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Jaime Vladimir Torres-Heredia Julca. The generative holistic noetic theory: With its application to the concepts of genus and species from Porphyry's Introduction. 2007. halshs-00150595v2

HAL Id: halshs-00150595

<https://shs.hal.science/halshs-00150595v2>

Preprint submitted on 15 Jun 2007

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The generative holistic noetic theory

**With its application to the concepts of *genus* and *species* from
Porphyry's *Introduction***

By

Jaime Vladimir Torres-Heredia Julca

June 2007

Translated from the French version "L'hypothèse de la noétique générative holiste – avec son application aux notions de genre et d'espèce de l'Isagoge de Porphyre " presented at Geneva University (Switzerland) on June 29th 2006 by Jaime Vladimir Torres-Heredia Julca

Notes on this English version :

This is the exact English translation of a paper written in French between 2004 and 2006 and officially presented at the Faculty of Letters of Geneva University on June 29th 2006.

In this version the quotations from French authors, except for Charles Dunan's quotations, have been left in French without perturbing the comprehensibility of the paper. Besides it, all concepts, ideas, terms, diagrams and texts of this English version are the exact translation of all the concepts, ideas, terms, diagrams and texts that appeared on the original French paper officially presented at the Faculty of Letters of Geneva University on June 29th 2006.

Moreover, the original version in French officially presented at the Faculty of Letters of Geneva University on June 29th 2006 has an IDDN certificate in order to protect intellectual property rights.

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<http://www.legalis.net/cgi-iddn/certificat.cgi?IDDN.CH.010.0106630.000.R.P.2006.035.31235>

The links for the original French paper officially presented at the Faculty of Letters of Geneva University on June 29th 2006 are:

<http://halshs.archives-ouvertes.fr/halshs-00150595>

http://www.concept-global.net/philosophie/noetique/noetique_generative_holiste.htm

This English version has also an IDDN certificate:

IDDN.CH.010.0108191.000.R.A.2007.035.31235

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ἐν γὰρ τοῖς μέρεσι τὸ ὅλον

Porphury, *Introduction*, (Species)

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I. - Introductory words:

The problem of genus and species goes at least back to Plato who treated it using his Theory of *Ideas*. Then Aristotle dealt with this problem by proposing his Theory of *Universal*.

Porphiry dealt with this problem in his *Introduction* by specifying that he would do it especially from a *logical* point of view. This means he doesn't deal with the problem of the ultimate nature of the genus or the species: he will be especially interested, among other things, in the links there are between the genus, the species, the three other predicables and the individuals¹.

But the links there are between these five predicables are surely dependent on the deep nature of the species and the genus. That's why a study of the nature of genus and species on a noetic level would also be interesting in order to see whether we can explain in a way the links and other properties exposed by Porphyry and also by Plato and Aristotle.

Precisely, the goal of this work is to study what could correspond in our mind² to the *Ideas*, the *universals*, the *genus* or the *species* using a theory the author of this work calls *the generative holistic noetic theory* (= GHN). This theory relates to the *noetic theory* insofar as it proposes a model of the activity of the mind by following the tradition of noetic researches of Graeco-Roman antiquity, Arab philosophy and the Western Middle Ages.

The aim of the GHN is to propose some solutions to problems put by noetic theory like the problem of abstraction. The GHN also tries to lie within the framework of contemporary research on holism carried out in fields like semantics, mathematics,

¹ It is clear that this *logical* approach is always followed by many contemporary logicians who develop complex systems without coming onto philosophical problems or more precisely metaphysical problems concerning concept, truth, etc. At least Porphyry recognizes that there is a problem but that it is not the goal of his *Introduction*.

² Or in an intellectual world that we would share.

physics or psychology. Finally, the GHN also tries to propose an explanation to the *generative* principle that one observes in many formal sciences, in particular in the generative grammars of Noam Chomsky³, mathematics, etc.

As we will see it further, the GHN bases itself obviously on works of Plato, Aristotle, Plotinus, Porphyry, Averroes, Albert the Great, Chomsky, Charles Dunan and of the philosopher and Spanish physician Juan de Huarte de San Juan whose work entitled “Examen de ingenios”⁴ will be briefly presented. The goal of the GHN is to resume their works concerning the mind activity but in laying down three noetic principles that will be further explained:

- The *noema* as principle of the thought
- The generative principle
- The holistic principle of the noemas’ generation

The goal of this work is not to treat the part of the noetic theory that relates to the origins of the thought, but rather to describe *the process* of thought on the basis of the principle that there is an intellect that contains *a priori* concepts or innate principles and that generates noetic objects as we will see it further.

Moreover, with regard to the links between the intellect and the brain, the GHN assumes the principle that the human brain constitutes information drawn from the sensory data and that will allow the intellect to form thoughts. These thoughts can have links with the brain as it is currently studied by cognitive sciences, but the GHN is interested in the mind as an intellectual principle already made up by leaving, at least initially, the crucial questions about the links between the intellect and the brain.

³ See Chomsky N., *Linguistique cartésienne suivi de La nature formelle du langage*, Paris, Editions du Seuil, 1969

⁴ Juan Huarte de San Juan, *Examen de ingenios para las ciencias*, Baeza, 1575

II. - Principles of the *generative holistic noetic theory*:

The holistic principle within the framework of semantics:

By studying the language we often notice that the significance of the words is part of a kind of network that connects the various significances⁵. From this type of observations, for example, was developed the thesis of *semantic holism* that Pascal Engel formulates this way : " La signification des mots (dans un langage en général, pas seulement dans un discours philosophique) n'existe pas indépendamment de celles d'autres mots, de leurs occurrences dans des phrases, et en dernière instance, des significations des phrases de l'ensemble d'un langage. "6.

However, it is completely justified to wonder, if we accept the thesis of *semantic holism*, what happens on the level of our intellect, more precisely on the level of our thoughts: does our thought have a holistic structure?

A formalization of the holism:

A holistic system can be characterized by the two following principles⁷ :

(P1) The whole is more than the sum of its parts

(P2) The parts take its possibility from its inscription in a whole

These primitive proposals can be formalized in the following way:

⁵ Besides these networks are highly used in many computing systems : they are called *semantic networks*.

⁶ See Engel Pascal, *La Dispute. Une introduction à la philosophie analytique* (Paradoxe), Paris, éd. de Minuit, 1997, p. 189.

⁷ See Bouchard Yves, « Le holisme épistémologique dans la *Critique de la raison pure* de Kant », thèse présentée à la Faculté des études supérieures en vue de l'obtention du grade de Philosophiae Doctor (Ph.D), Université de Montréal, 1997. URL : <http://www.theses.umontreal.ca/theses/pilote/bouchard/these.pdf>

$$(C1) \sum_{n=1}^{\infty} (\alpha_n \in \omega) < \omega$$

(C2) For all α , there exists an ω in so way that, if ω is not possible, then α is not possible

As we will see subsequently, the generative holistic noetic theory corresponds to these principles.

The intellect:

In GHN intellect is a substance that has the power to create or generate noetic objects and that contemplates or observes these noetic objects. The created noetic objects develop in a holistic environment, which means, among other things, that the mentioned noetic objects inherit, in a way, properties of the intellect itself. These noetic objects, although differentiating from the total intellect, are in the intellect. And what is called "thought" would correspond to the contemplation or observation of these new noetic objects generated by the intellect: this way the latter observes itself, as it was set out by Aristotle for the *First Motor* or Plotinus speaking about the *Intellect*⁸.

This is also closely akin to what Aristotle had written by saying that *intellect becomes all things*⁹. This can be interpreted in a holistic way. Indeed, the intelligible form inherits properties of the total intellect and evolves in the intellect itself. In addition, Alexander Aphrodisiensis wrote that " l'intellect en acte n'est rien d'autre

⁸ In this connection Charles Dunan wrote: "We do not separate the mind and the thought. The mind is undoubtedly one, but it is also multiple. It is not the substratum of the thought, motionless whilst thought varies ; it is the thought itself. These two terms *thought* and *mind* express a one and only thing, except for a certain difference of the points of view : the term *thought* being used to rather indicate this thing for that it is mobile and variable, the word *mind*, rather for that it is identical and immutable ". (Translation from French to English by Jaime Vladimir Torres-Heredia Julca). See Dunan Charles, *Essai sur les formes a priori de la sensibilité*, Paris, Félix Alcan éditeur, 1884, Chapitre VII, p. 110.

