Ruminations

Sundry notes and essays on Logic

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ABSTRACT.

Ruminations is a collection of sundry notes and essays on Logic. These complement and enrich the author's past writings, further analyzing or reviewing certain issues.

Among the many topics covered are:

- the importance of the laws of thought, and how they are applied using the logic of paradox;
- details of formal logic, including some important new insights on the nesting, merger and splitting up of hypothetical propositions;
- details of causal logic, including analogical reasoning from cause to cause;
- a cutting-edge phenomenological analysis of negation.

Additionally, this volume is used to publish a number of notes and essays previously only posted in the Internet site www.TheLogician.net, including a history of Jewish logic and an analysis of Islamic logic.

CONTENTS

1. About the Laws of Thought 9

1. Dialectical Reasoning 9
2. Genesis of Axioms 12
3. Paradoxical Propositions 14
4. Contradiction 20
5. Varieties of Contradiction 23
6. Double Standards 25
7. Special Status of the Laws 28
8. Motors of Rational Thought 31
9. Cogito, Ergo Sum 32
10. Concerning Identity 34

2. About Induction 37

1. Critical thought 37
2. Misappropriation 38
3. Evidence 39
4. Detail 40
5. Seems and Is 41
6. Adduction 42
7. Pertinence 43
8. Trial and Error 44
9. Field Specific 45
10. The Human Factor 46
11. Theorizing 48
12. Approaching Reality 51
13. Experiment 51
14. The Uncertainty Principle 54
15. Epistemic Ethics 57
16. Phenomenology 60
17. Appearance, Reality and Illusion 63
18. Existence and Non-existence 66
19. Philosophy and Religion 69

3. About Words 83
1. Meaning 83
2. Traditional Distinctions 89
3. Logic and Linguistics 97
4. Dialogue 104
5. Poles of Duality 106
4. About Formal Logic 111
1. Form and Content 111
2. Singular Subject 113
3. Special Forms 116
4. Fuzzy Logic 117
5. Added Determinants 119
6. Relational Expressions 121
7. Disjunction 124
8. Material and Strict Implication 133
9. Nesting of Hypotheticals 137
10. Compound Theses 141
11. Validation of Nesting 145
12. Brackets in Logic 148
5. About Paradoxes 151
1. On the Liar Paradox 151
2. Making No Claim 153
3. Nagarjuna's Trickery 157
4. Non-apprehension of Non-things 165
5. A Formal Impossibility 171
6. The Analytic/Synthetic Dichotomy 176
7. On the Russell Paradox 179
8. An Illustration of Russell's 181
9. On Grelling's Paradox 184
6. About "Modern Logic" 191
1. A School of Logicians 191
2. Alleged New Methods 191
3. Non-Aristotelian "Logic" 193
4. Postmodern "Logic" 197
5. Mere Manipulations 198

6. Thinking Reflexively 200
7. Conventional Logic 202
8. Absolute Truths 204
9. Untouched by Consciousness 205
10. Logical Atomism 206
11. Exclusive Judgments 209
12. Empty Terms 211
7. About Cognitive Development 215
1. The Fourth R 215
2. Empirical Studies 217
3. Piaget's Model 220
4. Piaget's Experiments 222
5. Lines of Inquiry 228
6. Experimental Techniques 232
7. Private Languages 234
8. About Causal Logic 239
1. Induction of Causatives 239
2. True of All Opposites 241
3. Extensional to Natural 242
4. Hume's Denials 243
5. Hume's Mentalism 247
6. Constant Conjunction 249
7. Billiard Balls 252
8. Against Kant on Freewill 254
9. Alleged Influences 259
10. Analogical Inferences 261
9. About Negation 269
1. Negation in Adduction 269
2. Positive and Negative Phenomena 272
3. Positive Experience Precedes Negation 276
4. Negation is an Intention 280
5. Formal Consequences 284
6. Negation and the Laws Of Thought 287
7. Pure Experience 292
8. Consistency is Natural 294

9. Status of the Logic of Causation 298
10. Zero, One and More 300
11. Psychology of Negation 304
12. Negation in Meditation 305
10. Jewish Logic: A Brief History and Evaluation 309
1. Introduction 309
2. Traditional Claims and Historical Record 311
3. Comparisons and Assessments 317
11. Islamic Logic 327
1. The Structure of Islamic Law 327
2. Islamic Hermeneutics 332
3. Interpreters 342
12. Logical Aspects of Foucault's *Archeology* 347
1. Slippery 347
2. Catch Him 351
3. Healing 360
13. Comments on 3 chapters of Foucault 369
1. *Las Meninas* 369
2. *The Prose of the World* 370
3. *Representing* 375
14. Bolzano's Semantics Concepts 387
1. "Propositions-in-Themselves" 387
2. "Ideas-in-Themselves" 391
3. The Issue of Time 396

The section headings in chapters 1-9 have been newly added in the present reprint for the reader's convenience.
Three chapters have been omitted from the present reprint : "J. S. Mill's Methods" (2005), which has been reprinted with *The Logic of Causation*; and "Addenda to *Judaic Logic*" (1997-2005) and "Diagrams for *Judaic Logic*" (2005), which have been reprinted with *Judaic Logic*. The remaining last chapters have been renumbered 10-14.

1. ABOUT THE LAWS OF THOUGHT

1. Dialectical Reasoning

The three "Laws of Thought" may be briefly explicated as follows:

1. *Thesis*: there are certain appearances; appearances appear.
2. *Antithesis*: there are incompatibilities between certain of these appearances; in such cases, one or both of them must be false.
3. *Synthesis*: some remaining appearances must be true; find out which!

We can in this perspective consider **dialectic** as a fundamental form of thought, through which knowledge is made to progress on and on. It is not a mere detail, an occasional thought-process, but a driving force, an engine, of thought.

The laws are not mere information, but calls to cognitive action. They enjoin proactive and curative cognitive

measures, to ensure (as much as possible at any given time) continued verification, consistency and completeness.

(i) The law of identity tells us to seek out the facts and sort them out as well as we can. The purpose of this law is to instill in people a healthy respect for facts, in the course of observation and judgment. It is essentially a call to honesty, and submission to the verdict of truth. People often think, or act as if they think, that ignoring or denying unpleasant facts or arguments will make them 'go away' – the law of identity says 'no, they will not disappear, you must take them into consideration'.

Some people think that it is impossible for us to ignore that "A is A". Far from it! All of us often do so – as when we refuse to look at or admit the evidence or a logical demonstration; when we avoid reality or evade it having glimpsed it; when we lie to ourselves or to others; and so forth. If the law of identity were always obeyed by us, there would be no need to formulate it. Logic states the obvious, because it is often shunned.

(ii) When the law of non-contradiction says to us "you cannot at once both affirm and deny a proposition", it is also telling us that if we ever in the course of discourse encounter a situation where a proposition seems both true (for some reason) and false (for other reasons), ***we have to go back upstream in our discourse and find out where we went***

wrong in the course of it*[1]*, and we have to effect an appropriate correction such as to eliminate the difficulty.

We are not just saying: "ah, there is a contradiction", and leaving it at that, nonplussed. No, we are impelled to seek a solution to the problem, i.e. to resolve the contradiction. We are inferring that there must be something wrong in our earlier thinking that led us to this conundrum, some error of observation or reasoning that requires treatment. So long as this situation is tolerated, and we cannot pinpoint the source of error, the credibility of all related knowledge is proportionately diminished. Consistency must be restored as soon as possible, or we risk putting all subsequent knowledge in doubt.

(iii) Similarly, the law of the excluded middle does not just inform us that "no proposition can be claimed neither true nor false". This law insists that if we find ourselves in such a situation, and it is indeed the case that both a proposition and its exact negation both seem false, we cannot let the matter rest or hope to find some compromise position – we have to eventually, as soon as possible, find good reason to opt for one side or the other. There is no logically acceptable middle ground, no avenue of escape.

These action implications inherent in the laws of thought may also be characterized as dialectical thinking. In this perspective, the "thesis" is our knowledge (or opinion) as it

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1 "Check your premises", Ayn Rand would say.

happens to be at a given time; the "antithesis" is the discovery of a logical flaw in that thesis, which causes us to have doubts about it and seek its review; and finally, the "synthesis" is the corrections we make in our premises, so as to resolve the difficulty encountered and obtain a less problematic new state of knowledge.

2. Genesis of Axioms

Axioms are not arbitrary, a-priori starting points of true human knowledge. They may be deductive or inductive, but in either case are to some extent *empirical* (in the large sense of 'phenomenological', i.e. without depending on any materialist or mentalist assumption concerning what is experienced).

Deductive axioms are established using certain positive or negative logical *arguments*, which we naturally find convincing. But even a deductive axiom relies on certain experiences, those *that gave rise to* the concepts and logical techniques involved in the proposition and its acknowledgment as an axiom.

The positive argument for an axiom is essentially dilemmatic: "whether this or that, so and so is true". An example is the axiom that diversity exists. The mere *seeming* of diversity is itself a case of diversity, sufficient to establish the fact of diversity. It is no use arguing (like Parmenides or the Buddha) that this apparent diversity is an "illusion", and that

"all is really one" – because the coexistence of illusion and reality is itself an event of diversity. Thus, diversity truly exists, and cannot just be ignored. We might still try to uphold the thesis that reality is ultimately unitary, but only if we convincingly account for the fact of diversity.

Deductive axioms are also justified negatively through paradoxical logic, i.e. by showing that their contradictories are *self-contradictory*. For example, "There is no diversity" is a claim to diversity (since it involves many words, many letters, many sounds, etc.), and therefore self-contradictory; whence, it is *self-evident* that "There is some diversity". This argument may also be construed (as above) as dilemmatic in form: "whether you deny or affirm diversity, you affirm it".

Inductive axioms rely on some generalization, or (more broadly) adduction, from experience; but such inductive process in their case is not ever likely to be in need of revision. Many truths of utility to epistemology are inductive, and yet once realized remain immutable; they thus behave largely like deductive axioms, and may by analogy be classed as inductive axioms.[2]

For example, the fact that most of our beliefs are contextual is a non-contextual truth, though based on common observation. The awareness that most of our knowledge is empirical, and subject to revision as new experiences are

[2] Indeed, it could be argued that, since 'deductive' axioms all have some empirical basis (as already explicated), they are ultimately just a special case of 'inductive' axiom.

encountered, that it is in constant flux, altering and growing – this is a broad observation that once realized will not be affected by any further empirical data. This observation is not useless, note well: it logically affects pursuit of knowledge, teaching us to remain aware of the non-finality of most of our beliefs.

But note also, the said principle of contextuality is pretty vague; it cannot by itself put specific knowledge in doubt (i.e. without some other more specific reason for doubt). Another example of such general but unspecific truth is the principle (derived from the law of the excluded middle) that "there is always some explanation". This optimistic principle serves to encourage research, but does not tell us what the solution of the problem is specifically.

3. Paradoxical Propositions

A (single) paradoxical proposition has the form "if P, then notP" or "if notP, then P", where P is any form of proposition. It is important to understand that ***such propositions are logically quite legitimate within discourse: a (single) paradox is not a contradiction***. On the other hand, a double paradox, i.e. a claim that both "if P, then notP" *and* "if notP, then P" are true in a given case of P, is indeed a contradiction.

The law of non-contradiction states that the conjunction "P and notP" is logically impossible; i.e. contradictory

propositions cannot both be true. Likewise, the law of the excluded middle states that "notP and not-notP" is logically unacceptable. The reason for these laws is that such situations of antinomy put us in a cognitive quandary – we are left with no way out of the logical difficulty, no solution to the inherent problem.

On the other hand, single paradox poses no such threat to rational thought. It leaves us with a logical way out – namely, denial of the antecedent (as self-contradictory) and affirmation of the consequent (as self-evident). The proposition "if P, then notP" logically implies "notP", and the proposition "if notP, then P" logically implies "P". Thus, barring double paradox, *a proposition that implies its own negation is necessarily false, and a proposition that is implied by its own negation is necessarily true*.

It follows, by the way, that the conjunction of these two hypothetical propositions, i.e. double paradox, is a breach of the law of non-contradiction, since it results in the compound conclusion that "P and notP are both true". Double paradox also breaches the law of the excluded middle, since it equally implies "P and notP are both false".

These various inferences may be proved and elucidated in a variety of ways:

- Since a hypothetical proposition like "if x, then y" means "x and not y is impossible" – it follows that "if P, then notP" means "P and not notP are impossible" (i.e. P is impossible), and "if notP, then P" means "notP and not P

are impossible" (i.e. notP is impossible). Note this explanation well.

We know that the negation of P is the same as notP, and the negation of notP equals P, thanks to the laws of non-contradiction and of the excluded middle. Also, by the law of identity, repeating the name of an object does not double up the object: it remains one and the same; therefore, the conjunction "P and P" is equivalent to "P" and the conjunction "notP and notP" is equivalent to "notP".

Notice that the meaning of "if P, then notP" is "(P and not notP) is *impossible*". Thus, although this implies "notP is true", it does *not* follow that "if notP is true, P implies notP". Similarly, *mutadis mutandis*, for "if notP, then P". We are here concerned with strict implication (logical necessity), not with so-called material implication.

The reason why this strict position is necessary is that in practice, truth and falsehood are contextual – most of what we believe true today might tomorrow turn out to be false, and vice-versa. On the other hand, logical necessity or impossibility refer to a much stronger relation, which in principle once established should not vary with changes in knowledge context: it applies to *all* conceivable contexts.

- Since a hypothetical proposition like "if x, then y" can be recast as "if x, then (x and y)" - it follows that "if P, then notP" equals "if P, then (P and notP)", and "if notP, then

P" equals "if notP, then (notP and P)". In this perspective, a self-contradictory proposition implies a contradiction; since contradiction is logically impermissible, it follows that such a proposition must be false and its contradictory must be true. This can be expressed by way of apodosis, in which the laws of thought provide the categorical minor premise, making it possible for us to exceptionally draw a categorical conclusion from a hypothetical premise.

If P, then (P and notP)

but: not(P and notP)

therefore, not P

If notP, then (notP and P)

but: not(notP and P)

therefore, not notP

- We can also treat these inferences by way of dilemma, combining the given "if P, then notP" with "if notP, then notP" (the latter from the law of identity); or likewise, "if notP, then P" with "if P, then P". This gives us, constructively:

If P then notP – and if notP then notP

but: either P or notP

therefore, notP

If notP then P – and if P then P

but: either notP or P

therefore, P

Paradox sometimes has remote outcomes. For instance, suppose Q implies P, and P implies notP (which as we saw can be rewritten as P implies both P and notP). Combining these propositions in a syllogism we obtain the conclusion "if Q, then P and notP". The latter is also a paradoxical proposition, whose conclusion is "notQ", even though the contradiction in the consequent does not directly concern the antecedent. Similarly, non-exclusion of the middle may appear in the form "if Q, then neither P nor notP". Such propositions are also encountered in practice.

It is interesting that these forms, "Q implies (P and notP), therefore Q is false" and "Q implies (not P and not notP), therefore Q is false", are the arguments implicit in our application of the corresponding laws of thought. When we come across an antinomy in knowledge, we dialectically seek

to rid ourselves of it **by finding and repairing some *earlier* error(s) of observation or reasoning**. Thus, paradoxical argument is not only a derivative of the laws of thought, but more broadly the very way in which we regularly apply them in practice.

