

Article one

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Objektyp: **Article**

Zeitschrift: **Études de Lettres : revue de la Faculté des lettres de l'Université de Lausanne**

Band (Jahr): - **(2001)**

Heft 3

PDF erstellt am: **08.08.2024**

Persistenter Link: <https://doi.org/10.5169/seals-870236>

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ARTICLE ONE

Professor Bronkorst has characterized a particular tradition of rational inquiry (I'll call it "B-rationality") which he suggests Indians share with Euro-Americans but not with Chinese. Whether this is so should be decided by Sinologists. Section I argues that such issues are also within the jurisdiction of *Universal Grammar* which addresses, for example, *nominalization*. Chinese may not have a nominalizing suffix such as Sanskrit *-tā* or *-tva* (= Greek *-της* or English *-ty*), but it possesses the nominalizing particle *che* that may distinguish "that which is white" from "white." Greek and Indo-European happened by but Plato might have been Chinese.

Section II discusses logical features of Universal Grammar. For example, all languages that possess *negation* (i.e., all human languages), adopt the principle of non-contradiction which expresses its basic property. Universal Grammar supports Quine's statement that "the more absurd or exotic the beliefs imputed to a people, the more suspicious we are entitled to be of the translations."

Since B-rationality is one of infinitely many possible operations that owe their existence to the logical structure of human language, Section III does not ask whether it happens to be ubiquitous but why it is universally intelligible — like the principle of non-contradiction that all humans implicitly use but do not explicitly teach. Rules of grammar, including syntax, are "followed," even if most of them remain unconscious. Syntactic structures may express logical structures as in the Sanskrit expression "*A-iti cen na B-tvāt*" which expresses the same as "*B therefore not-A*." B-rationality, explicit or not, can only be discussed in terms of rationality. Hence Article One of the *Universal Declaration of Human Rights*: "All human beings ... are endowed with reason."

Introduction

The seventeenth century Chinese philosopher Wang Fu-chih wrote about hair and negation:

If you say there is no hair on a tortoise, you are talking about (something on) a dog, not (nothing on) a tortoise (Graham 1959:103-4 = 1986:349).

I shall follow Wang and use hair to talk about negation; and negation to talk about reason. All animals don't have hair, not even on their heads; but all humans do. Some humans have black hair and others are blond or their hair is in another color. All turn grey if they live long enough. Some turn bald but that does not contradict the fact that humans have hair. I say this because the statement "all human beings are rational" is not refuted by the large number of people who act irrationally. Whatever it is, the problem about rationality we are considering here is similar to the question whether rationality is like hair, a general human trait, or like black hair, a subtrait of that trait.

Language is like hair: all humans possess it. An anthropologist returning from a distant tribe with any claim to the contrary would not be believed. The same holds for *negation*: a linguist claiming that there is a natural language without negation would be laughed at. The same is not true of an artificial language, as we shall see; whence the difference? Our problem about rationality seems at first to be an empirical question; but that depends on its definition. There may be something conceptual and analytic, i.e., non-empirical, about it as there is about the fact that all humans have language and all human languages have negation. What we call analytic is often the same as what Plato called innate. There is nothing mystical about it. Research in contemporary developmental cognitive science suggests that children learn not only language but also music or number spontaneously because they possess innate knowledge. In fact, they are such efficient learners precisely because their learning is constrained by what they already know. "The development of knowledge in childhood looks a lot like the development of knowledge in science. Children seem to construct successive theories of the world that are the product of both their earlier theories and new evidence" (Gopnik 1999:34).

If science works in the Platonic manner, it is not far-fetched to suppose that rationality is also innate and that the human animal is the *animal rationale* of traditional metaphysics not by *fiat* but for good empirical reasons. I shall try to show that negation and probably many elements of rationality are features of natural language and universal grammar (and thus empirical) but also of logic (and thus analytical) and that the two kinds of feature are intimately connected. Since it is made up of such elements, it is likely that the same holds for rationality itself, i.e., that rationality is like hair.

There is a slightly different way of explaining what I am trying to do. In the introductory statement to this conference, Professor Bronkhorst discussed rationality in terms of a tradition of rational in-

quiry defined in such a way, that it includes Indians and, presumably, Euro-Americans (“European Jesuits” were mentioned). He went a step further and suggested, through a series of rhetorical questions, that the Chinese do not possess that particular tradition of rational inquiry. If both Bronkhorst and Wang Fu-chih are right, this would tell us nothing about the Chinese: all we would be saying is that certain non-Chinese humans are rational.

I have mentioned dogs, turtles and human beings, but we should be grateful to Professor Bronkhorst for putting the cat among the pigeons. However, we should be careful not to create confusion. If we define a special tradition of rational inquiry, which according to some specialists is found among certain Asian civilizations and not among others, others will soon draw the conclusion that the former are rational and the others are not. Before we reach any such far-reaching conclusion, we should look not only at what those other Asian civilizations do *not* have, but also at what they *do* have (tortoises have shells, for example). I trust Sinologists will enlighten us on these matters. In the meantime, and until we know what they have to say, we should take care *not* to suggest that rationality has any special relationship with the specific Bronkhorstian tradition *only*. We are discussing, after all, *Rationality in Asia*. True, Humpty Dumpty made things mean the way he chose; but we should, I believe, try to spread light and define rationality in more general terms; then show subsequently, what particular kinds of rationality occur in particular (Asian) civilizations. Should it turn out that there are places where no kind of rationality occurs, we shall go on from there.

I’ll return later to the problem of what rationality is, but begin with the undisputable fact that it is a compound notion. It consists of such elements as Bronkhorst has enumerated: notions of right and wrong, argument, and independence from tradition, religion, “sometimes even ordinary perception.” We will accordingly understand rationality better when we analyze it into smaller elements just as physical objects are analyzed into molecules, etc. Rationality in the Bronkhorstian sense has *relatively* little to do with logic, as Bronkhorst says, but I emphasize the word *relatively*: for rationality in most senses (including Bronkhorst’s) depends on people arguing with each other, and arguments depend on uses of language and logic that involve such logical concepts as negation.

I shall use negation as an exemplary element of rationality and discuss it along with other similar elements that are features of language

or logic (e.g., *any*, *only* and counterfactuals). The organization of my essay falls naturally into three parts. I begin with a discussion of the place of negation and other elements of rationality in language and therefore in linguistics and *universal grammar* (Section I). I shall then discuss, more briefly, the role such elements play in *logic* (Section II). My final section (III), also brief, addresses the question of *rationality* in the light of sections I and II.

I. Universal grammar

Whatever else it may be in addition, rationality is a feature of language. Bronkhorst has focussed attention on the two largest civilizations of Asia, India and China, and if we confine ourselves to these, the chief languages to discuss are Sanskrit and Chinese. Since Sanskrit is Indo-European, deemed familiar and the language of our discussion, I shall not discuss it. An additional reason is that I accept Bronkhorst's thesis about the occurrence of his tradition of rational inquiry in India — at least during certain periods and in certain quarters. Given the fact that most Sanskritists are likely to agree on this, we must discuss Chinese; but here I run into a problem: I do not know Chinese. Fortunately, that is not as bad as it may seem for I am not interested in Chinese for its own sake: I am interested in Chinese because it may enable me to explain universal grammar.

As it happens, one need not know Chinese to assess some of the assertions that have been made about it for they have been well documented. These assessments share a general feature on which Christoph Harbsmeier put his finger in his discussion of "Argumentation and Rationality in Ancient China" (Harbsmeier 1998: 261):

I also want to show how logical reasoning is clearly *implicit* (my italics: F.S.) in certain ancient Chinese ways of speaking and writing ... (something that) might well seem self-evident to a logician or to a philosopher.