⁹ Aristote, *De Anima*, III, 5, 430 a 10, trad. R. Bodéüs.

que la forme pensée, si bien que chacune de ces choses qui ne sont pas purement et simplement intelligibles devient intellect lorsqu'elle est pensée (...).¹⁰

It is important also to notice that when we say that the intellect becomes all things, the intellect will also have, as writes Dunan in describing the thought, " the characters of all that becomes, mobility, variability, the succession in the duration, (...), the opposed characters, immutabilities, the perfect identity ; (...)."¹¹. And further on he writes: " If the thought is the mind itself, one can conceive, if need be, that the thought one and multiple appear in the form of time or in that of space "¹². The intellect therefore has *a priori* elements thanks to which thoughts will be generated.

The idea of creation of noetic objects and its comparison with the thought of God are in the work of Juan de Huarte de San Juan : for him the intellect is basically *a generative faculty*¹³.

It is by this observation of the intellect by itself through its generated noetic objects that it is said that the intellect is one and multiple. It is one because all occurs inside the intellect, but it is multiple because it generates in itself noetic objects and the whole in a holistic way as it will be specified further. This problem of the one and the multiple was amply set out by Plotinus in its *Enneades* when he describes the *One* and the *Intellect*.

Moreover, it should be noticed that in order to describe intelligence, Aristotle had recourse to the concept of potential. Indeed, he writes that intelligence "ne peut même avoir la moindre nature, en dehors de celle qui consiste à être un possible!"¹⁴.

¹⁰ See *Traduction du "De Intellectu" attribué à Alexandre d'Aphrodise*, in Moraux Paul, *Alexandre d'Aphrodise. Exégète de la Noétique d'Aristote* (Bibliothèque de la faculté de philosophie et lettres de l'université de Liège, fasc. XCIX), Faculté de philosophie et Lettres – Liège, Paris, Librairie E. Droz, 1942, p.187.

¹¹ See Dunan Charles, *Essai sur les formes a priori de la sensibilité*, chap. VII, p. 106.

¹² Dunan Charles, *ibid.*, chap. VIII, p. 115.

¹³ Nubiola Jaime et Gurpegui José M., *LA CREATIVIDAD LINGÜÍSTICA EN HUARTE DE SAN JUAN Y NOAM CHOMSKY*, Universidad de Navarra, URL: <http://www.unav.es/users/Articulo33.html>

¹⁴ Aristote, *De Anima*, III, 4, 429 a 10, trad. R. Bodéüs.

This "potential" character will be obviously transmitted to the generated noetic objects as it is explained further.

As we have seen, the intellect produces a noetic object that we will call from now on the *noema*.

The noema:

The term *noema* comes from the Greek *nóēma* that can have this translation: *the thought as the result of the act of thinking*¹⁵. In the GHN the noema is what the intellect generates by a creative act that one calls "to think". To think is, for our intellect, to create noemas that are in fact products of the intellect and that have, to some extent, practically all the potential of the intellect¹⁶.

The noema is a kind of cognitive element that would be in the heart of thought. Basically a noema has in a way the potential of the entire intellect. However, the intellect is the being that thinks and the principal noema in the thought of man is man himself.

The human mind is a noema that generates other noemas. And once it has generated them it contemplates or observes them¹⁷. And this means the intellect (or the mind or man) observes itself by observing its creation.

As written previously, since the noemas can inherit fundamental features from the total intellect, then the intellect can generate space-noemas, geometrical-noemas, numerical-noemas, etc.

¹⁵ See Platon, *Parménide*, trad. Luc Brisson, Paris, GF-Flammarion, 1994, p.39, note 84.

¹⁶ As we have seen above, Aristotle already thought that the intellect became all things. In other words, the thought thing is identified with the intellect and it then has in a way the potential of the intellect.

¹⁷ This thought principle of thought applied to man was also defended by Charles Dunan in his work *Essai sur les formes a priori de la sensibilité*, chapitre VII.

The noema is essentially one and multiple since it inherits fundamental features from the intellect itself, that is one and multiple. This will also be specified further when we deal with the problem of genus and species.

A noema generated by the intellect (what is called a *thought*) can generate other noemas and has two principal aspects:

- a) The *actual* aspect: precise characteristics by which a precise noema is distinguished from the total intellect (while being inside the intellect by holism). In the actual aspect of the noema, the heritage, the characters of the parent noemas also play a part.
- b) The *potential* aspect: potentials inherited from the intellect. The noema, although having an actual aspect, has also the potential to modify some of its features while remaining the same noema. The potential aspect also depends on the potentials of the parent noemas.

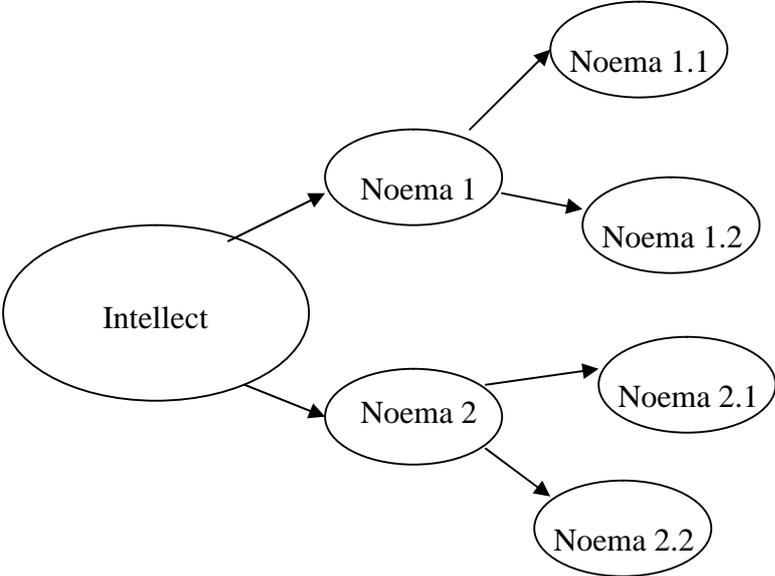
The process of generation of the noemas:

Like the total intellect itself, a noema can generate other noemas that in their turn will generate other noemas. This idea has also been set out by Juan de Huarte: he wrote indeed that the intellect generated *sons* and *grandsons*. Obviously, all that reminds us of the remarks of Plotinus concerning the generation, or more precisely the procession from the One.

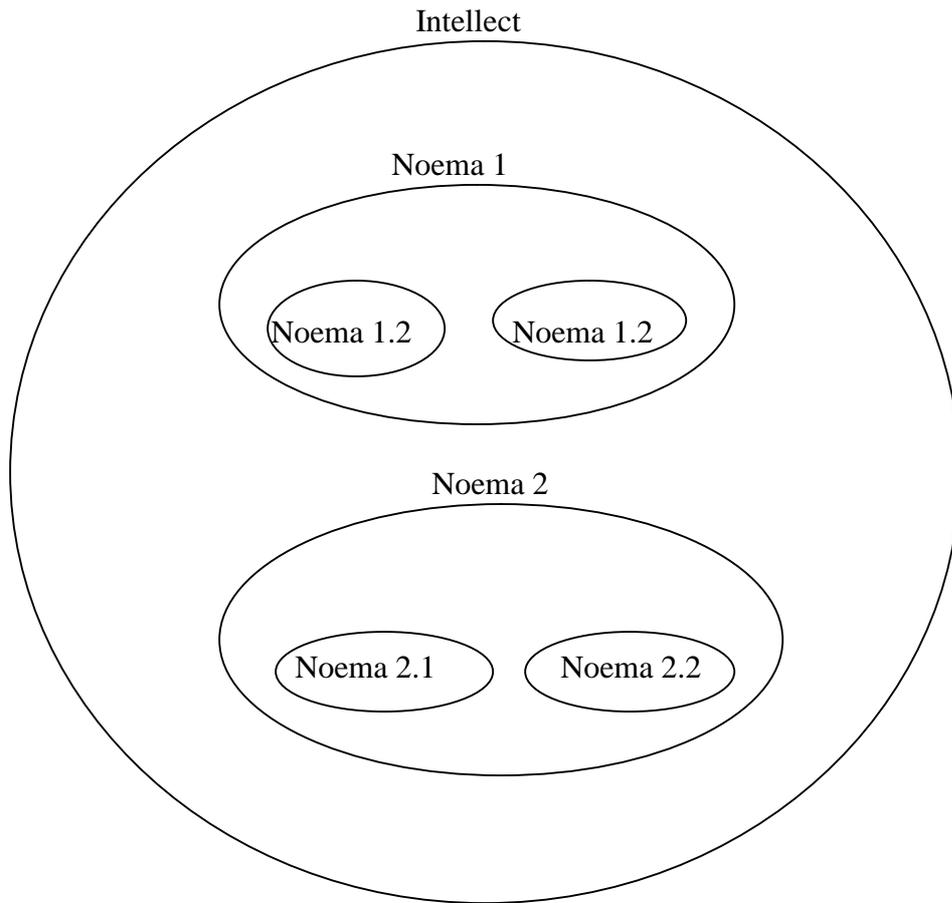
The generated noema will have an actual aspect that distinguishes it from other noemas and a *potential* aspect inherited from its parents. Moreover, the generated noemas are part of a holistic system. Each generated noema keeps an attachment to its parents and to the other noemas.

