedy—because that is precisely the strength of the set membership, i.e. the strength of being.

How to collaborate

We worked very hard during 2011 to organize the notes of Juan José Luetich. The task was not easy, but today we are satisfied to have found the logical dependence of countless works that are difficult to classify either by extension or by subject matter. Just to mention a few examples, Juan José Luetich's files includes: a series of articles regarding the basics of phenomenological thermodynamics, a historical reconstruction of the cult of Osiris, notes regarding metascientific visions in scientific experiments, a review of several topics on the theory of numbers, a theory for a new musical system, the description of an ideal machine *(Gedankenexperiment),* notes on matters regarding Indo-European linguistics, a technique for teaching the design and sizing of chemical reactors, a contents management system written in LISP, literary criticism articles, moral and political writings, textbooks, a translation of *"Entity and Essence"* by Thomas Aquinas with must-read notes, a book of piano études, and articles on the works of Boscovich, Legendre, Boltzmann, J. W. Gibbs, Langmuir and G. N. Lewis. After considering various options, we chose the newsletter format to publish the works. If you believe, as we do, that the dissemination of these works is a worthy goal, you can collaborate by subscribing to the printed version. The (not identical) online version is free. You may also collaborate by sending comments or questions or by talking to others you know about the characteristics of these works. For further details, visit the website for this supplement of Transactions.

The Eleatic School

The set theory, mentioned in the front page article, was developed in the 19th century. The word “set” (in German, *Menge*) was used for the first time by the bohemian mathematician, logician, philosopher and theologian, Bernhard Bolzano. At the beginning of the 5th century B.C., the Greek philosopher, Parmenides of Elea, has formulated the problem differently.

In his poem, *“The Way of Truth,”* Parmenides describes first his journey on a chariot pulled by beasts of burden—in what would be the description of a mystical voyage, a rite of passage or, simply, an inner search—and then he tells us that a goddess instructs him. The chariot must take one of two roads: *the authentic* or *the unnamable*. Regarding this, the poem reads as follows (see the text frame).

μόνος δ῎ ἔτι μῦθος ὁδοῖο λείπεται ὡς ἔστιν·
ταύτῃ δ῎ ἐπὶ σήματ῎ ἔασι πολλὰ μάλ῎,
ὡς ἀγένητον ἐὸν καὶ ἀνώλεθρόν ἐστιν,
οὖλον μουνογενές τε καὶ ἀτρεμὲς ἠδ῎ ἀτέλεστον·
…
ἡ δὲ κρίσις περὶ τούτων ἐν τῷδ΄ ἔστιν· ἔστιν ἢ οὐκ ἔστιν·
κέκριται δ῎ οὖν, ὥσπερ ἀνάγκη,
τὴν μὲν ἐᾶν ἀνόητον ἀνώνυμον, οὐ γὰρ ἀληθής ἔστιν ὁδός,
τὴν δ῎ ὥστε πέλειν καὶ ἐτήτυμον εἶναι.

There is only one road: that of what is.
In it there are signs in abundance,
because the entity, as it is,
is unborn and undying,
it is integral, homogenous, imperturbable and continuous.
…
The issue here is the following: “To be or not to be.”
But it is already decided, as it should,
to set aside the unnamable and unthinkable road,
because it is not true,
and take the other, that of what is, the authentic one.

The first two adjectives on the fourth line of the first paragraph (“whole” and “homogenous”) are very important. Together they could be translated as “unique.” A translation here is not easy since the fragment appears in various forms in the works of Sextus Empiricus, Clement of Alexandria and Simplicius, and must be done by meaning. The set membership that gives rise to a dilemma (you are or you are not), is clear. And clarity is the light that illuminates the universe and makes it possible to group the elements. Thus Parmenides qualifies the road of being as “authentic,” “genuine” or even “true.” However, this last word has a meaning today that could lead many astray of Parmenides’ thoughts, and even more so if the word “effective” were to be used there instead. Plato went even further when he said: “Good is One” (Here “Good” must be interpreted as “What is Right.”)

The association of light with being, which comes from seeing the entity as “that which is not hidden,” it is an image of great symbolic value, which could be expressed as:

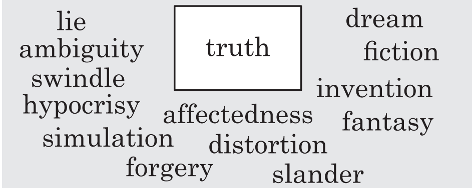
being ↔ light ↔ truth,

while

not being ↔ shadows ↔ opinions.