I would like to add "a linguist" here; but the important point is to emphasize the word *implicit* which belongs to the philosophy of science. Harbsmeier also uses it elsewhere (e.g., in his pages 268-9 on "Implicit logical arguments") and it is a characteristic of most of the issues I shall be discussing.

Harbsmeier starts his book with a discussion of the views of Marcel Granet about the uniqueness of the Chinese language. I would like to begin with a similar statement made to me by another distinguished Sinologist: "Chinese has no grammar." Perhaps this was

meant to convey that one need not study grammar in order to learn Chinese which obviously holds true for most Chinese. However, that applies to the native speakers of *any* language. To make the statement that Chinese has no grammar in a more literal and straightforward sense, one needs to know what is Chinese as well as what is grammar.

Professor Harbsmeier has drawn my attention to the *Chinese-English Dictionary* of 1892 by Herbert A. Giles where the question of “grammar” is taken up in the *Preface* (pages x - xi) which starts out as follows:

To dispose of Chinese grammar by saying that “there is none,” is to be only rhetorically exact.

The reader expects that the author will go on to show that one cannot dispose of grammar in this manner, but, as it happens, he arrives after some meandering at the same conclusion, albeit expressed in Latin: “Chinese is essentially *supra grammaticam*.” In the intervening discussion, this puzzling statement is made more explicit:

The dictum of MARSHMAN, author of the *Clavis Sinica*, that “the whole of Chinese grammar depends on position” has been regarded for many years as a golden key to the written language of China. But he who learns any number of rules and then attempts to apply them synthetically, will have more disappointments in store than another student who has spent the same time in reading extensively and *absorbing into his system* (my italics: F.S.) as much as possible of that elusive mysterious quiddity which we call the genius of the language.

We have already seen that the same holds for every language: even if it were to contain all the rules of the grammar, perfectly formulated (which is not the case in any existing grammar), a scientific grammar of a language (e.g., Pāṇini’s grammar of Sanskrit) is not a “Teach it Yourself” manual. The phrase I have italicized is of particular interest because it adds that the learner of a language (whether one’s first, native language, or another that is learned from immersing oneself in conversation or texts) is only capable of learning because there is a *system* of linguistic structure innate in the learner. This system is the innate component on which Noam Chomsky discourses and the “universal grammar” of my present section.

Until Christoph Harbsmeier provided the magisterial survey of language and logic in Chinese that has been published as Volume 7 of Joseph Needham’s *Science and Civilisation in China*, the foremost Sinologist to have published extensively on these problems was A. C. Graham to whom Harbsmeier’s volume is dedicated and whom I

quoted on the bald tortoise. Graham's latest and most explicit views occurred in an *Appendix* to a 1989 book, entitled: "The Relation of Chinese Thought to Chinese Language." (The collection of essays Graham 1992, though published later, does not revert to this subject matter.) Two of the main targets of Graham's 1989 critique were Hall and Ames who, according to Graham, provide both the most recent and most extreme example of "antiquated assumptions" about the Classical Chinese language. Hall and Ames had written that all Chinese words are names and Chinese sentences are "strings of names." Sentences, therefore, cannot be propositions that are true or false, a conclusion that is correctly drawn. Obviously, if it were true that the Chinese did not distinguish between truth and falsehood, they could not be rational in any sense of the term.

The theory that sentences are strings of names was not discovered by Hall and Ames. It was an ancient Chinese theory that arose in various forms in several civilizations. There are two things wrong with it: all words are not names and all strings of words are not sentences. The Chinese appear to have made both mistakes, St. Augustine the first and the ancient Indian *Bṛhaddevatā* the second. The Chinese discovered their mistake themselves as we shall see in a moment. Augustine did not but in Europe also, several logicians and linguists must have known for some time that theories of the Augustinian type are erroneous. The most famous refutation of Augustine came almost two millennia later and is due to Wittgenstein who discussed it at the beginning of his *Philosophical Investigations*. Wittgenstein constructed a language in accordance with Augustine's view, i.e., a language in which words name objects and sentences consist of such names. He then went on to show that our human language is not such a language.

The *Bṛhaddevatā* II:117 stated: *padasaṃghātajam vākyam*, "a sentence is a collection of words." (According to Deshpande 1997: 126 note 10, the term *saṃghāta/saṃghāṭa*, "collection," is rare in Vedic and may have been borrowed in its philosophical use from Pali or "from early Buddhist or similar traditions.") The *Bṛhaddevatā* doctrine was refuted by the Indian grammarians by a simple counter-example of a collection or string of words that is not a sentence:

gaur aśvaḥ puruṣo hastī (1)
"cow horse man elephant."

In Latin or Sanskrit, and to some extent in English, it is relatively easy to see that a string of words is not a sentence because most words

that occur in sentences are provided with endings which relate the words to each other. In English “birds eat” and “bird eats,” the number of the subject is expressed by endings of both noun and verb: they are sentences, therefore, unlike *“bird eat” or *“birds eats,” which are ungrammatical (as the asterisks indicate). In (1), there are no endings and the words are not syntactically related to each other in the manner in which the words of a sentence are in an inflected language.

In Chinese, words are uninflected; they are not provided with endings. It is therefore easy to believe that a string of words is a sentence, especially if it is written as a string of characters. Even so, the Mohist logicians discovered that sentences are *more* than strings of words. According to Graham, the difference between a sentence and a string of words “which Western logic could take for granted from the beginning, was the last and most difficult of the Mohist discoveries.”

Marshman’s thesis quoted by Giles, that “the whole of Chinese grammar depends upon position,” refers to such facts as the following. A basic feature of Classical Chinese is that the parts of speech generally depend on their position in the sentence and not on the form of the words themselves as is the general case in English and other Indo-European languages. For example, the word *hsiao* can mean “filial piety” or “being filial” if it occurs in the position of a noun, and “has filial piety” or “is filial” if it occurs in a verbal position. One cannot tell from *hsiao* by itself whether it is a noun or a verb. This Chinese feature is not characteristic of English but it does occur there also: for the same holds for English words such as “claim,” “range,” or “judge.” Compare:

I claim that I am entitled to a cup of tea (2)

and:

The claim that I am entitled to a cup of tea... (3)

In (2), “claim” is a verb; in (3), it is a noun. One difference between English and Chinese is that in English, when these words are parts of sentences, their different functions are often distinguished not only by their occupying different positions in the sentence, but sometimes in addition by their being provided with different endings, e.g., the nominal or the verbal. There are no such endings in (2) and (3), but they occur in (4) and (5):

I claimed that I *was* entitled to a cup of tea (4)

My claims *were* that I *was* entitled to a cup of tea *and* a refund. (5)

Though there is ample room for qualification (for further discussion, with examples from Shakespeare, see Harbsmeier 1998: 125-7), it is safe to conclude that, in general, Chinese and English differ with regard to the grammatical endings (something visible or audible, in brief: explicit), not grammatical function (something implicit). My first conclusion is straightforward. Chinese possesses grammatical concepts such as “noun” or “verb” and grammatical relations such as “subject” and “predicate” like Sanskrit or English.

What holds for nouns and verbs in Chinese also applies to nouns and adjectives. In a discussion on abstraction and Platonic forms, Graham writes: “Indo-European adjectives and verbs cannot stand in syntactically nominal positions except in nominalised forms which easily assimilate to concrete nouns to breed hypostatized entities; the corresponding Chinese words stand unaltered in nominal positions.” Applying Graham’s terminology to an example from Indo-European: the noun “whiteness” breeds the idea of whiteness. In Chinese, *pai* means “white” and there is no derivative noun that refers to “whiteness.” Hence no concept or idea of “whiteness” either. However, a nominalizing particle *che* may be added and modify the meaning to some extent: *pai-che* can mean, in certain contexts: “that which is white” (Graham 1986: 380).