Below we can observe a representation of the generation of the noemas starting from the intellect. As Juan de Huarte has written, *Noema 1* can have a *son*

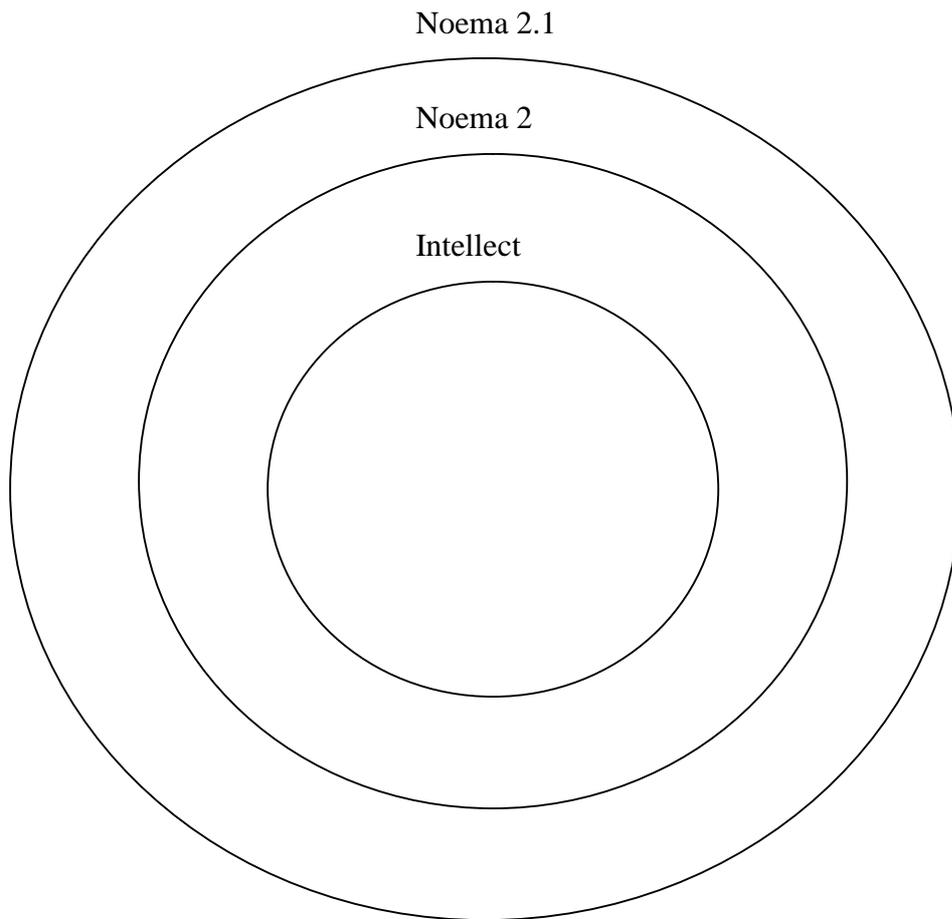
that is *Noema 1.1* or another son that would be *Noema 1.2* with other *actual* characteristics that differentiate it from *Noema 1.1* :



In order to emphasize well the fact that this generation of noemas occurs in the holistic space of the intellect, we can make the following diagram that put the accent on the fact that, for example, *Noema 1* inherits potentials from the intellect while being a little bit different from it by *actual* aspects. It is the same concerning *Noema 1.2* that inherits potentials from *Noema 1* and also from the *Intellect* by transitivity :



But in order to emphasize well the fact that the generated noemas of the first and of the second generation inherit potentials from the intellect and from the parent noemas, we can make the following diagram that concerns *Noema 2.1* :



This diagram shows that *Noema 2.1* has the potentials and some *actual* features of the parent noemas inside of him, which precisely corresponds to a holistic diagram.

As Porphyry said speaking of the species, *the whole is in the part*.

However, the question of knowing by which principle the intellect generates noemas remains open. Indeed, one could think, as Aristotle does, that we need an actual intellect to see to it that a noema generates other noemas.

Current characteristics and characteristics in potential of noemas:

The generated noemas have characteristics that distinguish them from other noemas. These characteristics can be actual in a sense, as in the case of the man-

noema whose feature is rationality, and they can be in potential, such as, for example, the capacity to become a sailor.

When a noema generates another noema, the latter can actualize certain potentials of the parent noema. Thus the animal-noema has a geometrical form in potential, in other words unspecified, but the horse-noema can already have a more precise geometrical form though there can be indeterminations or potentials until reaching by noemas such particular racehorse, for example.

Process of abstraction:

By the senses our brain manages to compose sound information, visual information, etc. From these data our intellect will generate noemas that will apply to this information.

For example, while seeing animals our mind will call upon an "animal" noema that had already been generated previously by a process of training that finally corresponds to the creation of noemas. This "animal" noema corresponds to a living being that moves and that has the characteristics of what we understand by animal. In the noema there will be the features of the animal according to the knowledge of whom generates this noema¹⁸.

Then, if we observe a horse, then we call upon (or we create if we see a horse for the first time) a "horse" noema which was generated starting from the "animal" noema. The horse noema contains in itself the potentials of the "animal" noema. They are interlinked. Then if we observe a particular horse we generate a particular noema for this horse and the latter noema will contain in itself the potentials of the "horse" and "animal" noemas.

¹⁸ This is important. The noemas won't inevitably be the same ones among all men besides some *a priori* noemas such as space, geometrical-noemas, etc. The animal-noema generated by a biologist will be a little richer than the non-biologists one, but owing to the fact that the biologist's animal-noema is based on *a priori* principles (basic principles that can be very complex in the end !) shared by most part of men, without problem one will be able to agree on the significance of the term "animal".

It is the same when one sees Socrates: initially one calls upon the "animal" noema that contains itself the "man" noema and that contains the noema "Socrates". When one sees Socrates, mentally we generate a noema that corresponds to him and that, in addition to the characteristics of Socrates, contains in itself the potentials of "animal" and of "man".

It is crucial to take the *creative aspect* of the noemas into account or else we could believe that the noemas "animal" and "man" that apply to Socrates are absolutes. In fact this is not inevitably the case and we can organize the knowledge differently by creating other noemas in associating them other linguistic names. Depending on the noema systems generated there will be other systems or other classifications of beings.

For example, when Linné presented his system of classification of plants, he generated in him noemas with the system of holistic heritage but this wasn't inevitably an absolute system, hence the discussions that followed. We can build various ontological systems just as we currently do in the computing systems of artificial intelligence¹⁹.