That is, the dialectical process we use following discovery of a contradiction or an excluded middle (or for that matter a breach of the law of identity) means that we believe that:

> **Every apparent occurrence of antinomy is in reality an illusion.**

It is an illusion *due to paradox*, i.e. it means that *some of the premise(s)* that led to this apparently contradictory or middle-excluding conclusion are in error and in need of correction. The antinomy is never categorical, but hypothetical; it is a sign of and dependent on some wrong previous supposition or assumption. The apparent antinomy serves knowledge by revealing some flaw in its totality, and encouraging us to review our past thinking.

Contradiction and paradox are closely related, but not the same thing. Paradox (i.e. single not double paradox) is not equivalent to antinomy. We may look upon them as cognitive difficulties of different degrees. In this perspective, whereas categorical antinomy would be a dead-end, blocking any further thought—paradox is a milder (more hypothetical) degree of contradiction, one open to resolution.

We see from all the preceding (and from other observations below) the crucial role that paradox plays in logic. The logic of paradoxical propositions does not merely concern some far out special cases like the liar paradox. It is an essential tool in the enterprise of knowledge, helping us to establish the fundaments of thought and generally keeping our thinking free of logical impurities.

Understanding of the paradoxical forms is not a discovery of modern logic[3], although relatively recent (dating perhaps from 14th Cent. CE Scholastic logic).

4. Contradiction

Many people misunderstand what we logicians mean by 'contradiction'. The contradictory of a term 'A' is its negation, 'not A', which refers to anything and everything in the universe other than A, i.e. wherever precisely A is absent in the world. The relation of contradiction between A and not-A is mutual, reversible, perfectly symmetrical.

The presence of something (A) excludes its absence (i.e. not A) in that very same thing, and vice versa, if all coordinates of space and time are identical. However, this does not

[3] For instance, Charles Pierce (USA, 1839-1914) noticed that some propositions imply all others. I do not know if he realized this is a property of self-contradictory or logically impossible propositions; and that self-evident or necessary propositions have the opposite property of being implied by all others. I suspect he was thinking in terms of material rather than strict implication.

exclude the logical possibility that the same thing may be partly A and partly not A. Thus, the law of thought 'either A or not A' can also be stated more quantitatively as "either 'all A' or 'all not A' or 'part A and part not A".

Some people appeal to this possibility of three alternatives as an argument *against* the laws of thought! But that is a misunderstanding – or worse, deliberate sophistry.

If something, e.g. 'B', implies but is not implied by not-A, it (i.e. B) is as 'incompatible' with A as not-A is, but it is not contradictory to A: it is merely *contrary* to A. The contradictory not-A of A differs from A's contraries in that *the absence* of not-A implies A, whereas in the case of mere contraries like B (or B1 or B2… etc.) this added logical relation of 'exhaustiveness' does not apply.

When contradictories are placed in a disjunction, 'either A or not-A', the disjunction involved signifies both mutual exclusion ('or', meaning 'not together') and exhaustiveness ('either', meaning 'and there is no other alternative'). It intends: if 'A', then not 'not-A'; and if not 'A', then 'not-A'.

On the other hand, any number of contraries can be placed in a disjunction: 'A or B or B1 or B2… etc.', so that the presence of any disjunct implies the absence of all the others; but such disjunction is not exhaustive, unless we specify that the list of contraries in it is complete. If that list *is* indeed complete, then the negation of all but one of the disjuncts implies the affirmation of the remaining one. Thus, 'not-A'

can be equated to the exhaustive disjunction of all things in the world ‘contrary to A’.

Something *different* from A, e.g. ‘C’, is not necessarily contradictory or even contrary to A. **The mere fact of difference does not imply incompatibility**. Different things (like A and C) may be compatible, i.e. capable of coexistence in the same thing, at the same time and place. ‘Difference’ simply signifies that we are *able to distinguish* between the things concerned: i.e. they are not one and the same when they appear before our consciousness. ‘Similar’ things may be the same in appearance, but not one (e.g. two instances of the same kind); or they may be one (i.e. parts of a single whole), yet not the same.

Thus, for example, the logical relation between the colors black and white depends on how precisely we focus on them. They are different, since distinguishable. Since they may coexist on different parts of the same surface, they are broadly compatible. However, as such or *per se*, they are contrary; that is to say: if I perceive a surface or part of surface as totally white, and you perceive *the very same* place and time as totally black, our claims are incompatible[4]. This irreconcilability is not a contradiction, however, because it is possible for a surface to be neither black nor white.

[4] Our disagreement is not terminological, note. We have in the past agreed as to what experiences ‘black’ and ‘white’ correspond to; here, we suddenly diverge.

5. Varieties of Contradiction

The expression '**contradiction in terms**' refers to a compound term composed of incompatible elements, such as 'A and not A' or 'A and B (where B is contrary to A)'. Such a mixed-up term may be said to be paradoxical, as well as internally inconsistent, since it implies that contradiction is possible, so that the laws of thought are denied by it, and then (by generalization, if you like) 'anything goes' including denial of the 'A and not A' conjunction.

> For example, the term "illusory reality" is a contradiction in terms. On the other hand, note, terms like 'an inhuman human' or 'an anti-Semitic Jew' are not strictly speaking contradictions in terms; they refer to natural possibilities of conjunction, only the terminology used makes them superficially seem contradictory (i.e. there are people who behave inhumanly, or Jews that hate their own people).

The proposition 'A is not A' (or 'some thing that is A is also not A'), being self-contradictory, implies 'A is A', its contradictory form. This statement should be explicitly acknowledged, though obvious, because it correlates two important concepts, viz. 'internal inconsistency' and 'the logic of paradoxes'.

The statement 'A is not A' is logically impossible, because it both affirms and denies the same thing. Therefore, the

opposite statement is true. That statement, i.e. 'A is A', is logically necessary, because *even its contradictory* 'A is not A' implies it.

Whoever claims 'A is not A' is admitting 'A is A' – ***ipse dixit***, he himself said it! Whereas, whoever claims 'A is A' is consistent with himself.

Self-contradiction consists of three items:

1. The proposition in question, call it P.
2. The admission that it is *an assertoric statement*, i.e. one that affirms or denies something.
3. The admission that all assertoric statements *involve claims* to consciousness, to knowledge, to truth, etc.

Thus, given P (e.g. "reality is unknowable"), admit that P implies "this is an assertion" – but all assertions imply some knowledge of reality – *therefore*, P implies non-P. There is a process from P to its negation, which Logic demands we acknowledge. That demand cannot be refused without committing the very same self-contradiction. This is not a circular or ad infinitum proof, but an appeal to honesty, without which no dialogue is possible.

That all assertoric propositions assert is an aspect of the Law of Identity. The Law of Non-contradiction may be discerned in the argument: All assertions assert something; P is an assertion; therefore, P asserts; whence, if P denies asserting, P implies non-P. The Law of the Excluded Middle is also

implicit here, in the awareness that we have no choice but to firmly disown P.

6. Double Standards

Contradictions appear in discourse in many guises. They are not always overt, but may be hidden in the fact of making a statement or in the standards of judgment used.

A claim may be paradoxical because it **inherently entails** its own contradiction, although it does not on the surface seem to be self-inconsistent. Such implication is not always formal but requires awareness of the meaning of the terms used. This form of indirect self-contradiction has been called "the Stolen Concept fallacy"[5].

For instance, the skeptical claim "I know nothing" may be rejected as self-contradictory, because as soon as someone makes it – someone *who understands and intends the meaning* of the terms "I", "know" and "nothing" – that is by itself proof absolute that the person concerned "knows" *some*thing, whence the original claim (of total ignorance) is shown up to be unavoidably contradictory and thus necessarily false.

Thus, in cases of this sort, the tacit implication involved is that one of the terms used (knowing nothing) implicitly includes the act in question (knowing that I know nothing), as

[5] By Ayn Rand and (I think) Nathaniel Branden.

a case in point contradictory to the explicit claim. (Rephrasing the said statement as "I do *not* know anything" does not change its underlying assumptions, needless to say.)

There are countless examples of such inherent self-contradiction. Saying "I have nothing to say" is saying something. Claiming "We have no memory" is self-contradictory, because each term in it presupposes a word, concept and background experiences remembered by the speaker – and the hearer too. An amusing common example is "I do not speak a word of English"!

Another important form of covert self-inconsistency is the use of **a double standard**. This consists in applying less stringent standards of judgment to one's own discourse than to the discourse of one's intellectual opponents. A lot of philosophical, and particularly political and religious, discourse resorts to such inequitable methodology.

The contradiction involved in a double standard is apparent the moment we step back and view its user's knowledge and methodology as a whole. In this wider perspective, the user of a double standard is clearly inconsistent with himself, even if his discourse viewed piecemeal may superficially seem self-consistent.

> Whole philosophies may be based on such fallacious reasoning. For instance, Phenomenalism sets as a general standard a limitation of knowledge to sensory data without allowing extrapolations from them to assumed external material objects – yet it does not

> criticize its own adductions using the same rigid standard.

There are two ways this fallacy may be committed: one may use relaxed standards on one's own discourse, while seemingly applying universal norms to one's opponents' discourse; or one may appear to apply universal norms to oneself, while concocting overly strict norms for them. One may *exempt oneself* from the usual logical rules, or one may make unusual logical *demands on others*.

In either case, the holder of a double standard is in conflict with logic's requirement of uniformity. An assumption of reason is that all humans are epistemologically on the same plane. Equity is an aspect of 'common sense'. Experience and logic have to be used to convince oneself and others, not sophistical manipulation or authority.

Standards of judgment have to be fair and universal; all discourse must be equally treated. If differences are advocated, they have to be convincingly justified. The principle of equality admittedly involves generalization; but the onus of proof is on any proposed particularization of it.

An example of a double standard is the appeal to cultural relativism. One may seek to rationalize ideas or thought processes that are contrary to ordinary reason, by claiming them to belong to a different cultural framework. Such tolerance seems on the surface friendly and open-minded, but it is proposed without full consideration of its negative human and epistemological implications.

7. Special Status of the Laws

The three **Laws of Thought** must not be construed as some prejudice of Aristotle's, which some scientific discovery – like the particle-wave duality or the relativity of space-time measurements – could conceivably raise doubt about or displace. These laws of thought are intended as perfectly neutral; they make no direct, specific ontological or epistemological claim, but rationally sort out the very act and concept of such claims – whence their name.

These laws express the ways we assimilate complex experiences, and resolve difficulties in the course of thought (concepts, propositions and arguments). Only by such logic can we 'make sense' of the world around us and in us. By making these truths explicit, Aristotle made it possible for humans to henceforth consciously practice the logic they were already unconsciously tending to.

These laws *exclude, ab initio*, the notion that something could both have and lack some property, or neither have nor lack it – *at the same place and time and in the same respects*. The latter specification, which Aristotle clearly and repeatedly stressed, is often ignored by those who consider these laws expendable.

That, say, a stone is blue on one side and red on the other, is not a contradiction, since the different colors are in different parts of it. That over time the colors may change is not an

antinomy either: the concept of time is intended to ensure that. That you and I view the same object from different angles, and see different aspects of it, is no surprise. That my view of the world and yours are not quite identical, is quite understandable in view of the different context of experience and thought we each have.

The laws of thought do not evade or deny the *appearance* of contradictions or unsolved problems; they just tell us that such appearances are *illusions, not realities*. They are designed precisely to help us take such apparent discrepancies into consideration and resolve them in some way. We continue to need the same laws of thought in the more complex cases uncovered by modern physics.

The theory of relativity is precisely an attempt to rationalize the surprising empirical constancy in the velocity of light, whichever direction we measure it from. The theory is not a statement that there are no absolute truths, but a statement that such and such a way of looking at the surprising events discovered makes them rationally comprehensible. The theory affirms that this way is probably (i.e. inductively) the best explanation, and effectively denies those who contradict it (unless they come up with an inductively better explanation, more in line with the empirical findings). It does not deny the laws of thought, but is an application of them.

Similarly, the discovery that the same things may behave occasionally as particles and occasionally as waves does not constitute an argument against the laws of thought. Whether

we interpret this duality epistemologically or ontologically, as due to different circumstances of observation or different material circumstances, it is affirmed to be a mysterious finding that must be faced. This realist attitude is precisely what the laws of thought demand. Any attempt to interpret the finding, one way or the other, is again an attempt to make the finding rationally comprehensible, so that we do not feel them logically impossible.

Under no circumstances may scientists or philosophers seriously claim the laws of thought to be abrogated. Such a claim is self-contradictory – because then its opposite is equally acceptable. It is therefore as if nothing has been said. It is the denial of reason, the institution of madness. The three laws of thought thus together constitute *the most incontrovertible and universal frame of reference of rational thought*.

Note also, the emphasis the laws of thought lay on *existence*. A common error of deniers of these laws is to regard 'non-existence' as just some other sort of existence, a parallel world or a location beyond space and time *from* which new existents come and *to* which finished existents go! These people are misled by linguistic habit into a *reification* of the word 'non-existence'.

Whatever positively appears, exists to that extent. Existence becomes open to doubt to the extent that we add assumptions to appearance – i.e. we adductively guess what might lie beyond them. At this stage, the reality vs. illusion dichotomy

arises. At this stage, too, the rational act of *negation* comes into play – when we say: this is apparent, but (since it gives rise to some antinomy) it is *not* real, it is illusory.

The 'concept' of *non*-existence thus has no direct empirical basis of its own. It is based on a rational act relative to experiences of existence. It is just a figment of the imagination, a mental dumping place for *ideas* that have failed the test of existential basis.

8. Motors of Rational Thought

It is important to realize that the laws of thought are **the motors of rational thought**. They generate questions and the pursuit of answers; they feed curiosity and fuel research. If we are satisfied with the way things seem, however contradictory or incomplete they seem, thought is arrested. We lose perspective and become ignorant. We lose intelligence and become stupid. We lose touch with reality and become insane.

Consider the *irrelevancy* to science of a hypothetical denial of the laws of thought. For instance, according to Einstein's theory of relativity, nothing can travel faster than light, yet it has been found that particles may affect each other instantaneously even though they are far apart. If in the face of such an apparent contradiction we just said: "oh, well, I guess the law of contradiction must be wrong!" and left it at that – would we be consoled? Clearly, not – this would not

honestly solve the problem for us, but merely sweep it under the carpet. Our minds would not rest till some deeper, more convincing explanation was found.

Accepting contradiction is just simplistic and evasive. Similarly, with breaches of the law of the excluded middle: if you ask me a question, and inquire is X the answer or not X? and I reply, it is neither, but some third thing: will you be satisfied with such reply? Your knowledge of the issue at hand is not made complete by such reply; a gap remains, which can only be filled by either X or nonX. The law of the excluded middle is just a recognition of the *inadequacy* of such neither-nor replies.