Sanskrit is rich in abstract-forming suffixes such as *-tā* and *-tva*. A rule of Pāṇini’s Sanskrit grammar (5.1.119) assigns to them the function of referring to the “being” or “existence” of a thing: e.g., *aśvatvam* or *aśvatā*, “horseness, being a horse, what makes a horse a horse,” from *aśva*, “horse.” Such abstract expressions are common in logical and other scientific kinds of Sanskrit (Hartmann 1955; Staal 1995). Sanskrit (like Latin) has no articles but Greek possesses them as well as abstract-forming suffixes such as *-tes* that correspond to English “-ness” or “-ty.” Plato and Aristotle, when discussing general forms or ideas, use both interchangeably: we come across “whiteness,” in the same positions as “the white,” and “equality” and “beauty” in the same positions as “the equal” and “the beautiful.”

In Plato, forms that correspond to the Chinese seem to be more common than those with the abstract-forming suffixes that Chinese lacks. All Greek passages quoted in Taylor’s still well-known monograph on Plato display the adjectival forms. The abstract suffix is sometimes used by Plato for special effect. When Socrates explains to the genius-boy Theaetetus the differences between *sensation* and *knowledge*, he refers to a white thing that is *seen* as *white*, and to the white color that is *known* as *whiteness*. My conclusion is again

straightforward: Greek and Indo-European happened by but Plato might have been Chinese.

Harbsmeier's discussion of Marcel Granet, who wrote in the 1920s and 30s, is benevolent but he adds a sterner footnote (page 24, *note 3*): "There is no similar excuse for sinologists writing in the 1980s." Let me add some fuel to that note. Hall and Ames published their book in 1987; but what are perhaps the most explicit "antiquated assumptions" about Classical Chinese were made by Jacques Gernet in 1985 in his study of Chinese reactions to the Jesuit seventeenth-century presence in China. Perhaps a Professor of Chinese at the *Collège de France* whose name is Gernet should take special care not to create confusion by opposing Granet. Whatever it is, Gernet started with the assumption that Chinese and Western thought are fundamentally incompatible. He regarded it as obvious that no "Aristotelian Westerner could grasp Chinese cosmology since there are absolute incongruities between the two languages and world views." In the final section of his book, Gernet comments on the Chinese language in memorable terms:

Now, a model of a language more different from that of Greek, Latin or Sanskrit cannot be imagined. Of all the languages in the world, Chinese has the peculiar, distinctive feature of possessing no grammatical categories systematically differentiated by morphology: there appears to be nothing to distinguish a verb from an adjective, an adverb from a complement, a subject from an attribute. The fact is that, in Chinese, these categories only exist by implicit and arbitrary reference to other languages which do possess them. Furthermore, there was no word to denote existence in Chinese, nothing to convey the concept of being or essence, which in Greek is so conveniently expressed by the noun *ousia* or the neuter *to on*.

I am not interested in criticizing these statements for their own sake but as it happens, a person who wishes to clarify the notion of universal grammar can hardly find a better passage to start from: for from the point of view of the linguist there is here, as in the hair on the tortoise, something that is crying out for attention because it is not there. Note that Gernet also uses the word *implicit*; but its impact is thwarted by its juxtaposition with the word *arbitrary*. It is true, of course, that Chinese does not distinguish grammatical categories by means of morphology: it has no morphology. We should leave it to linguists to decide whether it is the only language in the world with this property; which is unlikely. The point about morphology, that is not there, is the following: the distinctions of a language need not be explicitly marked by morphological means. In Chinese, distinctions between word

classes are made by rules that determine which place in the sentence a word may occupy, i.e., by means of *syntax*.

I have added Gernet's final words about being, because they are so instructively different from a series of articles published by Graham on "being" and the categories (Graham 1959, 1965, 1967, 1968, 1986). It may be recalled here that "being" is related to Aristotle's categories since they arose from a classification of forms of the predication "is P." Graham was familiar with a remarkable characteristic of the Indo-European languages, especially in the early periods, viz., that they combine the existential and the predicative or copulative function in the single verb *to be*. That means, in simple English, that "are" is used both in statements of existence such as "apples are" and in predications such as "apples are red." To anyone familiar with other language families, writes Graham, this combination (far from being convenient) is "one of the most illogical of all linguistic oddities."

Graham's observations have several implications that are unflattering to European philosophy. Some apply to the Western obsession with ontology, others, more specific, to Kant's famous discovery that existence is not a predicate — a truth that is transparent in any language in which the two are *not* expressed by the same verb. "Apples are" does not appear to be implied by "apples are red" in any language where the *are*'s are different, that is, in almost any language. Graham pointed out that Chinese translations of those passages in Kant, therefore, make no sense.

In Sanskrit, that confusion does not exist, and yet the copula is, in general, implicit. Sanskrit expresses "mangoes are red" simply as "mangoes red." English tends to express the existence of apples not by means of "apples are" but by "there are apples" or "apples exist." Most modern Indo-European languages avoid "to be" when existence is expressed. German says: "es gibt," French: "il y a" (cf. Graham 1989:407-8). The relevance of universal grammar to these discussions, and vice versa, is obvious: all these differences are literally superficial because they do no more than scratch the surface. Can we now leave particulars behind and address the question: what is universal grammar?

In Europe, the notion of *universal grammar* is about a thousand years old (Salus 1976; for Asia, cf. Staal 1979). One of its greatest exponents was Leibniz. Most notions of universality that were discussed by logicians and philosophers were of a logical nature or related to *a priori* or metaphysical truths. That began to change substantially after Chomsky's *Syntactic Structures* of 1957. Universal grammar ceased

to be an idea and became a matter of empirical investigation. Chomsky's own Master's thesis had been on the morphophonemics of modern Hebrew; but it was not published until much later and Chomsky has often been criticized for confining himself to English. That is perhaps apt but as it happens, Chomsky's analysis of English inspired immediately the study of a wealth of other languages by his pupils and colleagues. I shall single out only a few steps in that development. In 1958, Robin Lakoff noted that the rules of Latin sentence complimentation apply also in English. In 1969, Paul Postal, a student of American Indian languages and especially of Mohawk, wrote that "no one who has attempted to investigate the grammatical study of languages has not been impressed with the underlying similarities."

It did not take long, for language change to be studied within this perspective; and Chinese did not fail to be included. The Proceedings of a 1976 Conference on "Origins and Evolution of Language and Speech," published by *The New York Academy of Sciences*, contained contributions relating to Chinese and to Sanskrit. Using the early evolution of Chinese, William S.-Y. Wang argued that there are linguistic cycles that may go from complex morphology with simple syntax to complex syntax with simple morphology, and back. According to him, one cycle of the process whereby a language alternates between reliance on word order and reliance on affixation (prefixes, suffixes, etc.), may take more than a thousand years. "Since there are so few languages in the world with documented histories surpassing 1,000 years, the prospect of obtaining conclusive evidence for such global claims cannot be very promising at present."

Writing in the same volume, Paul Kiparsky considered Indo-European. Using early evidence for the Indo-European drift toward morphological simplification, he argued that up to about 5,000 years ago, the overall development was probably in the opposite direction. He writes that this is rather fortunate, since the hypothesis of constant simplification would cause obvious problems at the other end. Wang and Kiparsky's results show that historical change in languages is very rapid, by biological standards. According to Kiparsky, in some 10,000 or 20,000 years, any language can change into any other.