The light (clarity) as opposed to the shadows (confusion); the truth as opposed to opinions. Oneness is the primary quality of being, and all others are derived from it. Some people have a natural predisposition towards the light (“clear minds”); others do not. Paraphrasing the smart French essayist, Jean Brun (1919–1994), you could say that: *while some cast a light in search for truth, others fish in the murky waters of opinions.*

The “unnamable” road is not strictly only that of opinions, in the sense that this word has for us today. It is also that of myths, created with the language of poets, of multiple meanings and interpretations. This is what led Plato to propose, in *“The Republic,”* that the activities of the poets be kept under control. With the study of entities, which is called *ontology,* philosophy is born. That is why Aristotle called it the *first philosophy*. This birth came about during a moment in history when poetic language started generating confusion and lost its prestige as a means of communication in favor of prosaic language, in which every word has a unique meaning. If we combine the meaning of the words “opinion,” “conjecture,” “myth,” “mystery,” “delusion,” “hallucination,” “dream,” “fiction,” “invention,” “fantasy,” “error,” “lie,” “ambiguity,” “swindle,” “hypocrisy,” “affectedness,” “simulation,” “distortion,” “slander”—which jointly can be replaced by “falsehood”—the opposite of which would give us what was known as “truth” in ancient times.



Parmenides started a current of thought, known as the *Eleatic school,* which influenced many great thinkers. His main idea is found in the first line of the second paragraph: *“The issue is: To be or not to be.”*

MAIN ARTICLE

Ontology and Dialectics

(continued from page 2)

the names of the two complementary disjoint sets.

sports	not sports
▪ marathon ▪ amateur rugby ▪ rowingemo ▪ discus throw ▪ open water swimming ▪ cycling	▪ professional soccer ▪ boxing ▪ chess ▪ horse racing ▪ motoring ▪ poker ▪ trekking ▪ bowling

Upon observation, these lists show us that—as far as the sports-not sports dilemma goes—whoever made the table used a criterion that excluded from sports such things as: professional activities, those that do not lead to better health, those that do not imply any physical activity, those that promote gambling, those in which human beings share the merit with animals or machines, those that are for profit, those that are not competitive, and those that have no rules or organizations that define and apply them. With this kind of table, sports can be given a definition that would still serve in the future to place any activity in one or the other column. In defining what is understood to be a sport that which is a not sport is also defined, since the criteria for sport and not sport are exclusive and complementary. The same could be done to discover the criterion that gives rise to the concept of games. Once the meaning of both terms is clarified, the dialectic counterpoint can determine the relative position of the Sports and Games sets.

Dialectics examines the existing relationship between concepts, but does not try to change them. The definition already existed before. The proposal of paradoxes and the discussions that might arise from the confrontation of concepts are the responsibility of those who do so, who are generally not philosophers or are philosophers who have taken time off to go on vacation.

“Ask Jotajota”

This is the title we will use for the section where the author responds to the readers’ questions. It will be formatted similarly to the section with the same title on the Academy’s website. The printed version will only include answers to questions related to the topics covered in the last issue, selected according to the space available. However, no question shall be unanswered. The remaining questions shall be published in the online version of the supplement. Questions must be sent to the author’s email address: jjluetich@luventicus.org.

INTERVIEW WITH JOTAJOTA

Why publish?

Germán Schultze (gschultze@luventicus.org)

It is the last week of April and, in Rosario, leaves in infinite shades of ocher rush over the sidewalks and clump together. The weather has turned cold after a torrid summer. Juan Jose Luetich awaits us, as agreed, to talk about his work. He receives us in an office with North American oak furniture: roll up desk, swivel chair, file cabinet and library. Access is difficult due to the presence of several computers and countless books, magazines, binders and papers.