9. Cogito, Ergo Sum

Descartes' "*cogito, ergo sum*"[6] is composed of two self-evident propositions: "I think" (in the sense, I am conscious) and "I am" (I exist). For the contradictory of each of these propositions is self-contradictory, i.e. involves a stolen concept and gives rise to a paradox. Thus, "I am not conscious" could not be thought or said (or for that matter heard or understood) without being conscious. Similarly, "I am not" could not be expressed (or observed) without existing. Thus, Descartes was quite right in regarding these

[6] See Hamlyn, p. 137. The comments made here are not intended as an exhaustive analysis of the *cogito* statement, needless to say.

propositions as axioms; i.e. as first principles, which do not depend on prior principles.

Note moreover that these two clauses are axiomatically true independently of each other – So what about the *ergo*, which suggests that the *sum* follows from the *cogito*? Is the "therefore" perhaps meant to imply an order of knowledge, rather than an inference? One could formally deduce existence from consciousness, in the sense that a conscious being is a fortiori an existent being; but one would never in practice resort to such inference.

In practice, in my opinion, we are conscious of other things before we become conscious that we are conscious of them – so it would not be correct to place the "I think" before the "I am". It could be argued that a baby may first experience inner states, but I would reply that such states are results of prior sensations. We may however support Descartes' order, by considering it a logical one, in the sense that if the Subject did not have the power of consciousness, he or she would not be aware of existence. That is, it perhaps means: "I can think, therefore I can know that I am".

But I think the correct interpretation is the following: when we are aware of something, any thing, this provides *an occasion to become aware of oneself*, i.e. that there is a Subject who is being conscious of that thing, whatever it is. Thus, the first clause of the sentence is not strictly: "*I* think", but: "consciousness of things is taking place" (or "thought is occurring"). Whence the second clause is truly *inductively*

inferred, i.e. we may well hypothesize that "there is something being conscious of things", i.e. "thought has a Subject as well as an Object", i.e. "there is an I" (or "I exist").

It is *the self* that is inferred from the appearance of objects – reason argues: they must appear before someone. This is what distinguishes appearance from mere existence: it occurs *through* 'cognition' *by* 'someone'. Thus, Descartes is justifying our habitual assumption of a cognizing Subject from the fact of cognition. It is not mere grammatical convention, he tells us, but "think" *implies* "I".

10. Concerning Identity

Where does a material object begin or end[7], in view of the constant flow of particles and energy in and out of it, even (over a long enough time) in the case of apparent solids? We have to use the *apparent limits* of things as their space-time definition. Or more precisely, in acknowledgment of the above difficulties, their *illusory limits*. Thus, knowledge of matter is built on arbitrary, knowingly inaccurate, delimitations of "things".

We can similarly argue concerning mental objects (i.e. images, sounds, etc.). At first thought, their limits seem obvious; but upon reflection, they become doubtful –

[7] I have already discussed this ontological issue in *Phenomenology*, chapter IV:5.

imprecise and insecure. And this being the case, we cannot convincingly argue that the limits of material bodies are mental projections. If the limits of mental lines are unsure, then the limits of whatever they are intended to delimit are still unsure.

Ultimately, then, since we cannot even mentally delimit mental or material things, all delimitations are merely verbal artifices, i.e. *claims we cannot substantiate*. This remark concerns not only 'borderline' cases, but all material or mental objects.

These are very radical queries, productive of grave skepticism. They are principles of vagueness and doubt much more unsettling than the Uncertainty Principle, since they more basically question the validity of any geometry (and therefore, more broadly, of mathematics and physics).

When some Greek or Indian philosophers expressed skepticism at the possibility of human knowledge, this is perhaps what they were referring to. If one cannot delimit things, how can one produce precise concepts and propositions? And without precision, how can we judge them true or false?

Whereas denial of knowledge as such is self-contradictory, denial of *accurate* knowledge is not so. It is possible to observe the general vagueness of experience without denying the law of identity. If cloudiness is the identity of things, or we are simply incapable of sufficiently focusing our senses to

get past such cloudiness, we simply remain stuck at that level of experience, like it or not.

The best counterargument I can muster is that phenomenological knowledge is still knowledge of sorts, and this can be used as a springboard to arrive at deeper knowledge, by means of *adduction*. That is, we can still formulate ontological hypotheses, capable of ongoing confirmation or rejection with reference to reason and experience, even if the epistemological status of the latter is at the outset merely phenomenological.

This does not directly overcome the difficulty of measurement, but it gives us some hope that we might succeed indirectly. I leave the issue open, and move on.

2. ABOUT INDUCTION

1. Critical thought

Critical thought, or criticism, is considering the truth or falsehood of an idea – not only its truth, and not only its falsehood, either. It is not essentially a negative, anymore than positive, penchant, but an attitude of rigorous review in judgment, of keeping our standards high.

What makes a theory "scientific", in the strict sense, is not whether it emanates from some prestigious personage or institution or corporation, but whether a maximum of care has been taken to formulate it and test it in accord with all known criteria of inductive and deductive logic. Science does not primarily mean, as some imagine, lab technicians with white aprons or university professors, or the exact sciences or mathematical equations. The term "science" initially refers to serious study, or to pursuit of knowledge as against mere opinion. It signifies a sustained effort of sound methodology, as currently possible and appropriate to the field of study concerned.

2. Misappropriation

The most common logical fallacy is perhaps **the misappropriation of logical expressions** – using the language of logic, without having in fact resorted to logical processes. This often suffices to convince some people.

For examples: one might say: "it is a reasonable assumption that…" when one has made no attempt to logically check the issue out; or: "it may be inferred that…" when no deductive or even inductive logical process allows such inference. One gives the impression of logic, but without factual basis. Words like "it must be that", "a fortiori", "in conclusion", "because of", etc., are freely used as alibis, in lieu of logic, in the way of mimicry, when logic was in fact ignored or opposed.

Of course, such behavior in discourse is not always intentional dishonesty. It is often due to ignorance of logic or lack of logical skill, or even just to inattentive, vague and imprecise thinking. In particular, many people are not aware of *the difference between strictly deductive inference and merely inductive inference* – these two logical modes being all the same to them. Sometimes, even though their reasoning was sound and its results plausible, they are just not aware exactly how they did it.

> An example of intentional dishonesty is the discourse of Nagarjuna, which as I show in *Buddhist Illogic* is replete with pretended logic.

> Another notable example of pseudo-logical discourse is Sigmund Freud's "*Moses and Monotheism*". His method there can be characterized as *false advertising* and *creeping annexation*. He says he won't engage in some form of argument (which would be too obviously logically illicit or unscientific); and then, in the very next breath or gradually thereafter, he goes ahead and inserts that very argument into his discourse (to justify his prejudices). He loudly acknowledges the argument to be invalid (so as to give the impression that his approach is virtuously objective and scientific); then, coolly ignoring the very methodological imperatives he has just admitted, he hammers home his (foregone) 'conclusions'. It is psychological manipulation. He relies on the prestige acquired in his field to pass over lies concerning another field.[8]

3. Evidence

Every experience (concrete appearance – physical or mental percept, or intuition) is 'evident', in the sense that it is manifest before consciousness and that such appearance automatically gives it a minimum of credibility.

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[8] It is my wish to analyze that whole book in detail someday, so as to show up the cunning and variety of his tricks.

Concepts or theses (products of abstraction) are not themselves evident in this sense (though they too 'appear' in a sense), but rely for their credibility on their relation to certain experiences. An experience is 'evidence for' some concept or thesis, when it serves to confirm it adductively. A concept or thesis is 'evidently true' to the degree that such evidence for it is to be found.

A concept or thesis is said to be 'immediately evident', when very little effort is required to establish its truth, i.e. when the evidence that suffices to do so is readily available to everyone.

A concept or thesis is 'self-evident' (or evident by itself), if it is provable without reference to further experiential evidence (other than the minimum experience underlying its very conception or formulation). Such proof is achieved by noticing or showing the negation of the concept or thesis to involve an inconsistency or a self-contradiction of some sort.

We label 'obvious', then, all experiences (as such, i.e. in and for themselves), as well as 'immediately evident' and 'self-evident' concepts or theses.

4. Detail

An important criterion for the credibility of theories is the **degree of detail** they propose. For instance, the immediate Creation theory is vague, whereas the gradual Evolution theory offers detailed descriptions of entities and processes.

But of course, even the most detailed theory may turn out to be false. The existence of elaborate fictions in the form of novels (or scientific hoaxes presented as fact) shows that detail is not by itself proof.

One should also distinguish between **explaining** (e.g. fossils are leftovers of creatures that lived on earth in times past) and **explaining-away** (e.g. fossils are mere artifacts placed on earth by God to test people's faith). The former is generally preferable to the latter. Though here again, the criterion is not determining.

5. Seems and Is

The following are some of the **inductive arguments** which help clarify *the logical relations between the copulae 'seems' and 'is'*:

Uncertain mood:

P seems true and NotP seems equally true;

therefore (for this observer, at this time):

P 'may be' true, and equally NotP 'may be' true.

Probabilistic mood:

P seems true more than NotP seems true;

therefore (for this observer, at this time):

P ‘is probably’ true, and NotP ‘is probably not’ true.

Decisive mood:

P seems true and NotP does not seem true;

therefore (for this observer, at this time):

P ‘is’ true, and NotP ‘is not’ true.

6. Adduction

Adductive inference often takes the form of a deductively invalid syllogism, such as:

All Z are Y, and

these X are Y;

therefore, these X are probably Z.

Of course, strictly speaking the conclusion does not follow from the premises; however, the premises do *suggest some likelihood* for the conclusion.

For example, "all beans in your bag are white, and the beans in your hand are white; therefore, the beans in your hand are probably from your bag."

7. Pertinence

Pertinence might be explicated as the construction of an appropriate major premise, so that a given minor premise is enabled to yield the proposed conclusion. (I am thinking here of my findings in a-fortiori logic, generalizing the way we comprehend certain Biblical statements as inferences by interposing a presumed tacit major premise.[9])

How is the missing major premise discovered? It is not found by some direct, infallible insight – but as in all our knowledge (although we may not be consciously aware of these mental processes), it is arrived at inductively, by means of trial and error.

There may in fact be several alternative major premises, equally able to fulfill the required task of making the inference possible – equally pertinent. We may be aware of only some of these available possibilities.

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[9] See *Judaic Logic*, chapter 4.2.

We start by proposing a likely candidate for the post of major premise. This may at first glance seem like the most likely hypothesis. Later, we may change our minds, considering that the candidate does not fit in our overall context of knowledge in some respect(s). For instance, the proposed major premise might be more general than necessary, so that although it allows us to draw the desired conclusion in the present narrow context, it causes some havoc in a wider perspective. In such case, we propose a less general major premise or a considerably different one; and so on, till we are satisfied.

A hypothesis proposed is 'pertinent', if it can do the job at hand, which is to infer the desired conclusion from the given (minor) premise, even if it turns out to be rejected because it does not fit into the broader context. A proposed major premise incapable of fulfilling this role is 'impertinent'.

8. Trial and Error

With regard to the trial and error involved in adduction: "trial" means trying an idea out in practice, testing a theory by observation; and "error" means that some of the ideas we test will fail the test and thus be eliminated from further consideration or at least adjusted.

This is a rather broad notion. There are perhaps numerous, distinguishable types of 'trial and error' – in different fields

of study, in different situations – which we ought to distinguish and list. I do not attempt it here.

It should in any case be stressed that this simple method is pervasive in our pursuit of knowledge. Already at the level of sensation, we are using it all the time. For instance, when we smell food to check out if it is fresh, we are using this method. At the level of concept formation, we again repeatedly appeal to it. E.g. when we try out different definitions for a group of things that seem similar, we are using this method. Similarly, when we formulate individual propositions or compounds of many propositions, we use trial and error.

Trial and error is not just a 'scientific method' for high level theoreticians and experimenters – it is the basic way to knowledge by mankind, and indeed by all sentient beings. It is 'adaptation' to the environment in the domain of knowledge, a subset of biological adaptation applicable to conscious organisms.

9. Field Specific

Each field of study has methods and parameters **peculiar** to it, as well as many that are found in common with other fields. We may thus refer to specialized principles of logic.

For example, the logic of historical research (historiology) would demand that the various forms of evidence – physical remnants (artifacts, drawings, writings, etc.), behavioral

indices (traditions handed down), as well as verbal sources (witnesses, second-hand contemporary testimony, historians' later claims, etc.) – be clearly categorized and distinguished from each other, and their relative weight as evidence be assessed as objectively as possible.

10. The Human Factor

Induction depends greatly on the human factor – on our intelligence (in some cases, genius), on our open-mindedness, on the clarity and rigor of our thinking, and on the detachment and carefulness of our reasoning and experimentation.

When theorizing and setting up tests to confirm or reject our theories, it is important to make a big effort to foresee all conceivable explanations and all their possible implications. If the theories considered are not all the theories conceivable in the present context, or if we do not correctly work out their respective experimental predictions, our inductive conclusions are bound to be faulty and misleading.

> The danger could be illustrated with the following example from the history of science[10]. At one time, people thought that tiny living organisms could be 'spontaneously generated' – e.g. maggots could appear

[10] I noted this example in the course of a lecture long ago, so I cannot guarantee my present rendition is entirely accurate. But no matter, I only include it here for purposes of illustration.

out of nowhere in rotting meat. This seemed contrary to the thesis that all life was created in the first week, for instance. To resolve the issue, a scientist called Francesco Redi (Italy, 1626-97) devised an experiment in 1668, enclosing meat in a container flies could not penetrate and observing whether flies emerged in it. As it turned out, no flies emerged from within the meat, leading Redi to the conclusion that flies lay eggs and in this case were prevented from doing so.

So well and good. However, suppose Redi *had* found flies in the meat, would he have drawn the conclusion that flies are spontaneously generated? He would have been tempted to do so, since (as far as I was told) he did not foresee alternative theses, such as that flies' eggs might be carried to the meat like pollen or always present in it like bacteria. If that had been the case, Redi's inference from the appearance of flies in the meat would have been erroneous. We see from this example the importance of conceiving all possible alternative explanations for a phenomenon, before testing one's theories.

Note in passing that this is an example of what J. S. Mill much later called 'the method of residues'. The alternative explanations are listed, then tried out and eliminated one by one, leaving one theory we can still rely on. Of course, the reliability of the residual theory depends on the exhaustiveness of the original list of theories. If all theories

are eliminated, we know (from the law of the excluded middle) we need to somehow conceive one more. Sometimes we lack the necessary intelligence or information for that.

A current example of this is the debate in the USA between Creationists and Darwinists. The latter support Darwin's theory of evolution, and point to the plentiful and varied empirical evidence over billions of years for it (though the issue of origin remains unresolved); while the former support the Biblical idea of sudden emergence of life just a few thousand years ago and suggest "intelligent design" as an alternative outlook. Each group considers that the other's ideas should not be taught in the classroom.

But, it seems to me, the idea of Divine creation (apart from other specifics of the Biblical narrative) is strictly speaking compatible with Darwinism, if we grant that God chose to institute 'chance' evolution (i.e. spontaneous genetic mutations and environmental selection) as the way the life He created in nature would proceed thenceforth. A third alternative is thus conceivable, which reconciles the conflicting theses and allows biology to be peacefully taught in the classroom.