The composition or synthesis by generation - the creation of groups or types:

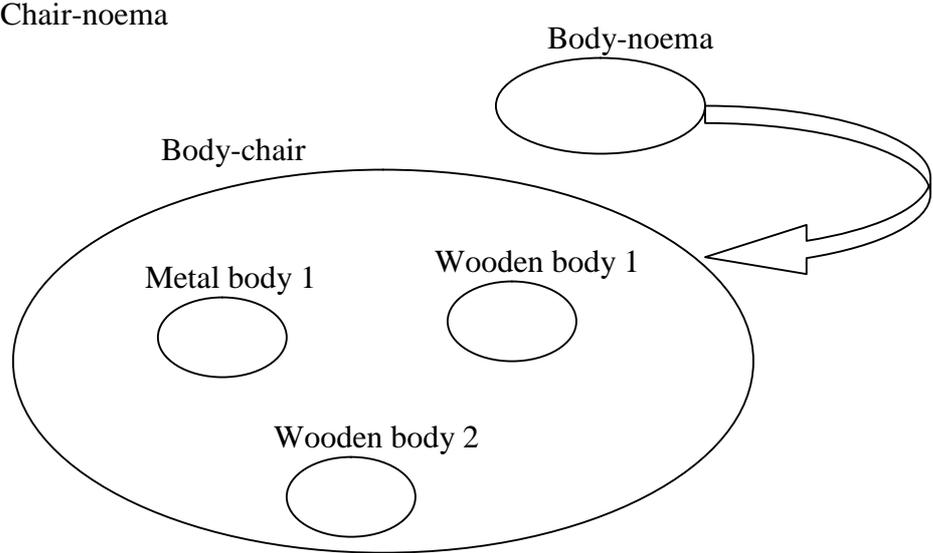
One could believe that the composition of concepts isn't really a generation in the strongest sense of the term: if we have noemas that correspond to pieces of wood and to certain precise metal parts then we will be able to compose a chair, but we could think that the *chair-noema* won't result from parent noemas.

Actually, if we analyze the noemas corresponding to the pieces of wood and to the metal parts, we will see that they result from the same *object-noema* or *body-noema*. However, it is by starting from this *body-noema* that we will be able to generate metal objects and wooden ones, so that we will have a new holistic noema corresponding to the chair.

¹⁹ See Sowa John F., *Knowledge Representation - Logical, philosophical and Computational Foundations*, Pacific Grove, CA: Brooks/Cole, 2000

This principle of composition can be applied to any other composition of noemas. The principle in order to compose two or several noemas is thus to go back to a common ancestor to all of these noemas and to create, starting from this common ancestor, a new noema that contains in itself, in a holistic way, the other noemas (or parts).

Here is a diagram that shows for example the composition of the chair-noema:



As it can be seen the chair-noema results from the body-noema that generated "in itself", in a holistic way, other body-noemas that have other features (plant, metal) and that form a chair-noema.

In a general way we can create all kind of groups of noemas. The groups, that are multiple by nature, will be *one* by the noema that generates them and that contains them in a holistic way. In each part-noema of the group of noemas there will be the noema that has generated them so that the unity is carried out and so that we

can say that each part-noema is indeed a part of the group. This will be useful further for the holistic generative theory of the numbers.

With this principle we can also create groups of noemas that have certain common features: for example a group-noema that binds 6 green cubes.

The movement-noema:

The movement (and also any action, creation, etc.) is also a holistic noema in our mind. Indeed, for example the idea of “eating” includes movements of the oral muscles, arms, hands, etc. All that is put together by a holistic noema we can call *to eat-noema* as we have seen above.

When the movement has a goal or when the action has an object, then the agent-noema and the object-noema will become part of a holistic noema, as in the case of the composition that has been seen above. For example, when by our intellect we think that a train approaches a city, on the level of the noemas we generate a holistic system-noema of two generated sub-noemas (the train and the city) that evolves in the course of time so that the two objects are getting increasingly closer (in the space-noema).

Unconscious process of creation of noemas and conscience of this process:

The process of creation of noemas is to a certain extent unconscious but by a work of introspection one can manage to find links between the noemas. One can ask itself questions about what one understands by "bee" for example and gradually our mind finds the parent noemas of the noema corresponding to “bee”²⁰ again. This is what, according to Plato, Socrates did by asking what were the things or the concepts like justice.

²⁰ See Dunan Charles, *ibid.*, chap VIII, p. 118

The hypothesis of the holistic total intellect as interpretation of the noetic theory of Averroes:

Just as the intellect of man can generate noemas in a holistic space, it can be that the intellects of humans are plunged into a holistic intellectual space shared by everybody. That would correspond to what the Andalusian philosopher Averroes tried to say in writing that there is one potential intellect for all. This expression can be interpreted within the framework of the generative holistic noetic theory applied to a more global holistic system that relates to all the intellects of humans.

Averroes' proposal can also be understood if one supports that it is the potential of a total intellect that lies in each man and not an *actual* intellect. Each man will do what he wants with the fragment of intellectual potential that is due to him in a holistic way.

Potential and possibles:

Our intellect is aware of the generative possibilities of the noemas. A noema is like a kind of seed which contains in potential other noemas. The intellect can be conscious of these potentials because, as we have mentioned it above, the noema is a generation of the human mind that is itself a total noema. This principle of the potentials of the noemas is at the root of the concepts of possibility, future, etc.

Training and creation:

Knowledge is made thanks to the noemas but it doesn't mean that all knowledge is in the human mind. Men create various kinds of noemas starting from *a priori* noemas that are in the intellect and they communicate them to each other and knowledge (generated noemas) is shared and the total knowledge of humanity is becoming richer.

The noema without precise features, in short the intellect as a potential, corresponds to some extent to Aristotle's *tabula rasa*. It doesn't have a form and yet it

is something in a way, but nothing in the way that it hasn't generated a noema indeed.

Origin of the principle of causality:

One of the principles of causality that one applies to many phenomena and theories would come from this generative capacity of the intellect. Indeed, the mind generates noemas and naturally the idea of causality is inside us and we apply it to what we observe.

Furthermore, it must be noticed that in nature the things often seem to occur like in our mind by generation. We especially see it in the living beings.

Holism of intellect and holism of the universe:

But also in nature there are holistic systems that are currently studied in fields like physics. One can quote the study of the *interlinked photons*²¹. It is about photons that, for still unspecified reasons, have links whereas they are often separated from several kilometres. If one acts on one of the particles this will instantaneously affect the other whereas apparently nothing connects them.

One has spoken about the "transmission" of the information of the particles but it can be that, in a way, we have there a holistic system where the particles share something in common that can be found simultaneously in both.

If such a holistic system is possible between two particles, one can think that this is possible on the level of our brain and our intellect that would act as holistic systems.

²¹ See Vos A., *Un premier pas vers le relais quantique*, in Campus (Université de Genève) N°78

The generative holistic noetic theory and Plato's *Ideas* and Aristotle's *Universals*

Plato's *Ideas* can be interpreted as noemas. As we have seen above, the intellect can generate noemas that correspond to the concept of *animal* or *man*. Moreover Plato himself proposed in *Parmenides* to see the as *Ideas* thoughts, but as he exposed it, this posed problems because of the links between these thoughts and the objects of nature. Obviously, this problem concerns also the GHN because, when an object of nature is observed, we classify it in various ways according to our noemas and we can study the nature of the links there will be between our noemas and the objects of nature.

But for Plato the *Ideas* are eternal and immutable. However, in the GHN concepts as that of bee are rather creations of our intellect but a question remains: how the intellect, even if it acts according to the generative holistic noetic theory, can generate this idea of animal? The same question can be put concerning mathematical objects. These thoughts on the origins of the noemas themselves and the origin of their potentials concerns the metaphysics and the study of the *a priori* forms as Kant proposed it.

As a matter of fact Plato puts questions we can always think about. His solution is that the ultimate principles, the *Ideas*, are eternal. It can be that there are concepts *a priori* eternal whereas the others are created by our noetic activity using these *a priori* concepts. The question remains open, but that doesn't prevent us from describing the intellectual process like a *holistic generation*.