In the decades that followed, universal grammar, the study of the abstract structures that underlie all human languages, became a substantial part of linguistics. It led to other new disciplines (like the cognitive sciences) and began to attract the attention of other scientists. In 1990, the topic played the central role in a discussion in the journal *Behavioral and Brain Sciences* on relationships between linguistics

and the life sciences which would, in fact, not make much sense without it: for the life sciences are interested not in the differences between Chinese and Indians, but in human beings and other animals. The discussion was initiated by Steven Pinker and Paul Bloom who respond to a collection of papers by linguists, biologists, psychologists, cognitive scientists and anthropologists. Misunderstandings are not absent from some of these contributions; neither are valid or interesting criticisms. However, no participant doubted the validity of what Pinker and Bloom stated in their introductory paragraphs:

Even a rudimentary grammatical analysis reveals that surface diversity is often a manifestation of minor differences in the underlying mental grammars

and:

When one looks at more abstract linguistic analyses, the underlying unity of natural languages is even more apparent.

What are these deep, abstract and underlying principles, and what are the superficial forms that are contrasted with them? They are precisely of the type that I have tried to illustrate in my earlier remarks about Chinese. Chinese has no morphology but it expresses the same thing by word order. (Actually, Sanskrit does the same but *within* nominal composition as was pointed out by Peter Hartmann in 1955.) Chinese lost its original copula, but it expresses the same things as the copula implicitly and without mentioning it, like Sanskrit or Latin but unlike Greek or English. Chinese has no abstract forming suffixes, but it is able to express the same by expressions that are used like abstracts, like Greek or English. What about languages that are even more exotic — from *our* point of view?

Linguistics is a fast developing discipline and I have long ago lost track of much that is happening there. All I know is that there is no general answer to the question to what is included and what is not included in universal grammar; it depends on empirical investigation, an ongoing process. A readable discussion with good illustrations occurs in Chapters 4 and 8 of Steven Pinker's 1994 book *The Language Instinct*. An important example of what belongs to universal grammar is the pair of categories subject and predicate. In European logic, it has been a millennial straight-jacket to which I shall return. In linguistics, it seemed at first that counterexamples occurred in certain so-called nonconfigurational languages found in Irian-Jaya, Queensland and among American Indian languages. Japanese is often thought to be included among the "exotic" languages but S.-Y. Kuroda pointed out in 1969 that the distinction of subject and predicate occurs there.

Kenneth Hale wrote about the Papago language of Southern Arizona that the concept of subject is:

a real enough notion in Papago syntax since it is the grammatical subject which determines the person and number agreement in the auxiliary (Hale, without date, page 103).

This is very similar to the English examples (2) - (5) I quoted before.

So far, the evidence seems to be uncontroversial: subject and predicate are universal. Chomsky formulated it cautiously on several occasions:

This assumption is empirical, therefore controversial, but it appears to be well supported by cross-linguistic evidence of varied types (Chomsky 1965:71, 1986:59).

Some contemporary linguists (including Chomsky) derive the subject/predicate relation from more abstract underlying structures of syntax. Whatever the precise derivation, the relation was crucial for Aristotle, much European metaphysics and monotheistic theology and is also widespread in Indian philosophy. For Chinese, there is a general discussion of the categories by Graham (1986). I have the impression that a linguist might be able to add clarifications — an impression, no more, for his investigation is difficult to follow for a reader without Chinese. The same holds to some extent for Harbsmeier's discussion (1998:380-3) and I hope that the discourse on this topic will continue.

I now come to negation in natural language, a concept that appears in many different forms and manifestations. It may also *not* appear and yet be there: for elements of natural language (or of nature, for that matter) may be implicit as well as explicit as I have been trying to explain. Before we take up a simple example let me interrupt the discussion briefly and broaden it to ask: How do we know invisible things?

The knowledge of invisible or inaudible things is a basic and it might be argued: the most interesting feature of science. It is based on logic and visible things in accordance with the Talmudic saying:

If you want to understand the invisible,
look carefully at the visible

(quoted in Staal 1990,1993:190). It is not interesting, accordingly, to read a scientific paper which leads to the conclusion that "the average distance between dwellings is larger in the countryside than in the city." But it is interesting to learn about *Black Holes* which are as

invisible as anything I can think of. That interest also explains Harbsmeier's use of the word *implicit*. Rationality need not depend on sensory perception and may go far beyond it. At the outset of his *Critique of Pure Reason*, Kant stated clearly—if it was not already clear before him—that all our knowledge starts *with*, but not necessarily *from* experience. Modern physics is an excellent example of rationality not just encroaching upon, but practically obliterating ordinary perception.

We often know implicit or covert elements of language because of grammatical relations; but not infrequently simply because of the use of *words*. The use of *any* in English is triggered by a preceding negation that may or may not be the *not* that is explicit in (8) and (11) but not in (9). The negation of:

I have some money (6)

is not:

*I don't have some money (7)

(where the asterisk * denotes not so much ungrammaticality as the fact that (7) is not the negation of (6)) but triggers *any* as in:

I don't have any money. (8)

But *not* need not be explicit because we similarly have:

I deny any wrongdoing! (9)

and not:

*I deny some wrongdoing (10)

where negation is implicit in the verb "deny." One of the meanings of "deny" is "not admit" and I could also have said:

I don't admit any wrongdoing (11)

where the use of "any" is due to the visible negation "n't."

Complex constructions that involve negation are of many kinds. When another Bloom, Alfred Bloom (1981), claimed that counterfac-

tuals (such as “had it not been the case that P, so-and-so would have occurred”) are not found in Chinese, he was refuted not only by A.C. Graham (1989:396-8), but also by Derek Herforth (1995) and Christoph Harbsmeier (1998:116). As it happens, counterfactuals occur in many if not all languages and are likely to belong to universal grammar, from Vedic (Delbrück 1888: 344) to these Maori examples in which the “counterfactual” clause does not contain an explicit negation:

Mehemea ratou i haere, kua oti ke nga mahi (12)
 “If they had gone, the work would have been completed”

Mehemea i tae mai ia, ka kite au (13)
 “If he had come, I would have seen him.”

I shall not try to analyze these sentences in detail, which would take up much space, but see Elizabeth Pearce (1995: 275). The English translations that use “would” in the main clause make it clear that, although there is no explicit “not” in these sentences, the first clause is in each case counterfactual: in (12), they had *not* gone and in (13), he did *not* come.

In Papago, Kenneth Hale discussed a case of what might be called “half way counterfactuals.” He quotes two very different looking sentences which I shall omit (see Alvarez and Hale 1970:86), but provides *one* translation for *both* expressions:

“If we get rain, I won’t go.” (14)

Hale discusses the two original expressions in the following terms:

The first sentence means ‘if it should rain to-morrow or the next day’ and we do not know whether it will rain (at all), because there are no clouds; we merely entertain the possibility that it might rain. In the other sentence, by contrast, it appears that the speaker half knows that it will rain because he sees that there are clouds and, for that reason, thinks it will rain.

Since Hale says of the the second sentence that the speaker “half knows” I have called the first “half-way counterfactual.”

In linguistics, negation has been found to be very complex. Some distinctions are still barely understood though these topics have been studied intensively for several decades (ranging from the pioneering

Klima 1964 and Kraak 1966 to Horn 1989 and many others). One important distinction obtains between sentence and term negation:

Gopal is not friendly (15)

is a sentence negation: it negates the sentence:

Gopal is friendly (16)

On the other hand,

Gopal is unfriendly (17)

is a term-negation. (17) does not negate (16) though it has something to do with it: (17) implies (15) but not vice versa. Term-negations are often puzzling and the logical principle of the excluded middle or third (to which I shall return) may not apply to them as is suggested by the sentence:

Gopal is neither friendly nor unfriendly but WOW! is he efficient! (18)

All languages seem to possess this distinction but it is not always expressed explicitly. Most of the eleven negative particles of Chinese discussed by Harbsmeier (1998:108-111) seem to be sentence-negations but some of the examples he gives (such as Confucius' "inhuman" versus "humane") seem to correspond, in English, to term-negations. It would be helpful to the barbarians if Harbsmeier were to explain this further.