11. Theorizing

Theorizing is of course not a one-time, static thing, but an ongoing, changing process.

An old theory may be replaced a new one, either because *the facts* currently faced are not covered by the old theory or because some *logical or conceptual* imperfection or inadequacy has been found in it. The new theory may not be much different from the old, a mere adjustment of it, but it must in any case bring something extra to bear, either a wider capacity to explain facts or some sort of logical improvement or conceptual clarification.

In setting standards for theorizing, we must highlight ***the fallacy of relying on "somehows"*** as a way to leap over *holes* in one's theories. This may be viewed as one of the ways people "jump to conclusions".

> For example, to defend the idea of theodicy (Divine justice or karma), we posit a thesis of reincarnation (in this world or another). That is, seeing the injustice evident in everyday life, we first think there must be some hidden guilt in the life of the victim, and that unpunished criminals will be dealt with before their life is through. We assume that, in the long run, over the course of a whole life, apparent discrepancies are canceled out and equilibrium is restored. But then, realizing that this too is evidently not empirically true we assume reincarnation as an explanation. For instance, children are sometimes raped or murdered; and since these are clearly innocent victims within their current life, granting that children are not punished for their parent's sins, the assumption of justice makes us suppose that they

> committed commensurate crime in a past life. Similarly, for an evidently unpunished criminal, it is assumed that Divine justice will punish him in an afterworld, or that karma will do so in a future life.[11]

In cases like this, the big fallacy is to be satisfied with a "somehow" to fill the gaps in our hypothesis. In the case of reincarnation, for instance, the theory should not be accepted unless *an exact description of events* in the transition from body to body were proposed, combined with *a set of testable predictions* that would make possible at least some empirical confirmation of the thesis (besides the events it is designed to explain). The *apparent* support that a *vague* reincarnation thesis gives to the *foregone* conclusion that "there is always justice" is not sufficient.

There are almost always hidden obscurities in our theories: the vagueness of some term, the lack of clarity of some proposition, the jumping to conclusions in some argument. Indeed, the sciences cannot claim success in their enterprise, as long as philosophy does not claim its own success. So long as consciousness, knowledge, universals, and similar concepts and problems of philosophy are not fully understood and solved, anything the special sciences say ignores such underlying obscurities and uncertainties. This means that the apparent success of science is temporary and delimited.

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[11] As I have pointed out elsewhere, such doctrines are unfair to innocent victims, accusing them without justification of past crimes; and they whitewash criminals, making it seem like they merely implement justice!

Success can only be claimed at infinity, when all branches of knowledge reach their respective goals.

12. Approaching Reality

What do we mean by a thesis "*approaching reality*"? We refer to the *disjunction* of all conceivable (now or ever, i.e. to date or in the future) solutions to a problem. At every *elimination* of one of these alternative solutions, all other alternatives are brought closer to being "the" solution. It is a bit like a game of musical chairs, where the last, leftover contestant will be declared the winner. As the list of possibilities is shortened, the status of each possible solution is increased. Thus, it is not only through confirmation (of a given thesis), but also through rejection (of alternative theses), that the given thesis advances in our esteem, or in its "degree of truth". In this way, we do not have to claim every thesis true or false without making nuances, and can view the quantitative aspect of induction as having formal justification.

13. Experiment

Experiment is a category of observation. It is observation in the midst of active interventions, in contrast to totally passive observation. Even when an observer moves around an object to see it from other angles, without interfering with the

object, that is experiment of sorts. Asking people questions on some topic is also experiment of sorts.

Of course, when we think of experiment, we especially think of manipulations of some object – i.e. changing some conditions in or around it, and observing how its properties or behaviors are affected. Scientific experiment may be viewed as a way to speed up observation – making the object go through different phases of its nature, rather than waiting for it to vary by happenstance. Experiment improves on mere observation simply because it expands its scope. Experiment is not some new discovery by modern science[12] but has always existed – since the first man prodded some beast with his finger to see how it would react!

To conclude, the distinction of experimentation is not manipulation of the object, but action by the observer. The essence of experimental research is still observation. It is active, instead of passive, observation. Experiment is not some epistemological category apart from and superior to observation.

Indeed, one might well ask if any observation is passive. But the answer to that is necessarily yes. At the end of any experimental activity, there has to be a moment of passive observation. Rather, then, one might say that the essence of

[12] Although, of course, modern science has been using experiment more consciously, systematically and successfully than ever before.

observation is passive – patient looking and seeing, receptivity and attention.

Experiment can of course go wrong for a variety of reasons; its results are not always credible. It may be designed on the basis of wrong theoretical or practical assumptions; the physical equipment intended to control or measure the phenomena studied may be badly constructed or set up; the researchers may be insufficiently careful and accurate in their handlings and readings, whether inadvertently or 'accidentally / on purpose'; the researchers may erroneously record their correct findings; and the results may be misinterpreted, due to weak logic or lack of intelligence or narrow knowledge base, or simply due to conscious or unconscious bias.

Often, experimenters are simply unable to see things differently from the schemas they are used to, and have foregone conclusions in their minds no matter what the experiments they make imply. Sometimes, however, experimental results seem contrary to all expectation and the incredulity of researchers is eventually legitimated by review of all procedures and further experiment. If an experiment gives *inexplicable results* in the light of all current knowledge and theory, one should indeed review and redo it very carefully.

Thus, theory and experiment have a dynamic, two-way relation. Experiments are meant to confirm or refute theories, by testing their predictions. But also, theories are used to

design and evaluate experiments, as well as to explain their results. The two must repeatedly be adapted to each other.

14. The Uncertainty Principle

The Uncertainty Principle of quantum physics, according to which we cannot precisely measure both the position and the momentum of a particle at a given time, may be interpreted either epistemologically (i.e. as an insurmountable practical difficulty of observation and calculation) or ontologically (i.e. as something out there, a truth about the particle itself, such that it does not *have* precise position and momentum). Taken in this neutral manner, it is assumably generally accepted as scientific fact; it is the interpretations of it that are debated.

Classical physics would opt for the epistemological view. This would say that at the phenomenal levels under consideration, any measuring instrument or technique physically affects the objects to be measured, and therefore cannot provide an accurate result – but *we can still hypothesize that* there is an underlying reality, i.e. that the particle does indeed have both position and momentum. Note well that this posture is logically compatible with the notion that the assumed "underlying reality" will never be specifically known, i.e. there is no intent to evade the discovery that it is technically unknowable.

Modern positivism would prefer the ontological interpretation. It would say: no, the immeasurability is not an illusion underlain by definite facts – *we can hypothesize that* the indeterminacy is itself the ultimate reality, the truth of the matter. Note well that this posture is just as hypothetical as the preceding; it cannot claim to know what the "ultimate reality" is anymore than the other view, since the common premise is precisely that the reality is technically inaccessible to humans. It is thus just as much a doctrinal stance, however prestigious those who take it are.

Granting the said impossibility of full measurement, it follows that – in this instance at least – each of the two interpretative theses is neither verifiable nor falsifiable. In this context, at least, their logical status is the same – they are equally speculative.

Both postures are admittedly hypothetical, but the former is clearly simpler, the latter philosophically more problematic. One of the principles of scientific method, in any context, is to prefer the simpler thesis unless we have good reasons to seek out a more complex one. That is, the simpler view is considered inductively more likely, because it is less prone to affect previously established knowledge.

We are not forced to rest content with the classical view; but we must have *sufficient motive* to abandon it in favor of the more complicated positivist view. The latter involves some very revolutionary suppositions about the nature of matter (namely, the possibility of natural spontaneity), which we

cannot favor just for the hell of it, merely for the pleasure of challenging the existing order of things. We must first show up some distinctive weakness in the older view or some novel strength in the newer view, to justify such a radical overhaul of all past acquisitions and explanations.

The positivists argue that since we cannot determine these facts precisely, we might as well – for all practical purposes – regard them as non-existent. But the result is not quite the same, because we should consider not only the consequences of such a posture on their particular field of study, but with regard to knowledge as a whole. That is, it is not an innocuous stance – it has wide-ranging ontological and epistemological significance, seemingly putting some important fundamental assumptions of reason (viz. that all natural events are caused) in doubt.

Furthermore, there is no justification in forbidding further discussion of the issue henceforth. The positivists make an argument by intimidation, saying effectively "those who disagree with us are not worthy of intellectual consideration"[13]. But surely, the positivists must still remain open-minded – for they may indeed one day be *proved* wrong, if it should happen that we are able to dig deeper into matter, and eventually find some way to experimentally measure what the uncertainty principle says we cannot.

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[13] This is also an argument by authority. To which one can answer: one may be a great physicist and a not-so-great philosopher; merit in one field does not guarantee success in all others. Such attitudes are reminiscent of religious authoritarianism.

We cannot empirically prove a "cannot" – a "cannot" is *a generalization* from experience (though, in some cases, it is a logical insight, as in the preceding sentence). The uncertainty principle is not a purely empirical fact, plucked out directly from experience; it emerges within a certain theoretical context, which shapes our interpretation of events. This context, like many others throughout the history of science, may yet change, as our knowledge grows. There is no final and incontrovertible scientific theory.

Note well that I am not personally defending one or the other posture here[14], but comparing them from a neutral perspective, giving both fair consideration. That is, I am evaluating *their discourse* as a logician, using a discourse that is pure logic.

15. Epistemic Ethics

Logic is not only about forms of reasoning, but also about intellectual style. It is first and foremost a teaching of epistemic ethics: the attitudes the intellect must adopt to arrive at truth. These include suppression of one's ego, open-mindedness and truth-orientation, among many others.

Genuine philosophers earnestly search for truth. They have sincere questions and try to answer them honestly. They

[14] My neutrality should be evident from the open-minded position I have taken with respect to the idea of natural spontaneity in *The Logic of Causation* (see for example chapter 10.1 there).

admit areas of doubt or ignorance. They are open to change, and evolve over time.

Fake philosophers play the role of being philosophers, but are really not philosophers. They have little interest in the substance of issues, but seek to dazzle an audience with their superficial erudition and their style. They sow famous names around in the hope of reaping reflected glory. They follow intellectual fashions in pursuit of wide approval ratings, being pious or subversive as befits the current market of ideas. To gain attention and fame, they may be scrupulously conventional or say shocking things.

They say things they do not personally fully understand; they claim to have knowledge they in fact lack. They are apologists for received doctrines, rather than researchers; and when they seem to propose some new doctrine, it is only by arbitrary opposition to established ideas so as to appear original.

For many people, philosophy is an instrument of social climbing or power over others, rather than a search for truth. Such people may convince many others of this or that absurd or silly doctrine, using the prestige of their position in the education system or in the media, or in some other social role. But in fact, they have only muddled their victims' minds and incapacitated them.

When philosophizing, it is wise to remain low-key and matter-of-fact, avoiding grandstanding and personal emotional outbursts as much as possible. This is an issue of

style, not substance. But if one does not exercise sufficient restraint in such discourse, it is very easy to get lost in misleading hyperboles. The wrong choice of language can end up determining our doctrines, causing us to approximate and exaggerate.

Here, I have in mind the likes of Nietzsche or Kierkegaard (and many others), who *pervasively* intertwine their emotional responses with their philosophical realizations. They make a big thing of their personal reactions – writing in a narcissistic manner. Thus, in the face of his insight that man is alone in the universe, without apparent supports – Nietzsche indulges in theatrical outbursts, dramatizing his utter shock, role-playing a heroic response. This is all bombast, designed to give his ego a sense of self-importance; it is a kind of mental equivalent of masturbation. Kierkegaard – "same-same, but different": an equally emotional approach, though a self-pitying one and one with more sincerity.

Such personal reactions were, of course, characteristic of the times and places those philosophers lived in. Their styles seem so "un-modern" – few would indulge in such tonalities today. We are perhaps less flamboyant – but also more careful to avoid confusion between judgments of fact (true–false) and judgments of value (good–bad). Philosophers are human, and may of course be passionate to some extent, and express their personal valuations; but this should not be the centerpiece of their discourse.

16. Phenomenology

'Phenomenology' refers to the consideration of experience, in its largest sense, before distinctions are made between 'real' experiences and 'illusory' ones. The term was coined by Johann Heinrich Lambert (German, 1728-1777) in his *New Organon* (1764), with this application in mind.

The title of the 1807 work of Georg W. F. Hegel (German, 1770-1831), *Phenomenology of the Spirit*, would be a misnomer, if we regarded the term as limited to sensory experiences and their mental equivalents, to the exclusion of intuitions. For the spirit (or self or soul) has no perceptible phenomenal qualities, but is self-intuited.

Although the term 'phenomenon' nowadays is usually taken (and I so take it) to refer to experiences with features like sights, sounds, etc., whether sensed or fancied, its original meaning in Greek and then Latin is 'appearance', a broader term in which we may well include intuited experiences (as Hegel did, and I do too).

Thus, 'phenomenology' should be understood to refer to the study of appearances, and not only phenomenal appearances.

Phenomenology is a branch of philosophy designed to overcome the problem posed by 'naïve realism'. The existence of this problem does not mean that there is no solution to it. Phenomenology neutralizes the issue, showing that all realism is not necessarily naïve, and allowing for

philosophical theories favoring realism that are more subtle and capable of truth.

Concerning my barely mentioning Edmund Husserl (German, 1859-1938) in my work *Phenomenology*, I have this to say. I simply had no pretension of being a historian. My silence was certainly not intended to ignore or belittle this philosopher's great work, whose scope, depth, intelligence and intellectual maturity are evident. I acknowledge strong influence from it (ideational and terminological). But I also have other influences (such as Indian philosophy), and my own contributions to make.

My intent in the said work was to summarize briefly, in a minimally intellectual manner accessible to the maximum number of people, the value and necessity of a phenomenological approach to knowledge, so as to underscore and bypass the common affliction of naïve realism. Husserl's discourse, to my mind, perhaps because of its roots in German Idealism and its academic style, gives the impression that the phenomenal is a conceptual construct rather that a raw experience. I tried to avoid such misleading impression, and to give readers a practical tool.

As for use of the term 'phenomenology' – it cannot be reserved to Husserl's work, but may legitimately be applied to any study of the phenomenal *per se* (i.e. quite apart from its status as reality or illusion, i.e. before such ontological and epistemological status is debated and determined).

Aristotle spoke of a science of being *qua* being, which he called ‘first philosophy’, and his successors labeled ‘metaphysics’ (because of the editorial position of this book after that on physics), and which became known as ‘ontology’. The idea and name of such a study has remained of universal value, even though there have been over time many views as to its possibility, scope and content.

In time, Western philosophy realized the methodological difficulties of this proposed discipline. In particular, it was not easy to disentangle it from the theory of knowledge, or ‘epistemology’ and logic. Conflicting schools kept arising; in each generation, in one guise or another, they competed: Idealists vs. Materialists, or Empiricists vs. Rationalist, and so forth.

The idea of a more fundamental field of research – viz. phenomenology – gradually arose in response to the realization of the underlying cause of the difficulties. In order to reconcile traditional philosophical tendencies, all of which evidently contained some truth, philosophy needed to reconsider the issues with renewed innocence, more clearly distinguishing between raw given data and processed information.