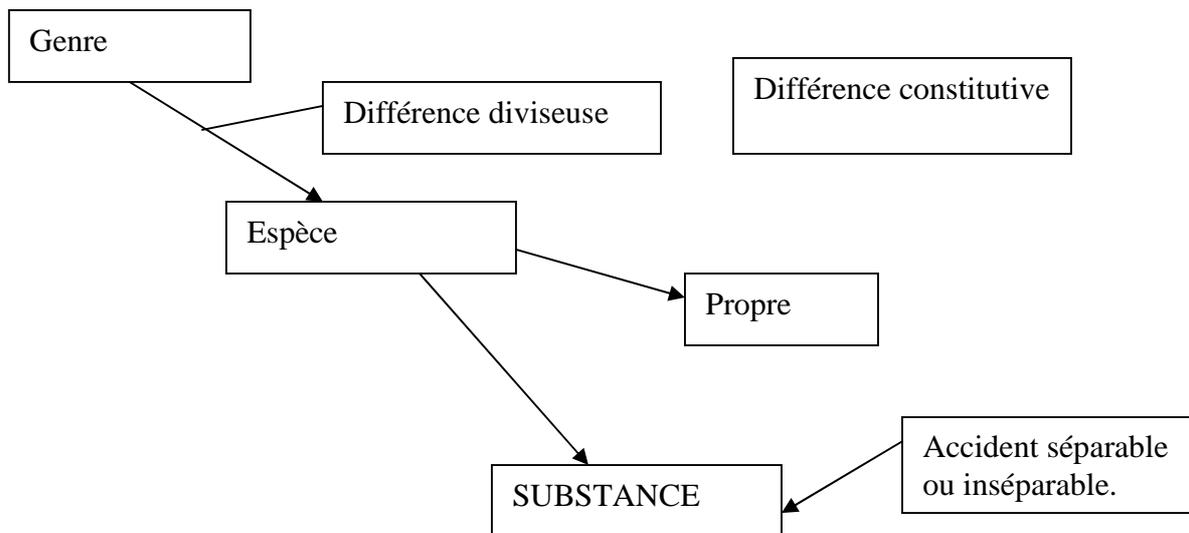
Concerning Aristotle's universals, we can propose an interpretation that corresponds to the GHN. Aristotle writes that the universal remains in the intellect and this can occur in a holistic manner.

III. - The generative holistic noetic theory and Porphyry's genus and species

The five predicables of the *Introduction*:

As we have foreseen it above and as we will specify it, the theory of the GHN agrees with the description of Porphyry's genus and species (and also of the other five predicables).

Porphyry presents us the five predicables (genus, species, difference, property and accident) so that they are linked up in a hierarchical way as we can see it below:



The Genus:

Concerning the genus, Porphyry writes:

"4. 'Genre' se dit encore d'une autre façon : c'est ce sous quoi l'espèce est rangée, peut-être ainsi nommée à l'imitation des [significations] précédentes : de fait, le genre dont nous parlons est une sorte de principe pour ce qui est sous lui, et il semble embrasser toute la multiplicité qui est sous lui.

5. 'Genre' se dit donc de trois façons, et c'est de la troisième qu'il est question chez les philosophes. Pour décrire [ce genre], il le définissent ainsi : [le genre] « c'est ce qui est prédicable de plusieurs différant par l'espèce, relativement à la question : 'qu'est-ce que c'est ?' », par exemple [animal].²²

As we can see, Porphyry describes us at first the genus as being that under what the species is placed. There is an idea of "capacity" or inclusion. And afterwards he specifies that the genus is a kind of *principe pour ce qui est sous lui, et il semble embrasser toute la multiplicité qui est sous lui*. It is clear that these remarks correspond to the holistic description that we have showed above.

It should be noticed that even if Porphyry has written at the beginning of his work that he would only deal with the problem of the genus and the species in a logical way, he cannot prevent ontological or even noetic descriptions. When he says that *the genus seems to embrace all the multiplicity that is underneath him*, Porphyry enters already a rather ontological or onto-noetic field, because it is obvious that the genus as a term cannot embrace anything.

Then he writes: " pour décrire [ce genre], il le définissent ainsi : [le genre] « c'est ce qui est prédicable de plusieurs différant par l'espèce, relativement à la question : 'qu'est-ce que c'est ?' », par exemple [animal] ". In connection with that, it is clear that to be able to say *that several differ by the species*, it is already necessary

²² See Porphyre, *Isagoge*, trad. De Libera A. et Segonds Ph., Paris, Vrin, 1998, p. 2-3.

that by our intellect we can know that several things differ by the species; moreover it should be known that a *predicable* applies to these things that differ by the species. In order to know that, the GHN proposes, as we have seen above, that the human intellect produce noemas corresponding to the species, *species-noemas* and the intellect observes its parents and if the intellect notes that the *species-noemas* have the same parent-noema then the term to announce this parent-noema will be applied to the species-noemas²³ (one will speak then with Porphyry about *predication*).

Then Porphyry continues :

" En effet, parmi les prédicables, les uns ne se disent que d'un seul, comme les individus (par exemple Socrate, cet homme-ci ou cette chose-ci), tandis que les autres se disent de plusieurs (comme les genres, les espèces, les différences, les propres et les accidents qui sont communs et non pas particuliers à un seul individu { un genre, c'est par exemple, 'animal' ; une espèce, par exemple, l'homme ; une différence, par exemple le capable de raison ; un propre, par exemple le capable de rire ; un accident, par exemple, le blanc, le noir, le fait d'être assis}). " ²⁴.

Concerning the predicables that say themselves from one, it should be noticed that before applying such a predicable to Socrates for example, our intellect must find a means of carrying out the unit under the multiplicity of the aspects of Socrates. Socrates, indeed, has a body extended with arms, legs, etc. He also has moral, intellectual qualities, etc. All that must be arranged under a unit in our intellect. This multiple unit will be realized by a noema applied to what one sees of Socrates and obviously this noema will inherit properties and potentials from the *animal-noema* and from the *man-noema*. Charles Dunan presents a similar idea²⁵: "The first sensitive object that comes carries out for us in a perfect manner the multiple unit that remains

²³ In fact this process corresponds to what Socrates did by asking what the things were : Socrates sought the parents of the object-noemas that those whom he questioned carried in their intellect. In addition it is necessary to notice this idea of *childbirth* to which Socrates referred to, which is close to a generative perspective.

²⁴ Porphyre, *Isagoge*, *ibid.*, p. 3.

²⁵ See Dunan C., *Essai sur...*, chap. VIII, p.118, translated from French by Jaime Vladimir Torres-Heredia Julca.

unity, and the multiplicity one that remains multiplicity. A house is a heap of stones, without ceasing to be a house; a heap of stones can form a house, without ceasing to be a heap of stones. But it is that the consideration of this unique object in itself consists really of two points of view that are opposed to one another. The house, it is this object especially as it is one, which doesn't prevent the house from being a heap of stones: the heap of stones, it is still this object, especially as it is multiple, which doesn't prevent the heap of stones from being a house. Between these two points of view of the object there is no medium : it is me to choose, and, according to the choice that I will make, the object, although essentially one and multiple at the same time, will appear to me like especially one, or especially multiple ".

The Species:

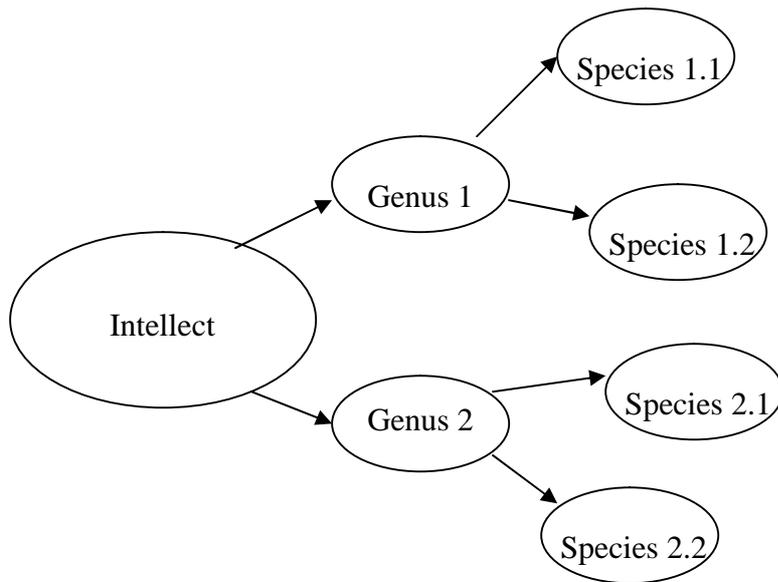
Concerning the species Porphyry writes :

« 3. [Les philosophes] définissent donc l'espèce de la façon suivante : « L'espèce est ce qui est rangé sous le genre, est dont le genre se prédique relativement à la question : 'qu'est-ce que c'est ?'. »

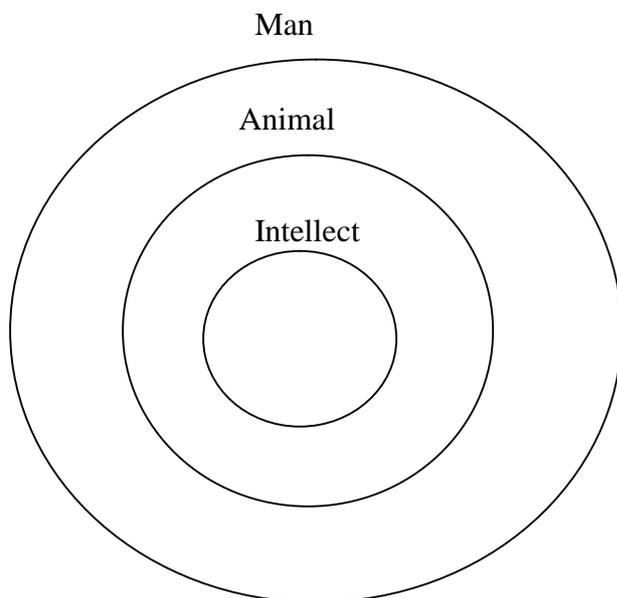
4. Ou encore de la façon suivante : « L'espèce est ce qui est prédicable de plusieurs différant par le nombre relativement à la question : 'qu'est-ce que c'est ?'. ». Néanmoins, cette dernière définition ne vaut que pour l'espèce la plus spéciale, pour ce qui n'est qu'espèce, tandis que les autres s'appliquent aussi aux espèces qui ne sont pas les plus spéciales. »²⁶.