In Arabic (and perhaps in other Semitic languages), term-negation is explicit and expressed by *ghair* whereas sentence negation is expressed by *laisa*:

Zaid ghair bashir (19)
"Zaid is nonclairvoyant"

(Madkour 1934: 169 quoted by Horn 1989:40). Note that *ghair* is a separate word unlike the English prefixes "in-" or "-un": we do not write (17) as:

*"he is un friendly" (20)

which is not merely a superficial fact about writing or spelling but reflects deeper facts, e.g., that “unfriendly” is an adjective with all the properties thereof.

The distinction between sentence and term negation is similar to or identical with the distinction between *pratiṣedha* and *paryudāsa* in Indian logic (Staal 1962a = 1988:109-28). The difference corresponds to some extent to Aristotle’s distinction between contradictory and contrary, retained in what has also been called called, “negative judgment” and “indefinite judgment,” respectively. It was used by Ibn Sīnā (from whom Madkour quoted) in an Aristotelian context. Aristotle refers to contradictoriness when he says that negation of a proposition is negation of the predicate and not of the subject:

the negation of “*to be a man*” is “*not to be a man,*” not “*to be a not-man*” (*De Interpretatione* 12 21 b 1-2). (21)

Fortunately, Aristotle’s example uses “to be” where English negation conforms to the Greek: “not to be.” Elsewhere English is confusing because it uses the auxiliary “do” when expressing negation: English says “John doesn’t walk” where most languages have something equivalent to “John walks not.” Some languages combine the negation directly with the verb, as Aristoteles predicts; e.g., Japanese:

watashi wa seito desu (22)
“I am a student”

but:

watashi wa seito dewa arimasen (23)
“I am not a student.”

In Japanese, more complex expressions for negation abound and many seem to be negations attached to the verb or predicate in the Aristotelian manner, e.g.:

hon wa kawanakatta desu (24)
“he did not buy books.”

Since negations are much more complex than my simplified account suggests, it is not surprising that Japanese possesses a myriad of rules about the particles that accompany it. Kuroda who discusses them (1969 = 1992) also treats (page 1992:84) the important particle *dake*, “only,” e.g., in:

John wa Syntactic Structures dake o yonda. (25)
 “John read only Syntactic Structures”

In this sentence, *dake*, “only,” expresses that there were some books other than *Syntactic Structures* that John might have read but in fact did not. Cross-linguistically, “only” may also be used in many different ways that have been studied not only within a Chomskian framework but from a model-theoretic perspective that is closer to logic (e.g., Thijsse 1983:24-6, referring to other literature). For logic, the importance of “only” lies in the fact that it combines negation and quantification. It accounts for the fact that in Indian logic, where quantification is often a problem because it is not expressed in a systematic manner, the Buddhist logician Dharmakīrti used Sanskrit *eva* “only” to express it (Staal 1962b = 1988:93-5), e.g., in his statement about the occurrence of the “reason” (*hetu*):

sapakṣa eva (26)
 “in similar instances only.”

This means that, wherever the reason occurs, it is in similar instances. Or, more explicitly:

for every x , if the reason occurs in it, x is a similar instance (27)

which brings out the quantification in English by means of “every.”

Linguistic variety abounds on the surface but there are generalities about underlying linguistic concepts that apply without exception. What underlies the fickle behavior of *nots* is the rock-bottom invariance of negation. An important example to which I shall return is that *watashi wa seito desu* “I am a student” (22) and *watashi wa seito dewa arimasen* “I am not a student” (23) can never be both true at the same time and in the same respect — not in Japanese, not in English, not in any language. Negation would not be what it is, and we would not call it “negation,” if it did not possess that fundamental property of contradiction in all languages. The same holds for “only” and many other expressions, concepts, and properties of language, e.g., conjunction or disjunction: they would not be what they are if they did not have the properties that distinguish and define them as such. This takes us to matters analytic and to logic.

II. Logical features of universal grammar

I have occasionally referred to logic in order to illustrate that it is closely linked to universal grammar; but let us take a closer look at it in its own right. Logic deals with concepts like truth, inference and proof, and is concerned with the creation of ideal, formal languages in which such concepts can be expressed clearly and without ambiguity. Most formal or artificial languages consist, like natural languages, of *sentences*, but in the European tradition, logicians from Aristotle onward have emphasized a subclass of these, i.e., indicative or declarative sentences, sometimes called *propositions* — things, in brief, that may be true or false. Indian philosophies also deal with such sentences; but some of them, e.g., the Mīmāṃsā, are primarily concerned with another subclass of sentences, i.e., injunctions. Aristotle's limitations are not primarily due to his neglect of such other sentences but to the limitations of his predicate logic itself and since this is not always appreciated, I shall begin with it.

Aristotle's predicate logic starts from propositions that are analyzed into their subject and predicate. For example, "Socrates is mortal" is analyzed into the subject "Socrates" and the predicate "is mortal." This is the traditional and also the correct grammatical analysis as we have seen because the distinction between subject and predicate belongs to universal grammar. The logic of subject and predicate is an excellent instrument for the expression of quantification and negation because subjects may be quantified and predicates negated as in "*all* humans are *not* mortal" which expresses sentence negation ("it is not the case that all humans are mortal") as we have seen; but predicate logic is not the only kind of logic. Many logics after Aristotle, the Stoic to begin with, paid no attention to subject and predicate and evolved a more general logic of propositions. Indian logic and, as far as I can see, the logic of the Mohists are also primarily concerned with propositional logic. Unfortunately, Aristotle's predicate logic remained the last word in logic throughout most of the European middle ages and persisted considerably longer.

What is wrong with Aristotle's predicate logic? A good counterexample is provided by Leibniz who was not only a great philosopher and mathematician, but also an eminent logician who paved the way for the emergence of modern logic. And yet he explained the proposition "Titus is bigger than Caius" by forcing it into the straightjacket of subject and predicate, thereby implying that "being bigger than Caius" is predicated (and thus a quality) of Titus. The historians of logic Kneale and Kneale comment: "The strenuousness of his efforts

to preserve the old theory shows his own uneasiness and has stimulated other logicians to shake themselves free from this part of the tradition" (Kneale and Kneale 1962:324-5).

Predicate logic does not apply in a natural manner to *relational* sentences as Gottlob Frege, Charles Peirce, Bertrand Russell and many others pointed out. Relational sentences are sentences such as the following:

Brutus killed Caesar (Russell's example), (28)

John gave the book to Mary (Peirce's example), (29)

John gave Mary the book in exchange for a picture. (30)

Here, the *grammatical* analysis which Aristotle adopted in his logic is in terms of subjects ("Brutus" and "John") and predicates (the remainder of these sentences); but a more appropriate *logical* analysis recognizes that these propositions express *relations* between terms or objects: *two* in Leibniz' example ("Titus" and "Caius") and in (28) ("Brutus" and "Caesar"), *three* in (29) ("John," "the book" and "Mary"), *four* in (30) ("John," "Mary," "the book" and "a picture"), etc. Note that the three expressions (28) - (30) correspond to mathematical functions such as $f(a,b)$, $f(a,b,c)$ and $f(a,b,c,d)$. Frege had this in mind, but he had also a different objection to the subject-predicate distinction:

There may indeed be a rhetorical difference between "The Greeks defeated the Persians" and "The Persians were defeated by the Greeks"; but the conceptual content of the two statements is the same because either can be substituted for the other as a premise without effect on the validity of our reasoning (Kneale and Kneale 1962:479 quoted by Kuroda 1992:78).