This new ‘first philosophy’, or science of appearance *qua* appearance (as we may also call it, imitating Aristotle), cannot be regarded as necessarily and forevermore frozen with the form and content Husserl first gave it. The term ‘phenomenology’ belongs to all philosophers, as an open and

neutral term like the terms ‘philosophy’, ‘epistemology’, ‘ontology’, or ‘logic’. It is no longer the name of a school of thought (like Phenomenalism), but of a branch of philosophy.

17. Appearance, Reality and Illusion

Phenomenology results from a realization that the building blocks of knowledge are appearances. This realization is obtained through a dialectic, comprising thesis, antithesis and synthesis, as follows.

(a) At first, one naturally regards everything one comes across in experience or thought as ‘**real**’ (this is the ‘naïve realist’ stance).

(b) Then, faced with evident contradictions and gaps in one’s knowledge, one logically realizes that some things that seemed real at first must or at least may eventually be considered unreal – i.e. ‘**illusory**’ (this constitutes a cognitive crisis).

(c) Finally, one realizes that, whether something is real or illusory (and ultimately remains so or turns out to be the opposite), at least it can immediately (unconditionally and absolutely) be acknowledged as ‘**apparent**’ (this is the ‘phenomenological’ stance, which resolves the crisis).

Knowledge of reality can then be inductively built up from knowledge of appearances, thanks to the following principle

(d): ***One may credibly assume something that appears to be real is indeed real, until and unless it is proved illusory or at least put in doubt for some specific reason.*** This may be characterized 'subtle realism', and proceeds from the realization that the mere fact of appearance is the source of all credibility.

Thus, phenomenology follows the natural flow of knowledge, which is to initially accept individual appearances as real, while remaining ready to reclassify them as illusory if they give rise to specific logical problems that can only be solved in that specific way. The concept of 'appearance' is therefore not strictly primary, but a transitional term for use in problematic cases. Since it refers to the common ground between 'reality' and 'illusion', it is deductively primary. But since the latter are in practice attained before it, it is inductively secondary.

The concepts appearance, reality and illusion are to begin with concerned with experiences; and only thereafter, by analogy, they are applied to abstractions, i.e. conceptual products of experience arrived at through rational considerations, such as comparison and contrast (i.e. affirmation or negation, and measurement).

The term 'fact' is usually intended to refer to purely experiential data, i.e. the raw material of knowledge, in which case the opposite term 'fiction' refers to other items of knowledge, i.e. those tainted by interpretative hypotheses. (But note that in practice of course we do not always abide by

such strict definitions, and may use the terms more broadly or narrowly.)

The concepts of truth, falsehood and uncertainty correspond in scope to those of reality, illusion and appearance. The latter triad is applied to the contents of propositions, while the former concerns the propositions as such. For example, considering "dogs bark", the fact of dogs barking is 'a reality', while the proposition that dogs bark is 'true'; similarly in other cases.

Once we understand all such concepts as signifying different epistemological and ontological *statuses*, it becomes clear why they need to be distinguished from each other. They are all used as logical instruments – to clarify and order discourse, and avoid confusions and antinomies.

Note well that phenomenology is not a skeptical philosophy that denies reality to all appearances and claims them all to be illusions. Such a posture (which too many philosophers have stupidly fallen into) is logically self-contradictory, since it claims itself true while rejecting all possibility of truth. The concept of illusion has no meaning if that of reality is denied; some credulity is needed for incredulity. Doubt is always based on some apparent contradiction or gap in knowledge; i.e. it is itself also an item within knowledge.

18. Existence and Non-existence

What is the relation between the concepts of existence and non-existence (or being and non-being), and those just elucidated of appearance, reality and illusion, one might ask?

At first, the term existence may be compared to that of reality, or more broadly to that of appearance (to admit the fact that illusions occur, even if their status is not equal to that of realities). However, upon reflection, an important divergence occurs when factors like time and place are taken into consideration.

We need to be able to verbally express changes in experience over time, space and other circumstances. An appearance, be it real or illusory, 'exists' at the time and place of its appearance – but may 'not exist' at some earlier or later time, or in another place. The 'existence' of appearances is transient, local, conditional and relative.

What appears today may cease to appear tomorrow, although it might (or might not) continue to appear less manifestly, through someone's memory of it or through the appearance of exclusive effects of it. Something may appear here within my field of vision, but be absent elsewhere. You may see this in some circumstances, and then notice its absence in others.

We thus need to distinguish different ways of appearance. With reference to time: in actuality, or through memory or anticipation; or with reference to spatial positioning. Or again, with regard to modality: in actuality, only through

potentiality (i.e. in some circumstances other than those currently operative), or through necessity (i.e. in all circumstances).

Time and place also incite a distinction between ‘existence’ and ‘reality’ (or ‘truth’), in that when something ceases to exist at a given time and place, the reality of its having existed at the previous time and place is not affected.

Furthermore, appearances are apparent to someone, somewhere – they are contents of consciousness, objects of cognition. The concept of existence is differentiated also with reference to this, by conceiving that what may be apparent to one Subject, may not be so to another. Moreover, we wish to eventually acknowledge that something may conceivably exist even without being experienced by anyone (though of course, in defining such a category, we must admit for consistency’s sake that we are thereby at least vaguely and indirectly conceptually cognizing the object concerned).

We thus come to the realization that *the concept of appearance is a relatively subjective one, involving two distinct factors: an object of some kind with specific manifestations, on the one hand, and an awareness by someone of that object at a given time and place*. The concept of existence is intended to separate out the objective factor from the factor of consciousness implicit in the concept of appearance.

‘Existence’ is thus needed to objectify ‘appearance’, and allow us to conceive of the object apart from any subject’s

consciousness of it. We need to be able to conceive of the objects appearing to us as sometimes ‘continuing on’ even when we cease to be aware of them. Furthermore, we need to be able to consider objects that we have not yet personally experienced, and even may never experience. In this manner, we can project our minds beyond mere appearance, and through conception and adduction hope to grasp existence in a larger sense.

The concept of existence and its negation are thus additional instruments of logic, facilitating rational discourse, without which we would not be able to mentally express many distinctions. Consequently, saying ‘existence exists’ and ‘non-existence does not exist’ is not mere tautology, but an acknowledgement that the words we use have certain useful intentions. These statements constitute one more way for us to express the laws of thought. Existence cannot be denied and non-existence cannot be affirmed.

We do not make the distinction between ‘existents’ and non-existents’ by mentally lining up two kinds of things, like apples and things other than apples. The epistemological scenario applicable to most of our concepts is not applicable to such basic ones, which are of a more broadly pragmatic nature. Discernment rather than distinction is involved.

Whereas the concept ‘existence’ has some ultimate experiential content, ‘non-existence’ has none – because factual denial is not based on the same mental process as affirmation. We never experience non-existence – we only

(in certain cases) *fail to* experience existence. The concept of existence is not built up by contrast to that of non-existence, since (by definition) the former relates to 'all things' and the latter to 'nothing', and nothing is not some kind of something. There is no time, place or circumstance containing nothingness. The word 'non-existence' is just a dumping place for all the words and sentences that have been identified as meaningless or false.

Terms like 'existence' and 'non-existence' are not ordinary subjects, copulae or predicates; they are too broad and basic to be treated like any other terms. Those who construct a theory of knowledge, or an ontology, which concludes that 'existence does not exist' or that 'non-existence exists' have not understood the logic of adduction. When there is a conflict between theory and observed facts, it is the theory (or the 'reasoning' that led up to it) that is put in doubt and is to be dismissed, not the facts.

19. Philosophy and Religion

It is important to distinguish between religion (including philosophical discourse based on a particular religion, for apologetic or polemical purposes) and philosophy proper (which makes no direct appeal to premises from a religious tradition, though it may discuss religious issues).

This is a derivative of the distinction between faith and reason, keeping in mind that faith may be reasonable (i.e.

without conclusive proof or disproof) or unreasonable (i.e. in spite of conclusive disproof). Note that reasonable faith is necessarily before the fact – for, if some fact is already indubitably established, there is no need of faith in it. Unreasonable faith is contrary to fact.

> Some philosophers regard faith in pure speculations, those that are in principle neither prov*able* nor disprov*able* (e.g. faith in the existence of God or in strict karma), as unreasonable. But I would class the latter as within reason, for it is always – however remotely – conceivable that some proof or disproof might eventually be found, i.e. the 'principle' is itself is hard to establish with finality. Moreover, the category of pure speculation is even applicable to some scientific theories (for example, Bohr's interpretation of quantum uncertainty as indeterminacy).

Religion is based on faith, i.e. on the acceptance of theses with insufficient inductive and deductive reasons, or without any reason, or even against reason (i.e. albeit serious divergence from scientific conclusions based on common experience and logic) – on the basis of statements by some assumed spiritual authority, or even merely because one feels so emotionally inclined.

Philosophy, on the other hand, is based on personal understanding, on purely empirical and logical considerations; although some or many of its theses might

well to some extent be hypothetical, or even speculative, they remain circumscribed by scientific attitudes and theories – that is, a sincere effort is made to integrate them with the whole body of experience and reason.

The difference between religion and philosophy is not always clear-cut, note well. Religion is not throughout contrary to reason, and philosophy is not always free of mere speculation. The difference is whether the credulity, or *degree of belief*, in speculative propositions is proportional or not to the extent of available adductive evidence and proof. In the case of mere faith, the reliance on a given proposition is disproportionate to its scientific weight; whereas in the case of rational conviction, there is an effort to keep in mind the scientific weight of what is hypothesized - one is ready to admit that "maybe" things are not as one thinks.

> The two also differ in content or purpose. Religions are attempts to confront the problems of human finitude and suffering, through essentially *supernatural* explanations and solutions. The aim of religion is a grand one, that of individual and collective redemption. Philosophies resort to *natural* explanations and expedients, attempting to understand how human knowledge is obtained and to be validated, and thus (together with the special sciences) gradually identify ways and means for human improvement. There is still an underlying

valuation involved in the philosophical pursuit, note well; but the aim is more modest.

To make such a distinction does not (and should not) indicate an antireligious bias. It is not intended as a 'secularist' ideology, but merely as a secular one. Religion (or at least those parts of particular religions that are not decisively anti-empirical or anti-rational) remains a legitimate and respectable human activity – it is just recognized as being a different intellectual domain, something to be distinguished from philosophy so as to maintain a balanced perspective in one's knowledge.

The reason this division was produced historically by philosophers was to protect philosophy (and more broadly, the special sciences) from being reduced to a supporting role, as the "handmaiden" of religion. It was necessary to make philosophy independent of religion to enable philosophers to engage in critical judgment, if need arose, without having to force themselves to be "religiously correct" or risk the ire of politically powerful religious authorities.

The secularization of philosophy was precisely this: a revolt against foregone conclusions imposed by religious authorities (i.e. people collectively self-proclaimed as sole torch-bearers of truth) as undeniable 'fact'. It is important to understand *the logical rationale* behind such a revolt, i.e. why it is epistemologically valid and necessary.

Anyone can stand up and claim to have been graced by some Divine revelation/salvation (or holy spirit) or to have attained some Buddhist or Hindu enlightenment/liberation.

Many people throughout history have made such metaphysical claims. Some have gone so far as to claim to be a god or even G-d. Some have not made explicit claims for themselves, but have had such claims made on their behalf by others. Some of the claimants – notably, Moses, Jesus, Mohammed, and Buddha – have founded world-class religions, that have greatly affected the lives of millions of people and changed the course of history. Other claimants – like your local shaman, Egypt's Pharaoh, or Reverend Moon – have been less influential.

The common denominator of all these claims is some extraordinary mystical experience, such as a prophetic vision or a breakthrough to 'nirvana' or 'moksha' (enlightenment/liberation). The one making a claim (or claimed for by others) has a special experience not readily available to common mortals, on the basis of which he (or she) becomes a religious authority, whose allegations as to what is true or untrue are to be accepted on faith by people who have not personally had any commensurable experience.

The founding impetus is always some esoteric experience, on the basis of which exoteric philosophy and science are shunted aside somewhat, if not thoroughly overturned. The founding master's mantle of authority is thereafter transmitted on to disciples who do not necessarily claim an

equal status for themselves, but who are pledged to loyally study and teach the founder's original discoveries.

Religion is essentially elitist, even in cases where its core experience (of revelation or enlightenment) is considered as in principle ultimately open to all, if only because of the extreme difficulty of reaching this experience.

In some cases, the disciples can hope to duplicate the master's achievement given sufficient effort and perseverance. In other cases, the master's disciples cannot hope to ever reach their teacher's level. But in either case, they are the guardians of the faith concerned, and thence (to varying degrees) acquire institutional 'authority' on this basis, over and above the remaining faithful.

Thus, we have essentially two categories of people, in this context.

a) Those who have had (or claim to) the religious experience concerned *first-hand*.

b) Those who, *second-hand*, rely on the claim of the preceding on the basis of faith, whether they have institutional status of authorities or not.

Now, this distinction is not intended to be a put-down, a devaluation of either category of person. But it is a necessary distinction, if we are to understand the difference in epistemological perspective in each case.

From the point of view of a first-hand recipient, i.e. someone who has personally had the mystical experience concerned, his discourse is (for his own consumption, at least) pure philosophy, not religion. He is presumably not required to have faith, but all the information and reasoning involved is presented to him on platter. His task is simple enough; his responsibility is nil, his certainty total.

But a second-hand recipient has a difficult task, epistemologically. He has to decide for himself whether the first-hand teacher is making a true or false claim. He has to decide whether to have faith in him or not. He is required to accept an *ad hominem* argument.

This objection is not a judgment as to the master's veracity. Some alleged masters are surely charlatans, who lie to others so as to rule and/or exploit them; some of these remain cynically conscious of their own dishonesty, while some kid themselves as well as others. But it may well be that some alleged masters are not only sincere, but have indeed had the experience claimed and have correctly interpreted it.

But who can tell? Certainly not the ordinary Joe, who (by definition) has never had the experience concerned, and in most cases can never hope to duplicate it – and so is not qualified to judge. Yet, he is called upon to take it on faith – sometimes under the threat of eternal damnation or continuing samsara if he does not comply.

How is the common man to know for sure whether some person (contemporary – or more probably in a distant past,

who may even be a mere legend) has or has not had a certain mystical experience? It is an impossible task, since such experience is intrinsically *private*!

To date, we have no scientific means to penetrate other people's consciousness. And even if we could, we would still need to evaluate the significance of the experience concerned. Such judgments could never be absolute and devoid of doubt, but necessarily inductive and open to debate. Thus, the 'certainty' required by faith could not be rationally constructed.

It is no use appealing to witnesses. Sometimes two or more people confirm each other's claim or some third party's. Moreover, often, alleged authorities disagree, and reject others' claims. But who will confirm for us innocent bystanders that any of these people are qualified to authenticate or disqualify anyone?

Thus, faith is a leap into the unknown. However, it is often a necessary leap, for philosophy and science are not able to answer all questions (notably, moral questions) convincingly, and we in some cases all need to make decisions urgently. So, religion has to be recognized by philosophy as a legitimate, albeit very private, choice. In this context, note well, secularism is also a religion – an act of faith that there is no truth in any (other) religious faith.