What we have mentioned above concerning the genus within the framework of the GHN also applies to the species. In fact the species, in the GHN, is a noema resulting from a genus-noema. The order of the generation of genus and species can be represented in the following way:

²⁶ See Porphyre, *Isagoge*, *ibid.*, p. 5.



And as we have specified above, this generation happens in a holistic way. In order to show this with a diagram that shows the inclusion of the potentials and actual aspects inherited from the parent-noemas, one can use the following diagram that relates to the species-noema *man*, the genus-noema *animal* and the intellect:



And as we have seen above, starting from the man-noema one can generate particular man-noemas like Socrates, for example, the whole in a holistic way. And starting from the noema corresponding to Socrates, one can create other noemas corresponding to Socrates' movements or thoughts, etc. and so on...

This diagram can seem surprising. One could believe that one would be brought to affirm that an animal is a man because apparently, according to the diagram, animal is included in man. But in fact this diagram only tries to indicate that in the noema (or thought) *man* the characteristics of the animal are included, or, more precisely, the animal-noema is contained in a way in the man-noema. It is because the animal-noema is in a way in the man-noema that we can affirm, for example, that man can move, etc. Moreover, as it will be seen below, Porphyry writes, concerning the species : " the whole, indeed, is in its parts ".

Furthermore we shouldn't confuse the *horse-noema* with the *noema-group-of-all-the horses*. Indeed, we could want to define the species horse by extension, in other words to define it as being the set of individual horses existing but what we would obtain in our intellect would be the *noema-group-of-all-the-animals* and not the *horse-noema*.

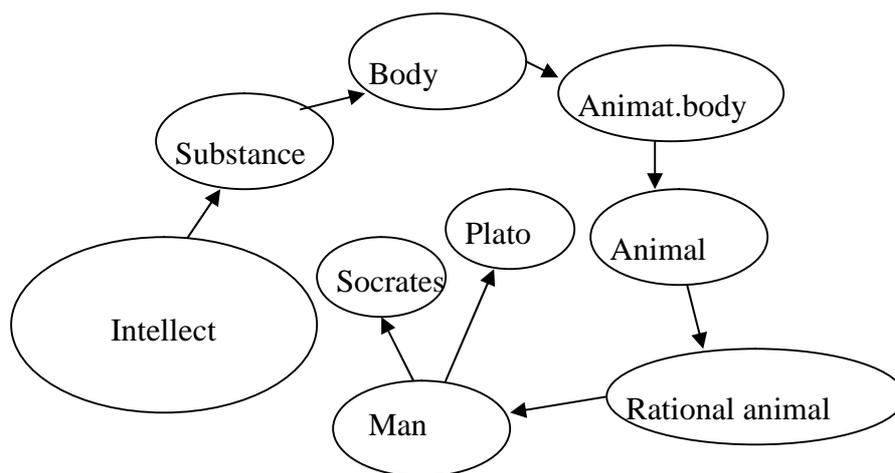
Then Porphyry gives us an exposition that corresponds to what is called *the Porphyry tree*:

"5. Éclaircissons ce que je viens de dire de la façon suivante. Dans chaque catégorie, il y a des [termes] plus généraux et, inversement, d'autres [termes] absolument spéciaux, et, entre les plus généraux et les plus spéciaux, d'autres [termes]. Le plus général, c'est celui au-delà duquel il ne saurait y avoir de genre plus élevé, tandis que le plus spécial, c'est celui après lequel il ne saurait y avoir d'espèce subordonnée; et entre le plus général et le plus spécial, il y a d'autres [termes], qui sont à la fois des genres et des espèces, mais à chaque fois par rapport à quelque chose d'autre.

6. Éclaircissons ce que nous voulons dire en prenant l'exemple d'une seule catégorie. L'essence est elle-même un genre; sous elle vient le corps; sous le corps, le corps animé; sous celui-ci, l'animal; sous l'animal, l'animal capable de raison; sous celui-ci l'homme; sous l'homme, Socrate, Platon et les hommes particuliers. Eh bien, parmi ces [termes], l'essence est le plus général, [c'est-à-dire] ce qui n'est que genre; l'homme est [l'espèce] la plus spéciale, [c'est-à-dire] ce qui n'est qu'espèce; le corps

est bien une espèce de l'essence, mais genre du corps animé. Et le corps animé, à son tour, est bien une espèce du corps, mais genre de l'animal; à son tour, l'animal est bien une espèce du corps animé, et genre de l'animal capable de raison; et l'animal capable de raison, une espèce de l'animal, mais genre de l'homme; et l'homme, une espèce de l'animal doté de raison, mais non pas genre des hommes particuliers, il est seulement espèce; de même tout ce qui, rangé antérieurement aux individus, en est immédiatement prédiqué, ne peut être qu'espèce, et non pas également genre. ²⁷.

From the point of view of the GHN one can make a diagram of the generated noemas in a holistic way. This diagram corresponds in any case to the form of the Porphyry tree:



Further Porphyry writes:

" C'est pourquoi Platon recommandait, en descendant depuis les genres les plus généraux, de s'arrêter aux espèces les plus spéciales, et d'accomplir cette descente à travers les termes intermédiaires en procédant à des divisions au moyen des différences spécifiques; quant aux [individus] en nombre infini, il faut, disait-il, les laisser de côté, car il ne saurait y en avoir de science. Quand donc on descend vers les espèces les plus spéciales, il faut faire des divisions en cheminant à travers la

²⁷ See Porphyre, *Isagoge*, *ibid.*, p. 5-6.

multiplicité, tandis que lorsque l'on remonte vers les genres les plus généraux il faut rassembler la multiplicité dans l'un; l'espèce, en effet, et plus encore le genre, est rassembleuse du multiple dans une nature unique, tandis qu'à l'inverse les particuliers et les individus fractionnent sans arrêt l'un dans la multiplicité; en effet, c'est par la participation à l'espèce que les hommes multiples constituent l'homme un, tandis que par les individus cet homme unique et commun devient plusieurs ; car le particulier est toujours diviseur, tandis que le commun est rassembleur et unifiant. "²⁸.

This passage can also be interpreted with the principle of the holistic generation. When Porphyry refers to the division, in the GHN one refers to the generation of noemas and when Porphyry refers to the rise and to the gathering, in the GHN one speaks either about search for parents, or about the creation of a group-noema, as it has been seen above, which also corresponds to a generation.

Finally Porphyry writes :

"16. Donc l'individu est embrassé par l'espèce, et l'espèce par le genre, car le genre est une sorte de totalité, tandis que l'individu est partie, l'espèce à la fois tout et partie, mais partie d'autre chose, et totalité non pas d'autre chose, mais en d'autres choses: le tout, en effet, est dans ses parties. "

These words by Porphyry are very comprehensible in the point of view of the GHN. Indeed, he writes that the genus is a kind of totality but so that this means something it is necessary, for example, that the concept of animal is in the concept of man as we have seen it previously. And apparently this can only be carried out in a holistic way as the GHN proposes it.

The difference and the property:

Thereafter the concepts of difference and property can be explained in the GHN by the characteristics of the noemas as we have seen it above. When these

²⁸ See Porphyre, *Isagoge*, *ibid.*, p. 8.

characteristics relate to the noemas called "species" Porphyry speaks then about *difference*.