Some critics will be quick to point out that Frege's examples are imperialist or colonial. I don't deny it but it should be retorted that that objection itself is rhetorical and does not affect Frege's point which is logico-grammatical.

In mathematics, subjects and predicates have never played much of a role and the reason is that they render no assistance in science, i.e., are not applicable to the universe. Fundamental statements of physics such as the Schroedinger Equation do not consist of a subject and a predicate. Even propositional logic does not render much assistance in science although equations are in some respects equivalent to propositions. The artificial language of modern science is much more

flexible: it is algebra, not logic, at least not in any of its traditional forms. I say this because my earlier remark, i.e., that propositional logic is more universal than predicate logic because it arose not only in Europe but also India and China, is likely to be related to the fact, that propositional logic has more to do with the universe than predicate logic. If we continue this line of reasoning we must be willing to take the following step: algebra is more universal than logic. To a linguist, the language of algebra poses a bit of a problem: it is not included in universal grammar since it is an artificial, not a natural language. Algebra is super-universal also in the sense that a denizen of another planet who visits ours will not be able to speak in English (as in “Star Wars”) or another natural human language because the properties of human language (such as subject and predicate) are arbitrary and *ad hoc*; but he/she/it might recognize symbolic expressions for numbers such as occur in algebra (for an early proposal of a cosmic language see Freudenthal 1960).

Another conclusion follows. If the artificial languages of algebra are more universal than natural languages, they could not be a European invention but must be a *human* achievement just as the origination of natural language itself — wherever and whenever it happened. That is in accordance with one of A.C. Graham’s most perceptive insights:

The Scientific Revolution appears as a unique and complex event, depending on a variety of social and other conditions including a confluence of discoveries (Greek, Indian, Chinese, Arabic, scarcely ever Roman) centred on the combining of Indian numerals and algebra with Greek logic and geometry. Since this crucial combination, for primarily geographic reasons, came about among the Arabs, afterwards passing to Latin Christendom, it becomes pointless to ask why the Scientific Revolution did not happen in some other part of the world. The whole question of why the Chinese never arrived at modern science seems to me a pseudo-problem (Graham 1989:317; cf. Graham 1973).

Graham implies that the question why the Scientific Revolution is European or “Western,” is a pseudo-problem also: for that revolution was not European. What was decisive for its occurrence was not the place but the time. Elsewhere I have argued that the center of Graham’s “confluence of discoveries” is algebra, the language of modern science (Staal 1995 and *forthcoming*). In our present context, the relevant feature of that confluence is that science, and therefore rationality, is universal.

We are not studying science but rationality and for that study propositional logic suffices. Good examples of propositions that also fit

our context are the principles of non-contradiction and the excluded middle. Let us begin to formulate these two principles in the precise language of propositional logic.

The principle of non-contradiction:

$$\text{not (A and not-A)} \quad (31)$$

asserts that a statement or proposition A and its negation not-A are not both true (Aristotle added, sensibly, "in the same respect"). The principle of the excluded middle or third:

$$\text{either A or not-A,} \quad (32)$$

asserts that either a proposition A or its negation not-A is true.

Note that (32) implies (31) but not vice-versa. In other words, (31) is more general than (32). Recall that the same holds for:

$$\text{Gopal is unfriendly} \quad (17)$$

which implied:

$$\text{Gopal is not friendly} \quad (15)$$

but not vice-versa. The principle of non-contradiction applies to (15) in combination with sentence negation and also with term negation, for both of the following are untrue:

$$\text{Gopal is friendly and not friendly} \quad (33)$$

$$\text{Gopal is friendly and unfriendly} \quad (34)$$

And yet, we cannot assert that:

$$\text{Gopal is either friendly or unfriendly} \quad (35)$$

is true because he may be neither as in:

$$\text{Gopal is neither friendly nor unfriendly but WOW! is he efficient!} \quad (18)$$

It seems that the principle of non-contradiction (31) applies in all languages but the principle of the excluded middle (32) does not. This is in accordance with an interesting fact: all logicians accept (31) but some logicians do not accept (32).

The European system of logic that rejects the principle of the excluded middle or third is *intuitionistic logic*. The reasons come from mathematics and have nothing to do with linguistics or universal grammar. L.E.J. Brouwer, the founder of intuitionism or intuitionistic mathematics, argued that in an infinite series such as the numbers in the decimal expansion of π : 3,141592653589... we cannot know whether there will ever occur a sequence of five fives: 55555 until we have found or *constructed* it. As long as we have not, it makes no sense to say:

either there is such a sequence 55555 or there isn't. (36)

According to Brouwer, the principle of the excluded middle does not hold in the domain of infinity and the existence of mathematical objects can only be accepted if they have been constructed. According to Brouwer's opponent and rival David Hilbert, a mathematical theory that is *consistent*, i.e., that does not lead to a contradiction, is acceptable even if it contains objects that cannot be constructed. But Brouwer wrote in 1923:

An incorrect theory which is not stopped by a contradiction is none the less incorrect, just as a criminal policy unchecked by a reprimanding court is none the less criminal (quoted in Kleene 1952:57).

Brouwer's intuitionism and Hilbert's formalism arose both in reaction to paradoxes that shook the foundation of mathematics at the beginning of the century. The mathematical and philosophical differences between intuitionistic and classical mathematics are formidable and led to heated discussions; their concepts of logic are also almost diametrically opposed. The resulting technical difference, however, was straightforward: it consisted in the rejection by the intuitionists of *one* principle of logic, the principle of the excluded middle or excluded third: (32).

What does the rejection of a single principle of logic amount to? If (32) is not accepted, we cannot use a very common form of reasoning, i.e., *reductio ad absurdum*. This form of argument starts with the assumption that the negation of what has to be proved is true; then derives a contradiction and with the help of (32), the desired conclusion. *Reductio ad absurdum*, which resembles the use of counterfactuals, is

frequently used in philosophy: for example, by the famous Indian philosopher Nāgārjuna who was not much of a logician. Mathematics becomes much more difficult if we don't allow such forms of reasoning. David Hilbert wrote in 1928:

To take the law of the excluded middle away from the mathematician would be like denying the astronomer the telescope or the boxer the use of his fists (quoted *ibid.*).

It is not surprising that, at first, few mathematicians followed Brouwer. However, the subsequent development of mathematics showed that the rejection of (32) could also lead to positive results because mathematics becomes more *constructive*, a property that not only helped resolve the paradoxes but turned out to have important practical applications, e.g., computers. Some constructivist pupils of Brouwer went further. G.F.C. Griss developed a negationless mathematics that is even more difficult to work with than intuitionism. Its formal apparatus can be expressed by means of the negationless logic to which I already referred. It does not contain the principle of non-contradiction because that principle cannot be formulated without using negation, obviously.

Intuitionistic logic illustrates that some principles of logic are more universal than others. Although the reasons have nothing to do with linguistics or universal grammar, the fact remains that there is a parallel here between natural language and the artificial language of logic and mathematics: there are degrees of universality and what is more universal in the one is also more universal in the other. It should not surprise us, then, that the study of comparative logic shows that the principle of non-contradiction is more widespread than that of the excluded middle (the equivalent principle of double negation: "not-not-A = A," however, is found in India and, famously, in Raghunātha with properties adventitiously similar to intuitionistic logic: Ingalls 1951:68-9).