> Note: Buddhism is today often painted as "a philosophy rather than a religion", implying that it does not rely on faith. But this is a patently unfair

description: there are plenty of faith loci within Buddhism. Belief in the wheel of reincarnation (samsara), belief in the possibility of leaving it (nirvana), belief that at least one man attained this Buddha state (Siddhartha Gautama), belief in the specific means he proposed (moral and meditative disciplines, notably non-attachment), belief in a multitude of related stories and texts – all these are acts of faith.

These beliefs require just as much faith as belief in the existence of God, and other more specific beliefs (starting with belief in the Torah, or Christian New Testament, or Koran), within the monotheistic religions. The adherent to Buddhism must take on faith the validity of his spiritual goal and pathway, *before* he becomes a Buddha (assuming he ever does). The end and means are not something philosophically evident, *till* he reaches the end through the means. This is the same situation as in the monotheistic religions.

So, Buddhism is not primarily a philosophy, but a religion – and to say otherwise is misleading advertising. The same is true of Hinduism, which shares many doctrines with Buddhism (as well as having some monotheistic tendencies, although these are not exclusive).

It is important to remain both: open-minded, granting some of the claims of religions as conceivable; and cool-headed, keeping in mind some of them are unproved. Intolerance of religion is not a proper philosophical stance, but a prejudice, a dogma. The true philosopher, however, remains sober, and does not allow himself to get carried away by emotional preferences.

Transcendental claims can, nevertheless, be judged and classed to some extent. Sorting them out is, we might say, the realm of theology (a branch of philosophy).

Some claims are, as already pointed out, directly contrary to experience and/or reason; if some harmonization cannot be construed, philosophy must exclude such claims. Some are logically conceivable, but remotely so; these are to be kept on the back burner. And lastly, some are very possible in our present context of knowledge; these can be used as inspirations and motivations for secular research.

Generally speaking, it is easier to eliminate false claims than to definitely prove true claims.

Each specific claim should be considered and evaluated separately. It is not logical to reject a doctrine wholesale, having found fault with only some aspects of it (unless these be essentials, without which nothing else stands). In such research, it is well to keep in mind the difference between a *non sequitur* and a disproof: disproving premises does not necessarily mean their conclusions are false, for they might be deducible from other premises.

In choosing among religions, we usually refer to the moral recommendations *and behavior patterns* of their founder and disciples (as well as more sociologically, of course, to traditions handed down in our own family or society) as indices. If the advice given is practiced by those preaching, that is already a plus. If the advice and practice are wise, pure, virtuous, kindly, and loving, etc. – we instinctively have more confidence. Otherwise, if we spot hypocrisy or destructiveness, we are repelled. (Of course, all such evidence is inconclusive: it suggests, but does not prove.)

But, however persuaded we personally might be by a religious teaching, its discourse cannot be dogmatically taken as the starting premise of philosophy. *To a first-hand mystic, it may well be; but to the rest of us, it cannot be.* Philosophy is another mode of human inquiry, with other goals and means. Spirituality and rationality are neither necessarily bound together, nor necessarily mutually exclusive. They might be mixed somewhat, but never totally confused.

Thus, if someone claims some mystical experience, or refers to authoritative texts based on some such foundation, his philosophizing might well be considered attentively and learned from to some degree, but it is ultimately irrelevant to pure philosophy; or more precisely such discourse can become in part or wholly relevant only provided or to the extent that it submits to the secular standards of public philosophy.

The latter can only refer to experiences and insights that can readily be duplicated, i.e. that are within everyone's reach (except a minority with damaged organs), if they but consider certain empirical data and follow a set of inductive and deductive arguments. It aims at developing, using ordinary language, a potentially universal worldview and understanding.

Admittedly, as some would argue, high-level philosophy (as with advanced mathematics or physics) is in practice not comprehensible to most laymen! Just as meditation or other religious techniques are not easily mastered, it takes a lot of effort and intelligence to learn and apply logic in depth. Moreover, the novice who enters the path of philosophy is as hopeful (full of faith in eventual results) as the religious initiate; and all along both disciplines, small successes encourage him to keep going.

So, one might well ask the embarrassing question: what is the difference between the elitism of philosophy and that of religion? Ultimately, perhaps none, or just a difference of degree! This answer would be true at least of reasonable religion. But in the case of unreasonable religion, we ought not allow ourselves to believe in it – even as a remote possibility – until if ever it becomes manifestly reasonable, i.e. until and unless our basic view of reality is indeed overturned by actual personal experiences.

It is unwise to excessively compartmentalize one's mind and life; at the extreme, one may risk some sort of schizophrenia.

One should rather always try to keep one's rationality and spirituality largely harmonious. Faith in religious ideas need not be an 'all or nothing' proposition; one can pick and choose under the guidance of reason. Reason is not in principle opposed to faith; it allows for its essentials.

The challenge for today's philosophers of religion, who wish to bring God and/or other religious ideas back into the modern mind, is to fully acknowledge and accept the current conclusions of modern science. It is no use trying to tell an educated contemporary that scientific claims – regarding the age and size of the universe, the evolution of matter, the age and history of our planet, the evolution of vegetable and animal life on it, the emergence of the human species – are all wrong! Such discourse is irrelevant to the modern mind, if not absurd.

There is still room, side by side with the worldview of science, for religious ideas – but these must inductively adapt to survive. This is always possible by exploiting (within reason) loopholes in the current scientific narrative, whatever it happen to be at any given time. Instead of emphasizing conflicts, thinkers should seek out the conceptual possibilities for harmonization. Real scientists remain open-minded wherever there are lacunae.

> Creationism need not be a fixed dogma. Rather than insist that the world was created in 6 days some 6'000 years ago, say that God is the creator of the initial matter-energy of the universe, and of the laws of

nature and evolution inherent in it, and that He triggered the ‘big bang’ 13.7 billion years ago.

Moreover, in physics, suggest that the indeterminacy apparent in quantum mechanics is perhaps really the opportunity God uses to daily impinge on details of the world process. Or again, in biology, propose the first conversions of mineral into living and then animate matter (wherever and whenever they occurred) were maybe due to God’s intervention; and rather than combat Darwinism, accept it as part of God’s plan and hypothesize that the apparently spontaneous occasional mutations of genes might well be miracles.

3. ABOUT WORDS

1. Meaning

Words are gestures, sounds or drawings[15] (whether physical or mental) that *mean something to someone*. But what they mean is not necessarily real, but may be imaginary. The *meaning* (or signification or reference or "sense") of a word is the direction it points our attention in (its "intention"). It is something wordless beyond the word, which we have to apprehend and comprehend to grasp the word.

Words are utilitarian symbols, whose function is to arouse some perception or conceptual thought, some memory or imagination, selected by their speaker, in their auditor (or by gesticulator for spectator, or by writer for reader). The same word may signify different things to different people, though good communication depends on there being some harmonization of meaning between them; otherwise, there will inevitably be misunderstandings between them.

Many words do have a reasonably 'objective' meaning, one that appears the same to many observers; in this sense, they

[15] 'Gestures' refers to sign language. Sounds to the spoken word. Drawings (doodles, scribbles) to the written word, be it in pictorial form or in purely symbolic script.

are absolute. For example, “she has green eyes” is hardly debatable. But some words are wholly or partly about ‘subjective’ events, so that their meaning is *relative* to some conscious Subject’s viewpoint. The relativity involved is usually due to the beholder engaging in some valuation. For examples, the predicates in “she’s so exotic” or “she’s beautiful” tell us as much about the speaker as about the person discussed (i.e. “she”). Such words can be made more public, simply by increasing verbal precision; e.g. “she is beautiful to him”.

Although generally a word ultimately refers to some experience(s), its meaning varies considerably from person to person or in the same person across time. E.g. if one has never seen an elephant in the flesh, but only a picture of one, the word ‘elephant’ means somewhat less to one than it does to an elephant trainer.

Indeed, there are things we know very little of – *not much more than their name*, and perhaps a rough description of the experiences or thoughts of other people that gave rise to this name (for examples, the meaning of ‘enlightenment’ to an unenlightened person, or of ‘black hole’ to a non-physicist).

Thus, the experiential basis for a word varies greatly, ranging from direct personal experience to indirect second-hand experience, based on hearsay evidence, verbal descriptions, various illustrations and recordings. Use of a word does not signify full knowledge of its potential meaning.

> Note well that reference, here, does not imply a 'correspondence' theory of meaning, such as that proposed by naïve realism. It is rather based on the idea of words acquiring meaning by intention - intention being a volitional act or velleity of the cognizing Subject, attaching this word to that *appearance*. The appearance may be experienced or conceived, real or illusory. In sum, reference is justified by a phenomenological approach.

Words are first produced by designation, i.e. pointing and naming – this is suggested in colloquial language by the expression "show and tell".

Physical **pointing** is usually performed by extending the index finger in some direction, in some cases touching the object concerned; or one can more precisely delineate the object's boundaries, at a distance or right up close. At a later stage in the development of knowledge, something akin to indication is often performed verbally; we may do so by using words like "this" or "that", or by describing how to get to an object or what the object looks like.

It should be stressed that indication cannot function if it is merely positive, just pointing and saying "this" – except when we intend to refer to the whole of our present experience (the here and now). Normally, indication has a usually tacit negative component, which excludes some of the present experience, leaving only the part of it we wish to refer to. We may say "*this – but not that*".

The negative clause is as important as the positive one, in directing our mind to the precise object intended. We cannot really understand pointing, if we do not realize the limits of its applicability, i.e. what we intend to exclude from consideration. "This" by itself may include too much. We need the negative thought "but not that" to delimit it.

It is important to realize that, whereas the positive aspect of indication is a purely empirical act, the implicit negation is in part a *rational* act. "This" only requires a look, whereas "but not that" requires a mental 'crossing off' of some items seen, i.e. an *imagination* of the part of the world covered by "this" existing *without* (in abstraction from) the part of the world covered by "that".

It is perhaps for this reason that babies (to about nine months) and most (or all) animals seem unable to comprehend the pointed finger: it does not merely point towards something, but also away from other things. There was no doubt a long evolutionary history, before the human species could grasp it.

Another marvel occurred when our ancestors managed to associate a word of some sort with the object pointed to. This is the act of **naming** or verbalizing (putting into words). A name is conventional insofar as the word is arbitrarily chosen; but the thing intended by it – whether real or imaginary, objective or subjective – is not invented.

Once some indicative words have been coined, knowledge often progresses by analogy; rather than the use of similes, this consists of creative assimilation by means of *metaphor*.

For example, the mental domain is empirical with regard at least to mental sights and sounds, which are similar to physical sights and sounds. Once this domain is established, it is permissible to assume "mental emotions" by analogy to those felt in the body. However, here the analogy is metaphoric, rather than based on simile, since mental emotions are not so concretely evident.

Some words we use have been consciously invented by an individual to put a handle on certain newly discovered things; others (the large majority of them, probably) arose more unconsciously in the course of history, through the give and take of two or more people trying to exchange information and instructions.

The property used in the **definition** is not all that the word refers to. A word is defined by some supposedly *constant and distinctive* property (or set of properties) of the object(s) it refers to, precisely because we are thus (if we supposed rightly) sure to always and in all cases find this property in the object(s) concerned and in no others. There may be and usually are many other properties equally eligible for the role of defining property. Moreover, we do not intend by our act of definition to ignore or exclude the less permanent and widespread properties of the objects concerned.

The definition of a word is not something essentially verbal – it is not other words. The verbal definition only serves to draw our mind in the direction of the intended property; the words used are mere means to this end. If definition were

only verbal, knowledge would consist of a suspended cloud of ultimately meaningless movements, grunts and shapes.

Use of words is not evidence of understanding. A proof of this is the experience we sometimes have of reading a sentence again and again (saying the words in our head) without having an inkling of what they are saying (due to our inattention – our failure to focus on their meaning, in addition to their shapes and sounds). Philosophers who equate thought with verbal thought fail to take such evidence into consideration.

It is important to realize that definitions *may change over time*, in scope or altogether. If a term is *predefined* by some experienced or inferred character, its definition is pretty well immutable. But this relatively 'deductive' approach is only one schema of definition. In the more common case of *inductive definition*, the sense of a term is not fixed, but a tentative hypothesis in an ongoing research. We do not know at the outset what defines the referents thought of, but gradually try to answer that question by trial and error.

Some philosophers tend to regard definition as arbitrary and conventional, because they think of all definition as predefinition and ignore inductive definition. Furthermore, they confuse word and concept, and consider that since the word chosen for a definition is initially freely chosen and always changeable, the relation of the concept to its meaning is equally open to choice.

The difference between use of a word as such or while intending its meaning should be kept in mind. For example, disjunction can refer to underlying meanings, or to a choice of wording for the same meaning. The former is substantive disjunction, the latter merely verbal. The former implies a question ("X or Y?"), whereas the latter effectively stresses by repetition ("X1 or X2" just means "X, however named").

Note that the same word may be used for different referents (homonymy, ambiguity); and conversely, different words may be used for the same referents (synonymy, equivocation).[16] This may occur within the same language, or in different languages.

2. Traditional Distinctions

How meaningful and valuable are the traditional distinction(s) between the **denotation or connotation**, or the **intension or extension**, of words or concepts? These qualifications are somewhat ambiguous and equivocal, and the doctrine(s) concerning them are unclear and doubtful. They are colloquially used, but rather variably and vaguely.

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[16] Also note the terms: Two words are 'homophones', if they sound but are not spelled the same (e.g. red and read). A word is 'polysemic', if in addition to its original meaning (e.g. the red color), it has been assigned new, incidental meanings (e.g. a 'red' is a communist, due to red being the color of the communist flag).

The ‘denotation’ of a term usually means its definition, i.e. to the defining aspect of the things the term refers to; in contrast to the ‘connotation’ of the same term, which then refers to all non-defining aspects of the things meant by it[17]. Thus, these concepts divide the characteristics of a thing (or class of things) into two sets: the essence (denotative aspect) and the non-essentials (connoted aspects). Obviously, some things are thought of so precisely and exclusively that they have a denotation but no connotation.

Note that these same terms are sometimes interpreted a bit differently, so that ‘denotation’ refers to the totality of meaning, while ‘connotation’ is taken to mean more specifically the essence. This can be confusing, since the earlier sense of ‘denotation’ and the later of ‘connotation’ mean about the same – so be careful! Moreover, in cases where the object thought of is very simple, the denotation and connotation in their latter senses will be coextensive.

Similarly, usually, when we consider the ‘intension’ of a term, we focus on the common attributes of the things referred to, and especially on its distinctive, defining property; whereas considering the ‘extension’ of it, we turn our attention to the multiplicity of things referred to, scattered in the world and in our experience of it. In other words, these two concepts are designed to direct our awareness to different

[17] In colloquial usage, ‘connotation’ is often taken to suggest association of ideas, or at least verbal association; this is not exactly what is meant here.

aspects of the same thing: on the one hand, what it is that makes of certain objects a *kind* of thing, versus the *instances* of that kind[18].