The accident:

In Porphyry the accidents correspond to the potentials of the noemas. Thus the man-noema has the potential to sleep or to have red hair.

The species as potential:

The polygon-noema, for example, is neither a simple word nor a simple image (it's obvious!) but an intellectual potential that enables me to recognize any polygon. It is the same thing for the recognition of faces. But this recognition would be done by generation of noemas applied to the sensory data organized by the brain.

When we are confronted with some object or other and that we want to say what it is, it is starting from the image formed by our brain that the intellect will "test" some noemas to see whether they can generate noemas corresponding to the image formed by the brain. Thus, if one is confronted with a hexagon, our intellect will call upon the polygon-noema to see whether starting from this noema one can generate an hexagon-noema for example. If this is the case one will say that one sees a polygon and more precisely a hexagon.

IV. - The generative holistic noetic theory and its application to formal sciences in general

The generative holistic noetic theory and its application to linguistics

The application of the GHN to linguistics is very simple if we have Chomsky's system of generative grammars in mind. This system allows to make *syntactic analysis*.

The syntactic analysis is a branch of computer science linguistics, computer science logic and artificial intelligence. Its goal is to study the structures of the natural or artificial languages so that, among other things, computer systems can determine if a sentence is well built or not.

A small grammar of French can be formally described as following (the explanation is below):

S → NP VP

VP → V

VP → V NP

NP → Det N

NP → N

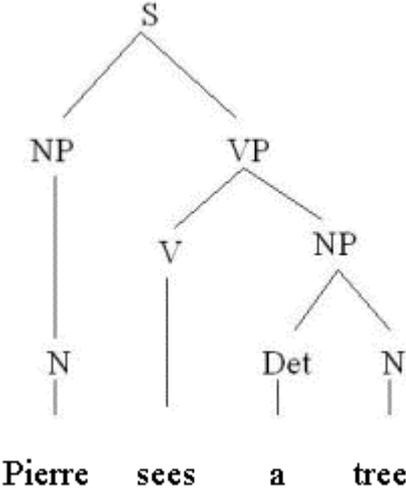
Here is the explanation:

- Det = determinant ("one", "this", "this", etc.)
- N = Name
- V = Verb - NP = nominal Group
- VP = verbal Group
- The symbol "S" corresponds to a well formed sentence.

The small formal grammar indicates that a well built sentence starts with a nominal group and ends with a verbal group. Then we indicate that a verbal group is made up either of a verb, or of a verb followed by a nominal group. And at the end we indicate that a nominal group is made up either of a determinant and a name, or of a simple name.

It should be noticed that the order is important. Thus, if one writes initially the verbal group and then the nominal group, the sentence will be wrongly built.

Here is an example of an analysis with this grammar:



The sentences of the type " Sees tree a Pierre " or " a Pierre tree sees " will not be recognized by the software and the famous message " **SYNTAX ERROR** " will be displayed.

The goal of the software called "syntactic analysor" is precisely to see whether a sentence respects a given grammar.

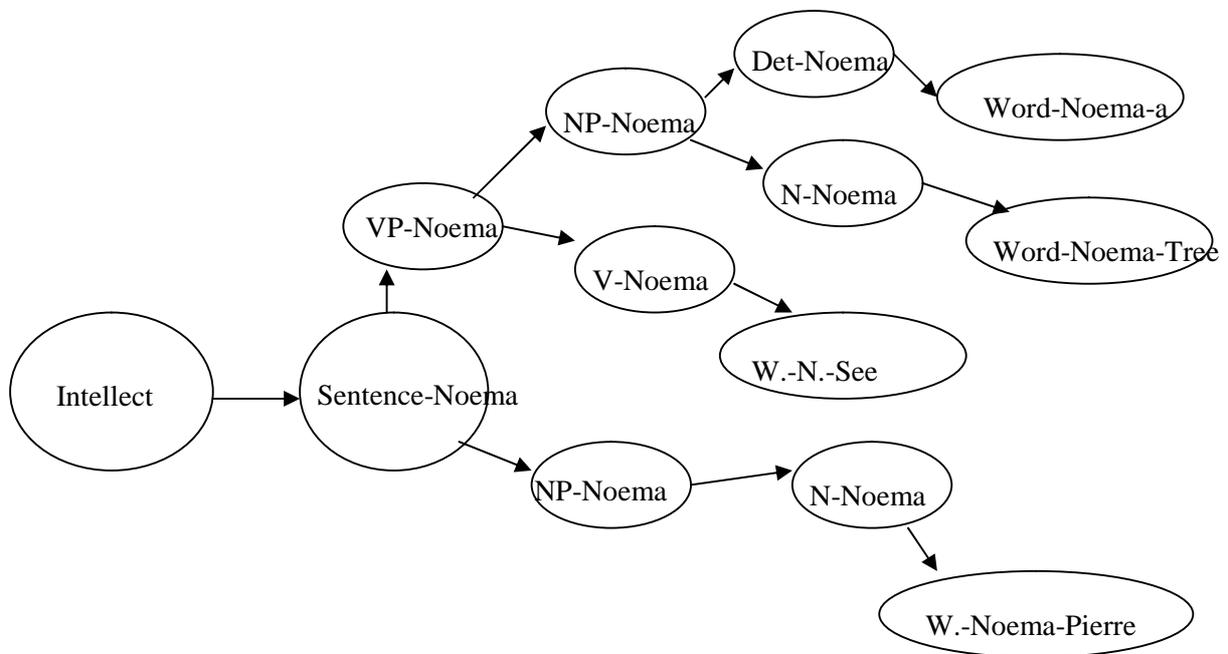
Obviously, the computer system imitates our way of mentally analyzing the sentences. That's why we speak about artificial intelligence.

Now, from the point of view of the GHN, the process happens thus on the level of the syntax :

- a) In the case of a heard sentence:
 - a. For each heard word our intellect calls upon a word-noema. It is clear that the word-noema, by holism, will have a significance (a noema) that will precisely give the grammatical category that corresponds to it. The significance is made by the creation of holistic groups as we have seen above.
 - b. For groups of words it constitutes group-noemas (as we have seen above) of words that correspond to the grammatical categories.
 - c. At the end if the intellect manages to constitute a group-noema of categories that can be generated starting from the sentence-noema then the intellect affirms that the sentence was well constituted. In other words the intellect recognizes the sentence thanks to the holistic generation of noemas starting from the sentence-noema.

- b) For the case where the sentence is written, the difference is that initially the intellect will first create letter-noemas starting from the sight of the ink spread on the sheet, then word-noemas starting from the letter-noemas and afterwards things will happen like we have seen above concerning the syntax.

To summarize, what the intellect gradually does is to recognize the elements of the sentence by the generation of noemas structured according to the fixed grammatical rules. But these grammatical rules are possible thanks to the successive generation of group-noemas in the intellect. The sentence-noema is a noema of the type "group" as we have seen above and the noemas generated starting from the sentence-noema are also group of noemas. It is the same for the VP-noemas, the NP-noemas, etc. that are group-noemas.



The noemas that correspond to the grammatical categories are similar, for example, to the noema that corresponds to "musical trio". This noema contains in a holistic way three human-noemas and this noema can help us to recognize whether or not a group of three people is a musical trio. If we see three people, for each one there will be the human-noema and if the three of them play music and work together we will be able to generate starting from the trio-musical-noema a particular noema (or instance) that corresponds to it in a holistic way and we will say that we have a musical group indeed. It is the same for the recognition of the sentences.

But for the comprehension of the sentence, on the level of the thought, there will be other created noemas. Indeed, for the sentence "Pierre sees a tree", apart from the creation of syntactic noemas, there will be noemas that will give the deep meaning of the sentence. From the point of view of the GHN thus we will generate or call upon the Pierre-noema already constituted, then we will make it generate the action to see with an object that will be the tree noema as we have explained above.