My final observation on logic comes from the well-known American philosopher Quine who is not widely known for looking beyond his own Euro-American philosophical province but who is much less insular than the majority of contemporary logicians and philosophers. Quine referred, in his well-known *Word and Object* of 1960, to two articles by John Brough (1951 and 1953) who was himself a brilliant Sanskritist who understood linguistics as well as logic. One of Quine's important contributions is basic to the study of other cultures because it concerns translation. It explains an essential feature of the universality of logical principles and their close relation-

ship to universal grammar. Quine's argument (1960: Chapter II; also discussed in Staal 1988: *Introduction*) begins with the principle of non-contradiction:

not (A and not-A) (31)

Let us suppose, says Quine, that certain natives assert as true the opposite of the principle of non-contradiction, i.e.,:

A and not-A (37)

Good field-workers will not be content with a native whose statement is in English or has been translated into English; for it to be significant, his or her statement must be in the native language. But how do we know that our English translation is correct? Here Quine steps in. If any evidence can count *against* translating certain original expressions as “and” and “not”, certainly the natives' acceptance of (37) as true counts overwhelmingly. Quine sidesteps an issue here that I have illustrated in the previous section but that is immaterial to the argument: in a given language, conjunction and negation need not be expressed by simple particles such as “and” and “not” but may be conveyed by means of other morphological or syntactic mechanisms. But Quine is right when he says:

The more absurd or exotic the beliefs imputed to a people, the more suspicious we are entitled to be of the translations (quoted by Harbsmeier 1998:262).

On an earlier occasion (Staal 1988:15-6,34), I briefly discussed some examples from the anthropologist Dorothy Lee, e.g., her statement that the Wintu Indians do not use and because they say “Mary we gathered wood” instead of “Mary and I gathered wood.” I would like to complete that discussion. Lee does not give the original expressions in the Wintu language, but let us assume that there is such a Wintu expression and that we are entitled to call it X. Lee translates X as “we,” thereby generating the attractively exotic translation “Mary we gathered wood.” Formally speaking, if we replace X not by “we” but by “I” (if conjunction in Wintu is expressed by concatenation) or “and I”, the translation becomes: “Mary and I gathered wood” and all exotic weirdness has vanished. The correct solution is likely to be different, because a larger number and wider context of linguistic data have to be taken into account. Whatever it is, there is no need to translate and interpret exotically.

To return to the principle of non-contradiction: *in any language*, particles such as *and* and *not* (or other equivalent expressions) are used in such a way, that this principle holds. If certain native speakers use QWWMIZ (and a similarly native equivalent of “and”) in the following expression which is a correct translation of what they accept as true:

A and QWWMIZ-A (38)

we are entitled to conclude that QWWMIZ cannot be the same as “not.” In other words, the principle of non-contradiction is valid for all languages that contain negation. Quine’s argument supports and is supported by the linguistic arguments we reviewed in Section I because the principle of non-contradiction, like many other — but not all — logical principles, belongs to universal grammar.

III Rationality

I spent much time on Chinese, a language I don’t know, because I already agree with Johannes Bronkhorst that the kind of rationality he is looking for occurs in Sanskrit. The more important reason for my uses or abuses of the Chinese language is that I wanted to illustrate what universal grammar is about and why it is relevant to our discussion. I hope it is clear, therefore, that I am not arguing that Bronkhorst’s specific type of rationality occurs or does not occur among the Chinese. Such matters can only be determined by Sinologists. What I tried to do is show, that underlying the Bronkhorstian specific kind of rationality are more general kinds of rationality that are universal or so widespread, that for the Chinese not to possess them would not merely be astonishing (something induced by the empirical), but unthinkable (something impelled by the analytical). As far as the principle of non-contradiction is concerned, this unthinkability is simply due to the fact that the Chinese possess *language*; it has nothing to do with the fact that they are literate, for example, or that they possess science. In the oral society I envisaged in my 1989 critique of Goody, “Kiwok cannot promise his daughter to Lampang and deny three years later that he ever did, *without* Lampang perceiving a contradiction between Kiwok’s two statements.” Contradicting oneself is violating the principle of non-contradiction.

At this point a familiar objection raises its head: if I am right that all humans are rational and that fact is relevant to our discussion, then

why do they not all possess a particular tradition of rational inquiry, akin or similar at least in some respects to the tradition that Bronkhorst has taken care to explicate? And why do not all humans teach their children the principle of non-contradiction?

The answer to this objection lies in the point about “implicit” that I have been making throughout this essay and that, in the final analysis, is equivalent to the innate nature of language structure that Chomsky, following Plato, has explained. “X is innate” does not mean: “everyone is aware of X.” The linguistic properties of negation are mind-boggling and far beyond the grasp of the large majority of speakers of any language; nevertheless, when people use negation in their native language, they do so in accordance with those linguistic principles. It’s not so different from the planets that move around the sun in accordance with Kepler’s laws but do not know it. The difference is, that humans are capable of understanding at least *some* such principles. I have met Californian students who don’t, but the Dayaks of Indonesian Kalimantan I talked with (and from whom the names “Lampang” and “Kiwok” were taken) are certainly capable of understanding the principle of non-contradiction, which does not imply that they teach it to their children.

Scholars in general and students of Asia in particular should study traditions where the principles of argument are explicitly and systematically formulated in accordance with specific canons and conventions. We would unduly over-emphasize differences and obscure similarities, however, if we failed to mention that the occurrence of such traditions is due to the fact, that humans are able to argue and do all those other things that may resort - if resort they must - under logic and its many applications. In the final analysis, all the operations of argument and discussion — and many others — owe their existence to the basic logical structure of human language.

There is, or may be, more. There exist other traditional forms of expression that occupy an intermediary position between the general logical and the specific Bronkhorstian. Let me discuss an example, from Sanskrit this time.

In Sanskrit scientific writing (Hartmann 1955: “wissenschaftliches Sanskrit”; cf. Bloch 1968), a genre also referred to as the *bhāṣya* or commentarial literature, each of many types of argument is structured and formulated in the same consistent manner. For example, if *A* and *B* are propositions or statements, a specifically styled expression, phrase or formula is used to express that *A* is refuted by *B* (see, e.g., Renou 1956:142). First, *A* is quoted which is done by marking it at

the end with the particle *iti*: *A-iti*. Next, a conditional is expressed by placing the particle *ced*, “if,” at the end of the statement. Next, the first statement is negated by *na*, “(it is) not (so).” Sanskrit sandhi rules turn: *ced + na* into: *cenna*. Next, *B* is nominalized: let’s call it *N(B)*, in Sanskrit: “*B-tvam*,” “*B-ness*” or “the fact that *B*.” Finally, the reason is expressed by using the Ablative case-ending: “*N(B)-tvāt*,” “because of *N(B)-tvam*” or “because of the fact that *B*.” As a result of all these conventions, the entire argument is expressed by the brief formula:

$$\begin{array}{l} A\text{-iti cenna } N(B)\text{-tvāt} \\ \text{“If you say } A, \text{ that is not so because of } B\text{.”} \end{array} \quad (39)$$

This could also be written as a logical principle or rule, e.g.:

$$B \text{ THEREFORE NOT-}A. \quad (40)$$

or as:

$$\frac{B}{\text{NOT-}A}. \quad (41)$$

A simple example in which the statement *B* is not nominalized and does not, therefore, end in *-tvāt* but simply in the ablative ending *-āt*, occurs in *Brahmasūtrabhāṣya* 2.2.17. Here the Advaita Vedānta philosopher Śaṅkara criticizes the Vaiśeṣika doctrine of relations. According to the Vaiśeṣika, relations such as *saṃyoga*, “conjunction,” and *samavāya*, “inherence,” exist independent of the two objects which are joined by them. Śaṅkara declares:

sambandhiśabdapratyayavyatirekeṇa saṃyogasamavāyaśabdapratyayadarśanāt tayor astitvam ITI CENNA ekatve’pi svarūpābāhyarūpāpekṣayānekaśabdapratyayadarśanĀT

IF YOU SAY ‘Conjunction and inherence have such an existence because there are names and concepts for them over and above the name and concepts for the objects that are brought together by these relations,’ THAT IS NOT SO BECAUSE OF the common observation, that several names and concepts are attached to one and the same thing when it is considered by itself or in relation to other things.