Note in passing that these concepts ought not be confused with 'intensity' and 'extent' of awareness (although it might be argued, not very convincingly, that intensive consciousness is more intense and extensive consciousness is more extended). Also note: the expression 'intension' is not identical with 'intention', in spelling or meaning, though they are related; the latter is a verb denoting a cognitive and volitional act by a Subject: intending a word to have a certain meaning is convening such word and meaning to be attached together, so that henceforth the one draws our attention to the other.

Thus, it would appear that denotation (in its first sense) and intension (in its narrower sense) may be roughly equated, and identified with the essence or definition of the thing discussed. However, connotation (in its first sense) and extension are divergent in meaning, the former covering the wider aspects of intension, while the latter focuses on the underlying occurrences of the thing discussed. For this reason, the two distinctions are not identical, though they overlap somewhat.

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[18] We may also apply them to an individual thing, insofar as an individual *in toto* is the sum of its particular manifestations in space and time – so that it is technically very similar to a class.

Sometimes, as just considered, the qualifications seem to refer to one and the same term. Each term is thought to have both a denotation and a connotation, or both an intension and an extension: these are considered different perspectives on the same thing, different aspects of meaning. For example, ‘humans’ may be thought of with reference to the properties that constitute each and everyone of them, or as a group of entities with these properties.

Sometimes, however, it seems that different though connate pairs of terms are intended by each of these distinctions; i.e. one term is denotative and its ally is connotative, or one is intensional and the other is extensional. This is suggested by examples often given, such as the contrast between ‘humanity’ and ‘humans’ – clearly, though their intents are related, these terms are not one and the same.

Note anyway: these distinctions are not only applicable to ‘entities’ and their properties and instances, but to any category of thing – ‘qualities’, ‘actions’, etc. For examples – the quality ‘green’ as such and its particular occurrences here and there, or the action ‘dancing’ and every variant event that can be so characterized, and so forth.

Our ability to intellectually distinguish between a defining property and other observed properties, or between a definition and the things that have this defining property, should not be taken too literally. All aspects of an object’s existence, all contents of a class, must continue to be taken

into consideration, whatever distinctions are made. Intellectual distinction is not actual separation.

As a practicing logician, I have found these various distinctions relatively confusing and of little use. I do use three of these terms occasionally, but I do not remember ever having really needed to use the notion of 'intension' to elucidate some logical issue. The concept of 'extension' has often been useful to me (as to most other logicians), but this includes within it the connotation of intension[19]. It seems very artificial to me (and many others) to think of the intension of a set of things *apart from* their extension, or vice versa.

It might be suggested that a more modern terminology for this distinction might be 'meaning' vs. 'reference'. But as far as I can see, the intention, meaning and reference of a term are all ultimately the same thing. The difference is only one of emphasis, at best: intention emphasizes an underlying

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[19] Thanks to the idea of extension, we define 'quantity' (all, this one, some) and develop syllogistic theory (e.g. distribution of terms). I also often use this term with reference to extensional modality. But observe introspectively, and consider how extension is thought in practice: e.g. to think of 'humans' *in extensio*, we mentally project a few human shapes without clear features and perhaps wordlessly refer to some human samples in our memory or currently in our sight. In all, just a few imagined shadows and some features in a couple of sample remembered or perceived cases! And note: even in this minimal evocation, there are intensional aspects.

psychological act; meaning signifies a logical equation; reference is a reminder of where to move attention towards.

> Concerning ‘entities’ – the original suggestion seems to be that the world consists mainly of numerous, discrete bodies (of material, mental or spiritual substance) in space and time, each of which may be viewed as an aggregate of various qualities, states or attributes, and to be undergoing a particular course of motion, change and action.
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> In one version, one of these properties is the veritable ‘essence’ of the thing, that which can objectively be identified with and equated to the entity as such – every other property being incidental (though fixed) or accidental (because fluctuating) relative to that. In this extreme version, the entity proper or essence is the ‘thing in itself’, whereas all else associated with it is mere adjunct to that. Here, the essence is conceived as in principle capable of existing ‘by itself’, ‘independent of’ non-essential properties.
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> A milder version of the doctrine is that any permanent, distinctive and universal property may arbitrarily be considered the essence or that all these together count as the essence. This viewpoint would deny that the essence is conceivable as existing apart from other fixed properties, allowing only accidental properties as irrelevant to or outside the essence, arguing that

separation has to be found to occur empirically for such distinction to be meaningful.

Others argue that even non-essential aspects of an apparent entity must be counted as part of it, even though they may be temporary, nonexclusive and/or not general. There are apparent entities, but this concept refers to a whole thing in all its variations – not to any selected substratum. Some conclude from this argument that there is no entity at all, just a changing contiguity of cognized states and events that we arbitrarily mentally isolate together and give this (or some more specific) name to.

Another issue arising in this context is that of 'universals' – just what is it that common attributes have in common, that allows us to name two things with one name? I have discussed this issue too at length in other writings – for instance, pointing out the inconsistency of the Nominalists, who do not explain on what grounds they freely refer to 'one' name while forbidding others to refer to 'one' thing named.

In my view, the concept of entity is legitimate inasmuch as there *seems* to be entities already at the experiential level. The mere phenomenological fact that there *appears* to be entities – i.e. that we do not just perceive series of disconnected phenomena and arbitrarily tie them together, but we perceive phenomena as apparently having a certain continuity in spite of perceived

fluctuations – this fact is enough to justify an initial concept of entity.

Philosophical rejection of the concept is still logically possible thereafter – but one would have to bring forward some unassailable arguments. I know of no empirical evidence or logical antinomy capable of causing such rejection, so I remain attached to the concept. The onus of proof (or rather of disproof) is on the skeptics, since the concept was based on appearance.

However, I may have already abandoned this defensive posture and joined the opposition, when I argued that all boundaries between things are artificial constructs, in my book *Phenomenology*[20]. So let us stay open-minded!

In the light of these underlying philosophical issues (which are epistemological and ontological, as well as logical), the proposed distinction between intension and extension of a term should be indulged in very sparingly and critically.

With regard to the adjectives 'denotative' and 'connotative', I would suggest an excellent justification of them would be to apply them, respectively, to *the deductive and inductive approaches to definition*. In the former case, we focus on a previously cognized (established or imagined) property as a fixed definition, and wonder what (new or specific) instances it applies to; whereas in the latter case, we repeatedly

[20] See chapter IV, sections 4 and 5.

research and adapt our definition of the distinguishing common attribute of a set of things (they appear someway similar at the outset, and we try to gradually determine exactly why so).

Thus, a term functions denotatively, when we take the definition as given and use it to identify the instances it applies to; whereas, a term functions connotatively, when its definition is still open and variable, and we are rather led on by our wordless insight (or even vague feeling) that the things we so named do have some distinctive common property that we have only to find (and thus justify our initial search). These approaches remain flexible and interchangeable. Occasionally, we may start in one mode, and later switch to the other, according to need.

3. Logic and Linguistics

Logic and linguistics overlap to some extent; but they are not coextensive or in a genus-species relation. They are considerably different studies, though they have interests in common. Linguistics studies statements as words, sentences and texts, with little interest in their underlying meanings – compared to logic, for which they are concepts, propositions and arguments, deeply charged with meaning.

Some properties of words are of interest to both disciplines, though with perhaps slightly different perspectives. For instance, grammarians have observed that words may vary in

form according to their position in a sentence. For example, in "I do not like what this is doing to me", the pronouns "I" and "me" (or he-him, they-them, etc.) refer to the same person – but the former concerns that person in position of subject, while the latter concerns him or her as object. For grammarians, this observation is mainly about use of pronouns (morphology of words) and sentence structure (rules of syntax)[21].

They may point out that some words are different because, though they refer to the same referent, they refer to it in a different *relational position*. This comment is not however merely about language; clearly, it has semantic undertones, i.e. it refers to some extent to the underlying meaning of some of the words. The logician would emphasize that aspect, and conclude: we may be justified to use a different name for the same thing, if we wish to signify a difference in our perspective towards it in a given context. In such cases, the word change is technically useful, as an aid to ordering and clarifying thought.

The acceptable wording and order of words in a sentence, in a given language, is an empirical given for linguistics. Some variations in wording and order may be permitted within that language, or may occur over time, or comparing one language with another; but outside such existing range of rewording, some sentences are grammatically unacceptable. I

[21] In French grammar, it is the distinction between the nominative and the accusative cases.

could not legitimately, in English, write: "some sentences unacceptable are grammatically", even if you understood me![22]

Our natural languages, by the way, have many imperfections. In English, for instance, we lack a 'common' (or 'neutral') gender, i.e. one that we could use for both males and females indifferently. This forces us (in this age when discourse is addressed to women as well as men) to make clumsy statements using "it", "one", "we", "he or she" or "they". Another example is when pronouns become confusing because two or more subjects are discussed with the same pronoun; e.g. in "after they fought them and they became blue in the face" – it is not clear to whom the latter "they" refers, those who fought or those who were fought.

There are aspects of language, which emerge from the serial arrangement of words in sentences, which are not directly relevant to logic. Contrary to what many people suppose, logic is not overly concerned with such issues, provided the intention is reasonably clear. For example, logic does not

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[22] Noam Chomsky (American, b. 1928), the founder of modern 'generative grammar', distinguishes between 'deep structure', which consists of facts and rules found common to all languages, and 'surface structure', which refers to the grammars of specific languages. Incidentally, in my view, deep grammatical structure is an *ex post facto* construct used by the grammarian to summarize features found in all languages. Deep grammar differs from logic as such, in that the former is essentially verbal whereas the latter can be pre-verbal. But the two converge in their common concern with what underlies actual language.

care whether we place the subject, copula and predicate of a proposition in that order, or in any other order we please[23]. Logic does not even require that we express a proposition in words – it suffices if we wordlessly intend some meaning in our thought, for logic to evaluate our underlying thought.

Notwithstanding, the verbal sequence is usually intended to convey some logically relevant information. Thus, the categorical form "S is P" could be reshuffled any way we want without affecting its meaning; but in English, we have the convention that the term before the copula "is" is intended as the subject and the one after as the predicate. Similarly, in "X becomes Y" a chronological sequence is intended from X to Y, and in "if P, then Q" a logical sequence from P to Q. The tacit conventions enable us *to avoid lengthy explanations* every time as to which item precedes which. They serve to convey a maximum of information in a minimum of words.

Another interesting example (more comparatively): the adjective generally comes after the noun in some languages (e.g. in French, le chien noir), while in others it is placed before (e.g. the black dog). Logic might ask: which is more "logical"? The French order seems more rational, because one would want to think of the entity (dog) before thinking of

[23] This example of subject, copula and predicate, by the way, is often given as an objection to formal logic – but such critics merely display their own misunderstanding, their own confusion between logic as such and the words through which we may transmit it.

its attribute (black). Perhaps the English order reflects a more empirical stance: one sees the entity's particulars (blackness) before realizing its totality (dogness). In conversation, then, the French put you in the overall picture first and then give you details, whereas the English require you to hold onto details before you even know what they are about![24]

One could suggest that different languages are similar in many respects due to their having common objects, but dissimilar in many respects due to their handling the serial aspects of verbal discourse in various ways. The common objects naturally restrain divergence; whereas issues like order of words are relatively accidental, so that their treatment is optional and conventional.

Similar comparisons could be made in all fields of linguistics. The peculiarities of each language in comparison to others may, upon reflection, seem more or less "logical" or "natural".

Logic is also, of course, interested in the underlying psychological and material facts. How thoughts are put into words in accordance with a language and its rules is a fascinating object of study, which some linguists have made valiant inroads into. They have, for instance, pointed out how verbalization requires comparison of the present situation to similar ones in the past, so that the language used is in

[24] It is interesting that historians of philosophy usually classify French philosophy as more rationalist, and English as more empiricist.

conformity with accepted practice, even while it is necessary to adapt creatively to the new variation.

Thoughts arise in our minds gradually; they are verbalized serially, word after word; they are gesticulated, spoken or written down in sequence, too. Discourse is thus inevitably shaped like a string of cognitive and verbal events. Thus, even though no particular thought or word order need be considered more natural or logical than any other, it must be acknowledged that some sort of ordering will occur. It is therefore useful to adopt linguistic conventions, as we indeed do, to standardize and thus facilitate our discourse.

Logic may also acknowledge that, once such linguistic convention is adopted by a population group, it may somewhat affect their "ways of thinking". Different languages instill different habits of thought. Indeed, the reverse may be historically true in some cases; namely, that certain habits of thoughts were solidified in the early stages of a language[25] (as a result of which the ancestors of a group continue to influence their descendants).

There are other respects in which logic and linguistics may or may not have common interests. Certain cultural, social or political aspects of language may be of little relevance to

[25] Why do some languages involve more "flexion" than others? The differences may not reflect "ethnic" characteristics, or genetic makeup, but perhaps simply the accident of some first thought taking a certain shape rather than some other, and then being imitated on and on.

logic. For instance, rhetoric may interest linguists from an aesthetic point of view or as an effective way to political power, while the logician will focus exclusively on the validity or fallacy of the argumentation involved. For logic, poetry is of little interest, except as a nursery for the cultivation of new linguistic forms.

For the logician, language is primarily a tool of individual thought, facilitating acquisition and storage of knowledge, and only secondarily a tool of social communication and action. In principle, a human individual could and would invent a language to think with, given sufficient time (and genius and motive). In practice, as some famous "experiments" in isolation have shown, no one would have the enormous amount of time required (not to mention the cerebral power and occasion). Historically, language has arisen very gradually[26] and variously, as a collective achievement of mankind.

Indeed, the intelligence of mankind (our biological ability to think conceptually and rationally) did not antedate language ready-made, but evolved and developed in tandem with language. Human thought, language – and the underlying bodily organs – grow together, feeding off each other. Each little advance in the one requires or generates an advance in the other. Results are cumulative, building on past

[26] Though some linguists suggest that the early languages were not as simple they expected. There may, then, have been some quantum leaps in the evolutionary process.

acquisitions. But anyway, such small advances must occur in some individual(s) to begin with, before they become a collective acquisition.

4. Dialogue

A Russian Marxist linguist of the early 20th Century (whose name I have forgotten) has suggested that all monologue is dialogue – and I agree with that to some extent. Monologue is often virtual dialogue – if only with oneself, or with an imagined other[27] (such as a future reader of one's books). However, dialogue does differ from mere monologue in that, within real dialogue, each unit of monologue is successively tailored in some way (which may or not be relevant) to reply to the previous remarks of one's respondent, the intent being to actually effect a change in the other's beliefs, attitudes or behavior.

In **conversations** between two (or more) people, information and reasoning can be transmitted from one to the other – one way, or back and forth – provided they have certain common grounds. They need to have some past or present (or future) common experiences, which make it possible for their words to have mutually agreed referents. These experiences – together with others that each separately has – will stock their respective minds with data bases. They may have already

[27] We may even in some cases fantasize specific responses from our imaginary respondent.

discussed and harmonized their databases to some extent, but never fully.

Each, within his or her mind, has somewhat ruminated over and digested at least some of that pool of data. But they have probably not done so in quite the same way or to the same extent. For their knowledge bases are not identical, and the effort and processes they have put into assimilating them are bound to differ. The courses of their lives, their senses and brains, their intellectual powers and logical skills, and their characters are naturally all different. So we say they have different contexts.