—*When did you start to write?*
—I write since I can remember. In the grade school, the work I liked the most were the written assignments.
—*Did you have a favorite subject?*
—I preferred to pick the subject myself, but that was seldom possible.
—*Were you interested in mathematics then?*
—I never disliked them, but my strength was language. However, when I had to take the high school entrance exam, I got a higher grade in Mathematics than I did in Language by using an unorthodox method to solve a problem. That fact made me look at mathematics as a creative outlet that was as important as literature.
—*What method do you use for writing?*
—I spend a lot of time thinking. I usually do that while I walk. I try to go everywhere on foot. And I only write when my head is about to explode, when nothing else can fit into it. This could happen at any time, you never know. That is why sometimes, not having adequate writing materials on hand, I resort to bar napkins, wrapping paper, mail envelopes or supermarket receipts, to take down some notes. A great part of my doctoral thesis was written that way.
—*That is not the advise we get from methodologists.*
—Methodologists are people who say how something must be done that they never did. [laughter]
—*Do you remember any topic that you spent a long time thinking about?*
—Yes, of course. I dedicated a lot of time, among others, to the basis of the mathematical induction method. I must have spend years on that. One day, when I thought I had finally gotten it out of my head, I thought about it again, and I realized something very important. Then I wrote an article. [I would like to add that once I pour out my ideas on paper, a lot of time goes by before I find the appropriate tone and write the final draft.]
—*And did you publish it?*
—Not at that time. It is among the things that will be published in this supplement.
—*Were you not interested in publishing?*
—I was never interested in publishing. I have only done it from time to time.
—*Alfonso Reyes used to say that writers publish so as not to spend years rewriting the drafts.* [smiles]
—Yes, he expressed it with much grace. I, on the other hand, published little to have fewer regrets.
—*And what has led you to publish now?*
—The year 2010 was a turning point in my life. I suffered an aortic dissection and came to be very close to death. The love of a woman, the doctors, the will to live, and the strength I got from my friends, saved my life. When I recovered and went back to work, I realized that, had I not returned, everything would have been lost: my work, a set of papers that only I could understand; my office, which is like the fulfillment of a dream—I worked for many years in a rented office—; my office furniture, which had cost me so much to collect and restore; my books, which are so valuable to me but who knows if they mean the same to someone else… This led me to rethink what I had been doing.
—*As it is used to say, is the moment in life when you realize that you are not immortal.*
—In my case it was more like realizing how close death was. I don't know how much time I have left. In truth, no one knows. What is new for me is that I am now a part of the group that is aware of that and I want to put my affairs in order.
—*Did you have any vision or experience during that difficult moment?*
—Yes, I did, but I am still searching for a language to faithfully communicate it.
—*Going back to the writing techniques, I see that you have several computers in your office…*
—Yes, but I prefer writing on paper. I believe it is the fastest way to preserve your ideas. When I write I use symbols, arrows, and I make schemes. Doing all that in a machine takes much time. The same thing happens when you want to take notes during a class or a conference. Only the digitizing screens and tablets can come close, regarding speed, to writing on paper. I use computers for other things: to format articles, books, magazines and web pages, and to make graphic materials for use in class.
—*We shall return soon to talk about the topics covered in the first issue.*
—It shall be my pleasure. Thank you for your interest in my work.

Juan José Luetich ("Jotajota" ["Jay-jay," in Castilian], for his students) walked us to the door and kindly said goodbye. Out on the street I realized it was already dark. The gentle autumn breeze continued to play with the leaves and making the streetlamp that cast a pale light over them swing. As I review my notes, I fear that I may not be able to transmit all of the sensations I experienced during the conversation. I choose to transcribe them literally, adding only a couple of comments.

Juan José Luetich, philosopher, critic, writer, alchemist, mythographer, musicologist, mathematician, chemist, scientist, engineer, researcher, educator, programmer, linguist, translator, born in Rosario on January 24, 1964. After working for many years as a private tutor, he founded the Luventicus Academy of Sciences in 2001 with the purpose of exploring how the new communications media (digital documents, electronic messages) may be used in teaching. Since then he has worked as an editor, author, teacher, consultant and programmer for that organization. The positions he formally holds are: Editor of Serial Publications and Director of the Computational Chemistry Lab. He also teaches in mid and high level institutions (advanced and university), where he has collaborated in the creation and modification of study programs. The work of Juan José Luetich is interesting—more than just for the diversity of subjects it covers and its extent—because of the relationships it establishes between topics of distant specialties and the originality of the author's approach while presenting or resolving classical problems. Such a vast volume of work, however, has only one objective: to explain everything with clarity so that everyone understands.

About this publication

Transactions is a serial publication about the foundations and philosophy of science of The Luventicus Academy, an NGO promoting information, education, science and culture. This supplement is dedicated to the dissemination of the works of Juan José Luetich. The articles published in this issue are: *"To be or to be not, that is the dilemma"* (2001), *"Ontology and Dialectics"* (2003) and *"The Eleatic School"* (1995). Webpage: www.luventicus.org/transactions. E-mail: transactions@luventicus.org.

The Luventicus Academy
Príncipe Pedro Building
Buenos Aires 633, 2nd Floor
S2000CEA Rosario, Argentine Republic
+54 341 4487316
www.luventicus.org
academy@luventicus.org

Printed in the workshops of Tecnigráfica