Śaṅkara proceeds to give several examples: Devadatta may be considered a human being, a Brahman, learned-in-the-Veda, affable, a boy, youth, old man; also a father, son, grandson, brother, son-in-law, etc. Another example is the stroke which, according to its position,

may denote 10, 100, 1000, etc. — a reference to the decimal positional system which also occurs in *Yogasūtrabhāṣya* 3.13.

When we discuss the black, blond, brown and other varieties of human hair, we are standing on a platform of discussion of human hair itself. When we discuss the Bronkhorstian kind of rationality, we are standing on a platform of logic or discussion that pertains to more general kinds of rationality. What are these rationalities?

That the question of Chinese rationality depends on the concept of rationality was argued by Chad Hansen (1991:171 ff.) who proposed to clarify matters by asking three questions:

- (A) Is Chinese philosophy rational?
- (B) Does Chinese philosophy have a concept of reason?
- (C) Do Chinese philosophers give reasons for their views?

Of these, (C) is the least controversial and Hansen answers it in the affirmative. With regard to (B), he introduces qualifications and with regard to (A), he has an affirmative answer explicated in terms of a new concept he baptizes “non-contrastively rational.”

Graham (1991:292) accepts Hansen on (C). On (B), he writes:

If a culture so remote from ours did turn out to have a word with the same complex ramifications of meaning (as reason), indeed have any perfect synonym of a term outside logic and mathematics, what could it be but a freak of chance without significance?

If the concept of reason depended on the tradition associated with European philosophers such as Descartes, Spinoza or Leibniz, its ideal philosophy would be deductive and mathematical, but differ from mathematics in giving us factual information about the world. Additional qualifications would have to be made. In Spinoza, for example, we would have to distinguish between *explanatory rationalism*, *causal rationalism* and other rationalisms (see, e.g., Bennett 1984:29-30). Of course, there may be parallels elsewhere to European specificities. All European rationalism assumes that the world can be known. This is also the thesis of the Indian Nyāya-Vaiśeṣika, which does not assume, however, that this objective structure can be disclosed through a process of deduction based upon rationality. The European discussion is further complicated by the key issue — the role of experience — not infrequently related to the Platonic theory of innate ideas which adds to the impression that its hue is somewhat provincial. And yet, that impression would be misleading. Whether or not there exists an abstract term to denote it, the entire discussion in classical Chinese ethics between Confucius, Mencius, Mo Tzu and

others about whether humans are born good or whether goodness has to be cultivated, revolves around innateness. In India, the idea of the eternality of language is a closely related topic. And yet, Graham is right, of course: whatever it is, there is no one-one-correspondence between words and concepts in different languages and civilizations. Graham's point about freakiness is well taken and that also applies to his rejection of the approach which starts with "a Western concept such as Reason hovering up somewhere in the air" and then asks "whether it ever came down in China" (in Rosemont 1991:292). We cannot expect to find in Asia close parallels to a specific European development or in China to a specific Indian development.

On Hansen's (A), Graham has this to say:

I find it convenient to call the Mohists and the Sophists 'rationalistic' in tendency because they rely on analytic thinking, and Taoists 'anti-rationalistic' because they deride it (in Rosemont *ibid*).

We are left with the consensus that "Chinese philosophers give reasons for their views."

It is easy to agree with Graham, but the evidence from universal grammar and logic suggests that we may go further. I believe that our Sinologist colleagues will do so and that Harbsmeier will expand not only Graham's *Philosophical Argument in Ancient China*, which was the subtitle of his 1989 book *Disputers of the Tao*, but also the section he devoted himself in his 1998 book to "Argument and Rationality (pp.261-77)." His book is replete with suggestive illustrations that evoke Bronkhorst's concept of rationality, like the Chinese text he quotes on page 108:

The explanations put forward by Confucius were rejected by Mo Tzu. The explanations put forward by Mo Tzu were rejected by Yang Tzu. The explanations put forward by Yang Tzu were rejected by Meng Tzu.

Harbsmeier also provides a brief section on "Reasoning in science" (p. 413) which adds fuel to the only serious general criticism of Graham that I have come across, i.e., that by Nathan Sivin (I cannot judge Geaney 1999). According to Sivin, Graham used the term "rationality" in too limited a sense by applying it only to arguments of a special sort among the Mohists, Sophists, and similar sources; in other words, to Chinese logic. If it were true that Chinese rationality "develops with the controversies of the schools and dwindles as they fade after 200 B.C.", we would according to Nathan have a paradox:

At face value, Graham implies that Chinese thought slid into irrationality at about the time that the cumulative written traditions of

mathematics, computational astronomy, mathematical harmonics, and so on gained momentum (Sivin 1992:25).

Sivin's comment makes one thing clear: the notion of rationality is not confined to logic or philosophy. In whatever terms we define it, it must be a feature of science. When it comes to science, India and China both have plenty to offer. There may, of course, be differences in emphasis. I don't have to mention Joseph Needham, who stressed the organic character of much Chinese science, but may be permitted to refer to my own much more limited effort on the abstractness of much Indian science (Staal 1993; see also Staal 1995 and *forthcoming*). Does that imply, that I am comparing myself to Needham, if only *implicitly*? I know better and refer you to the Sanskrit verse that Charles Malamoud (1989:10, 1996:6) quoted in a similar context:

*kavayah kālīdāsādyāḥ kavayo vāyam apy amī
parvate paramāṇau ca vastutvam ubhayor api*

Poets? Kālīdāsa was one. And so we are poets too,
are not the mountain and the atom both, one and the other,
things?

Having quoted Sanskrit and being unable to quote Chinese, let me at least quote in translation the well-known story of Chuang Tzu or Zhuangzi, anti-rationalist according to A.C.Graham, yet a mini-picture of the Bronkhorstian notion of rational inquiry:

Chuang Tzu and Hui Tzu were strolling along the dam of the Hao River when Chuang Tzu said, "See how the minnows come out and dart around where they please. That's what fish really enjoy."

Hui Tzu said, "You are not a fish — how do you know what fish enjoy?"

Chuang Tzu said, "You are not I, so how do you know I don't know what fish enjoy?"

Hui Tzu said, "I am not you, so I certainly don't know what fish enjoy. On the other hand, you are certainly not a fish — so that still proves you don't know what fish enjoy."

Chuang Tzu said, "Let's go back to your original question. You asked me *how* I know what fish enjoy — so you already knew I knew it when you asked the question. I know it by standing here beside the Hao."

This takes me to my final duty: a mini-summary of what I have tried to establish. I have said little on Bronkhorst's notion of

rationality as a “tradition of rational enquiry” although I hope that the example from Śāṅkara supports and illustrates it. Not having much to contribute on the Indian side, where I agree with Bronkhorst, or on the Chinese where I lack the required competence, I have tried to steer a middle course and concentrate on conceptual matters. I have tried to explain and strengthen these with illustrations from linguistics and logic. I have argued that the discussion of Asian rationalities must stand on a platform of prior investigation into rationality itself. From a preliminary investigation, I have concluded that rationality has so much to do with both language and logic, that it comes indefinitely close to being universal. No wonder that Article One of the Universal Declaration of Human Rights declares that “All human beings ... are endowed with reason.”

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ACKNOWLEDGEMENT

I have gratefully taken into account the comments and criticisms on an earlier draft of this article contributed by other participants in the Leiden workshop of whom I like to mention Professors W.J. Boot, Leonard van der Kuijp and especially Christoph Harbsmeier. I also owe a debt of gratitude to Dr. Dorothy Stein for suggesting the title.

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