The origin of the generative tree structures in general:

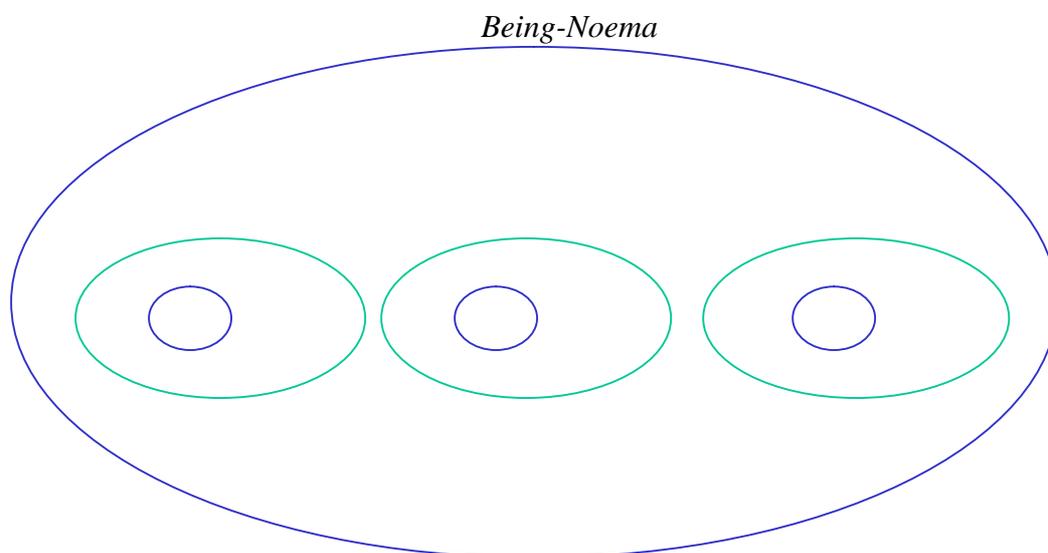
Chomsky 's trees of grammars, the syntactic trees of the formulas of logic and mathematics, the taxonomic tables, Porphyry's tree, etc., all that would draw its origin from the holistico-generative property of our mind.

Even if each noema has its characteristic, it keeps links with the rest of the mind.

Definition of the mathematical number within the framework of the GHN:

Within the framework of the GHN a number is a holist noema-group-being that has generated and that contains several being-noemas. Let us study for example the number 3:

The noema-three = holisict noema-group-being with three generated being-noemas



There will thus be a group-noema that has generated three noemas in a holistic way. The three ellipses at the interior of the large ellipse represent the generated being-noemas. At the interior of each of these three ellipses there is a small ellipse that represents the unit included in each part. In other words each of these three generated noemas has links with the whole-three. This holistic set is one and multiple at the same time. It is one and three.

In fact the noemas that correspond to the numbers are like lists of highly general noemas. By generation the noema-group-three-being can generate the noema-group-three-horse that corresponds to what one usually understands by "three horses". Each noema generated in a number-noema corresponds to a being and doesn't really have an accident nor another feature.

For the more complex numbers noemas develop following for example base 10. The generation occurs by group-noemas containing ten generated noemas.

Now that we know what number 3 is in the GHN, we can wonder what a number is in general. In fact a number in general, or *the number* is a being-noema

that has the potential to generate other being-noemas in a holistic way. This general number-noema can be used to generate other numbers.

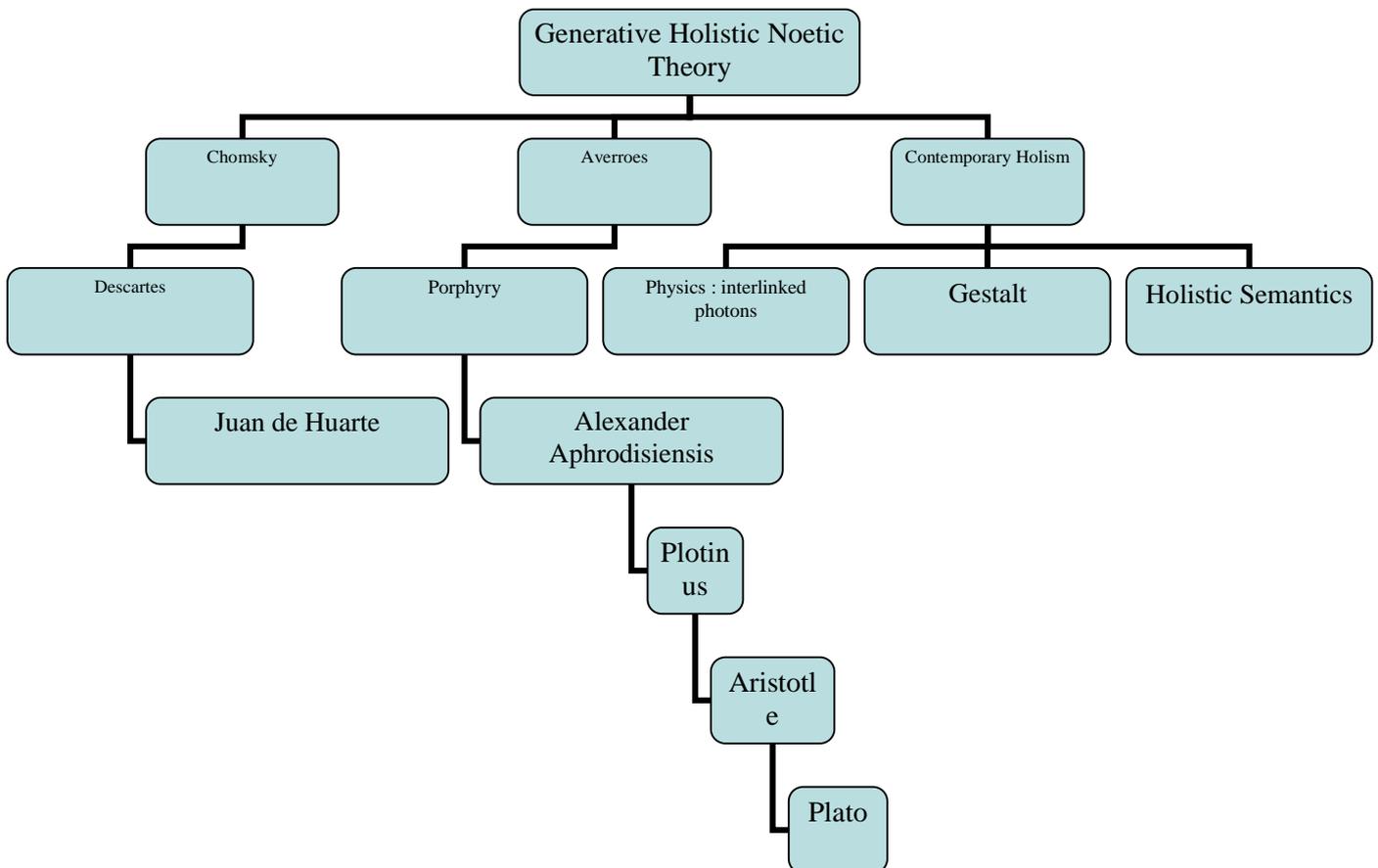
Noemas corresponding to the interpretation:

If we have a noema corresponding to the drawing X and that we say that X can be a number then we create a holist system that links a number-noema to the noema corresponding to the geometrical figure of the X as we have seen previously.

The fact that this occurs in a holistic way would explain why we think sometimes that there is no thought without language. This would come from the fact that in our intellect the word-noemas are holistically interlinked with the significance-noemas that are the thought that we want to signify. Because of the fact that they are holistically interlinked one can believe that there is no thought without language.

V. - Conclusions:

As it has been announced above, the *Generative holistic noetic theory* is inspired by works of philosophers like Plato, Aristotle, Alexander of Aphrodisiensis, Plotinus, Averroes, Juan de Huarte de San Juan, and Chomsky. We can also mention works of the Gestalt concerning perceptions, the systems of intricate photons, holistic semantics. One can represent these contributions in the following way (non exhaustive):



As we have said, one of the bases of the GHN is that the thought is one and multiple. That has links with many physical principles. For example the particles act like corpuscles or waves. We speak about *wave-particle duality*. As a wave the particle will be extended, *multiple*, and as a corpuscle it will be *one*, definite.

The GHN enabled us to explain as far as possible the links there are between the genus and the species in Porphyry and this on a noetic level. The GHN also enabled us to explain the generative processes that we observe in the majority of formal sciences.

The mind evolves with the noemas that become richer thanks to new observations of nature or thanks to the study of "a priori" noemas as some geometrical noemas.

The GHN only proposes one description of the process of thought but it is clear that the majority of the traditional questions of the noetic theory remain open. For example one can wonder about the origin of the potential of the noemas.

Finally, within the framework of the GHN itself there remain much subjects to develop in order to see whether it is necessary to reinforce or weaken certain principles of the theory.

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