As the two converse, their minds will refer to shared memories, of perceptions or conceptual information or logical inferences. And all this is of course what makes understanding between them possible.

But to correctly depict interpersonal discourse, it is equally important to emphasize the *mis*understandings that occur! Information and reasoning can be correctly transmitted to some extent, but there will likely always be *failures* of transmission. And of course, the latter (the blanks and missteps) can equally affect the resulting interaction between the people involved.

Each one of us sees and hears what he or she more or less prepared to see and hear. We take in what we please, and ignore or keep out the rest. We tacitly or explicitly reword the messages received, to assimilate them within our own framework and knowledge context. Value judgments come

into play, whether in the structured form of an ideology or in vague subconscious waves – turning the discourse received into a somewhat other discourse.

Knowledge transmission requires efficient communication. The speaker or writer must be good at formulating just what he or she means, clearly, precisely and concisely. People often interpose irrelevancies that needlessly divert attention from their main message; they embellish their discourse for psychological or social reasons, i.e. trying to put across some additional, unrelated message(s).

At the other end, the interpretation made by the auditor or reader does not inevitably match the intended message, because he or she may not be as receptive, focused, knowledgeable and logically skillful as required.

5. Poles of Duality

Concerning the principle, advocated by many, especially oriental, philosophers, that poles of duality (e.g. good-bad, light-dark, etc.) arise together – certain comments are worth making.

Oriental philosophers pursue a non-sorting mode of consciousness, the awareness prior to the making of distinctions; for this reason, dualities are obstacles in their eyes. Such Monist consciousness is, however, rarely if ever attained.

I would reply, ontologically: since we can conceive of Monism, then we can also conceive of a universe with *only* good or *only* light, etc.; i.e. a world with one polarity of such dualities is logically possible. Of course, this would only be strict Monism, if this quality was quite alone and no other quality was found in the world (i.e. not just not the other polarity of that quality). Of course, also, we – those now conceiving of that world – would not be distinguishable in it, since then there would be two things in it – viz. object and subject.

But note such solitude of existence could not apply to just any quality. Negative concepts like 'imperfect' cannot exist alone[28]; i.e. an *only* imperfect world is inconceivable, as some part of it must remain perfect to exist at all. However, this remark may rather concern the next observation.

From an epistemological and psychological (rather than ontological) viewpoint, there is some truth in the said oriental belief. That is, *the idea* of good or light is not possible without *the idea* of bad or dark. Imaging one pole necessitates our *also bringing to mind* the other pole for the purpose of contrast. This is due to the mechanics of concept formation: it functions by *making distinctions* as well as by identification of the things distinguished.

Because it is only by way of contrast to dissimilars that similars can be classified, every word, every concept, has to

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28 As Alan Watts pointed out, somewhere.

make some room for its opposite; we cannot comprehend a term without having to think of its opposite. Thus, one might suggest: although logically, X totally excludes nonX – psychologically, "X" may be said to be say 99% "X" and 1% "nonX".

Another point worth making, here: contradictory terms, such as X and not-X, have equal logical status, i.e. their formal treatment is identical; however, phenomenologically, affirmation and denial are very different: the first signifies an actual experience (phenomenal, through the senses or mentally, or non-phenomenal, intuitively) – whereas the latter signifies a rational act, a conceptual report that some anticipated experience has not occurred. Strictly, perhaps, experiences should be verbalized affirmatively, while negations should be cast in negative terms. In practice, this is rarely followed.

A positive word like 'silence' or 'stillness' may indicate a negative event (no sound, no move). However, even in such cases, there may be an underlying positive event; in our examples, although silence refers to the non-perception of any sound phenomenon – we may by this term mean rather to refer to our will to block sounds, which volition is something positive, though without phenomenal character, known intuitively.

Similarly, I suspect, some negatively cast words may in fact refer to positive experiences, although there may be a good reason why the negative form is preferred. For example,

‘unabashed’ simply means without apology, but viewed more closely refers to certain behavior patterns; so, though negative in form, it is rather positive in intent. However, the negative form is not accidental, but serves to indicate the missing ingredient in the behavior patterns, which makes them socially questionable.

4. ABOUT FORMAL LOGIC

1. Form and Content

The notions of form and content are simple enough, though the uninitiated must first have them explained. 'Form' and 'content' are relative terms used in different contexts within formal logic. The basic idea is that of container and contained.

In one sense, a word is a form, and the word's meaning – the real or imagined things it refers us to (i.e. that we intend when we use the word) – is the content. Thus, the personal name 'Joe' refers to an individual man we know by that name; the common name 'man' refers to an open-ended group of individuals like Joe, Jim, Nathalie and others.

We can also call any abstraction (or concept) a form and its (perceptual or intuitive) concretes the content. In this perspective, our concept of Joe is a collection of an immense number of sights, sounds, etc., across time and in various circumstances, that we have found fit to unify under this one idea. Similarly, in the case of general concepts like that of man: they refer to a presumed unity in the midst of large ongoing collections of material, imaginative and introspective data about Joe, Jim, etc.

Till here, we are in the everyday practice of logic. We enter the more abstract field of formal logic, the moment we posit a symbol like ‘X’ or ‘Y’ to stand in for *any term* like ‘Joe’ or ‘man’. At this stage, we formalize propositions.

For example, categorical propositions are written: ‘X is Y’, where X is the subject, Y is the predicate, and ‘is’ is the copula, i.e. the intended relation between X and Y. Note that ‘is’ is a form in the preceding sense; it is a bit less abstract than ‘X’ or ‘Y’. Note also that the relation we signify by ‘is’ does not exist apart from its particular terms (X and Y, in this case); it refers to the cement between them, which is also part of them. It is only cognitively that a distinction between these items exists; at a concrete level, they are inseparable.

Besides ‘is’ there are many other categorical relations, including copulas like ‘becomes’, ‘makes’ and so forth. Moreover, categorical propositions have other features not so far mentioned that are on a similar level of abstraction as the copula, such as the quantity (all, some, this one) and the modality (must be, can be, actually is).

We could therefore further formalize categorical forms, by means of symbols like (say) “Q(X)MR(Y)”. This concoction is of little use, however, because little can be said about categorical propositions viewed so generally. More interesting is to realize that there are other propositional forms, like the comparative (e.g. “X is more Y than Z”) or the hypothetical (e.g. “if p, then q”), for instances.

At this stage, logicians propose a general symbol, say: "P" (or "Q" or whatever), to stand for just *any sort of proposition*. This artifice of formalization has been found very useful. For instance, the p and q in "if p then q" are such general symbols. They allow us to study what the form "if-then" entails, without having to specify what kind of proposition p or q might represent in a particular case. We can study the "if-then" relation as such, in a very general way.

Formalization, then, is just a way to *freely study the logical properties of different propositional forms, without regard to their content*. A 'form' is simply a shorthand expression for any number of particular propositions, or 'contents'. What we say about the form applies to all the contents. The wider the form, the broader the range of possible behavior, and the less rules there are for it. If any content is specified, or a more specific form is considered, the behavior pattern becomes more narrow, and the rules more restrictive.

2. Singular Subject

A singular subject is usually *identified*:

- indicatively (as "this X"), or
- by name or pronoun (e.g. "John" or "he").

But there are also *unidentified* singulars, which may be:

- categorical (as in "*someone* stole my car"), or

- conditional (as in "*whoever* it was, I'll find him").

The same distinctions apply to plural subjects, groups: "these X" is indicative; "The Brothers Karamazov" are named, "they" is the corresponding pronoun; "some people" and "whoever they be" are the unidentified group of individuals.

The singular subject "**This X…**", which is sometimes read as "This thing, which is an X,…", may be further analyzed as follows:

1. First, I say "**this**" (demonstratively pointing to something, or in some other way directing attention to it), to produce in the auditor an awareness of a specific object, i.e. the minimum knowledge of it given within the perceptual glance or remembrance produced.
2. Secondly, I categorize the object as "**X**", i.e. classify it (occasionally, exceptionally, if the sentence is intended to convene on a word or transmit existing language, I just name it). This adds to the auditor's knowledge, making him aware of the character X apparent in the object previously indicated (or, in the case of mere naming, aware of the name).
3. In a third stage, I may propose a predicate, e.g. "This X **is Y**", thereby more precisely categorizing the object and increasing knowledge of it. Such predication may be based on some experience or on a rational inference (such as syllogism).

The point being made here is that propositions are not ready-made, static wholes (as some modern logicians seem to regard them), but thoughts that are gradually built up in the mind and comprehended stage by stage. *Subsumption is not a mere abstract relation, but signals a mental process of becoming aware of and assimilating information.*

Likewise, a sentence is not mentally or orally formed in one shot, but gradually emerges. Our first try might just be an approximation of what we mean, expressing a thought that as yet remains ambiguous and uncertain in some respects. Then, reflecting on what we have just said, we might be moved to attempt a clearer, more precise expression of our insight or observation. Or we might discover and repair logical or grammatical faults in our previous statement. Sometimes, all such refinement is achieved on the first try; other times, we need successive tries to obtain a satisfactory result.

Conversely, when a logician seeks to logically evaluate some discourse, he has to do a considerable amount of preliminary linguistic analysis[29], to properly and fully interpret what is being said, before issues of formal logic come into play. This background processing, be it conscious or subconscious, is often insufficiently stressed by logicians.

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[29] Such as that taught by J. Searle.

3. Special Forms

The form "**It happens that X**" or "**There is X**" is used to refer to events without pressing them into a strict subject-predicate form. For example, "It is raining" could have been stated as "Water drops are falling from clouds in the sky" – but we colloquially prefer the brief and phenomenal description, acknowledging or indicating the fact that there is rain in the field of vision (out there somewhere), without specifying whence this rain is making its appearance (the sky, clouds).

In such cases, we may retain the copula "is" to signify the presence of something, but we do not intend thereby to force the event described into a standard "S is P" format. The "it" in "it is raining" is not intended as an authentic subject. The latter (the sky, clouds) remains tacit. The form used is only superficially like the standard form.

Contrary to the certain critics of 'Aristotelian' logic, we do not hold that "S is P" is the only form of proposition. There are other categorical forms, as well non-categorical forms. The job of logicians is precisely to notice and investigate an ever-widening circle of forms and arguments. Nevertheless, the "S is P" form is basic to rational knowledge. Propositions like "it is raining" do not belie this standard, but require reference to it to be fully clarified.

The question to ask in differentiating a form is – is *its logical behavior* different? If the eductions and syllogistic inferences from it are different from the standard form, then the deviant

form should certainly be given special treatment. If its inferences are essentially the same, then logicians need not give it more attention than necessary.

Logicians have tended to regard propositions as built up from their parts (terms, copulae and operators), but the process is in truth more *inductive*: we first look upon the whole event (e.g. a woman smoking), and out of many such events, by comparison and contrast, we mentally isolate the parts (woman, is, smoking). Only after this, can we name the parts and put the words together in a sentence.

All propositions are concepts, like the terms, copulae and operators (e.g. if-then, either-or, etc.) that constitute them. If they have (established, existing) referents, they are "true"; if not, not. Likewise, all concepts are implicitly propositions, since they affirm their referents (tentatively or definitely to exist). Forms like "There are…" or "It is…" reflect this technical equivalence between whole and partial concepts.

Note that such forms can also be modal: "There might be…", "There are sometimes…", "There is necessarily…", etc.

4. Fuzzy Logic

One function of "fuzzy logic" is to process concepts whose referents are not clearly definable.

Logicians in their theories should be careful to reflect the varieties of human thought processes, and not try to put their

square pegs in round holes, e.g. by demanding that all subjects be defined by a universal predicate.

Normal concepts are defined by a common and distinctive character, and are therefore mutually exclusive: anything *with some* X in it is an X; and anything *without any* X in it is a non-X. However, some concepts refer to the *predominance* of some character Y, without insisting on the total absence of its contraries.

> For example, the term "Indo-European language" refers to words and grammatical forms that are *mostly* Indo-European in origin, although some other roots and constructions (e.g. Semitic) may admittedly be found in it. Or again, the Bible's "historical books" are *not only* historical, but contain some legal and other material.

The "fuzziness" of such concepts is not due to their having *not yet* attained (inductively) an optimum clarity of definition – it is *inherent* to their subject matter. It is not a conceptual flaw, but a reflection of the mixed state of the things referred to.

How can such concepts be logically processed according to Aristotelian syllogism? An example is the third figure mood:

> Most Q are R, and
>
> Most Q are P
>
> Therefore, some P are R.

This argument is strictly valid, since the middle terms ("most Q") of the two premises overlap. If the effective middle term is a "fuzzy concept", the premises would both apparently refer to "all Q", but in fact be based on the form "each Q is mostly Y, though partly non-Y".

One should of course be careful in such contexts not to commit the fallacy of Four Terms. This formal fallacy is very common in practice, usually by way of *ambiguity* – the middle term verbally seems (or is made to seem) the same in both premises, but in fact does not refer to the same cases, so that any inference linking the major and minor terms through it is invalid.

5. Added Determinants

Certain 'arguments' remain informal, because they cannot be formally validated. They are intended more rhetorically or poetically, than strictly logically. They are commonly used because of their usefulness in discourse: they make a point with a punch.

These include processes that have been labeled 'added determinants' (or 'complex conception'), although I would hesitate to consider such processes to be sufficiently uniform to be clearly categorized. Rather, I would speak of a loose collection of diverse forms: an open-ended catchall for leftovers.

A couple of examples should suggest the degree of variety.

(a) "Power corrupts – absolute power corrupts absolutely". A statement like this is not meant as an argument; rather, the first general statement is *augmented* by the second one, which quantifies it and specifies the extreme degree of it.

By syllogism, we can *infer* from "power corrupts" that "absolute power corrupts" – but not that the latter "corrupts absolutely", which is an additional observation.

It could also be argued that "power corrupts" refers to small quantities of power, so that we may *a fortiori* infer that larger quantities of power corrupt even more. Note however that such inference would not be in accord with the sufficiency ("*dayo*"[30]) principle.

In sum, the statement "power corrupts" does not by itself reveal whether there is concomitant variation and proportionality between power and corruption, and so cannot *formally* imply that "absolute power corrupts absolutely".

(b) "All love is wonder; if we justly do account her wonderful, why not lovely too?" Here, a John Donne intent on seduction argues that given 'love implies wonder' it follows that 'if the woman is lovely, she is wonderful' (actually, he reverses the conclusion, but let us ignore this poetic license).

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[30] See *Judaic Logic*, chapter 4.3.

Such an eduction is of course formally open to debate. The premise seems to be a psychological statement, that being in love gives rise to an experience of wonder; whereas the putative inference, characterizes the female object of his attentions as lovely and wonderful. The process is made to seem like an application of a generality to a particular case. The terms are admittedly not unrelated, in that the poet's psychological condition affects his perception of the woman. Still, the shift from his rather subjective assessments to quasi-objective characterizations is not strict logic.

Note the grammatical differences between the above two examples. In (a), a more or less common determinant (absoluteness) is added, as an adjective and an adverb respectively, to the initial noun and verb. In (b), two abstract nouns are turned into adjectives relative to some added third noun (the woman); in this case, the addition is a 'determined' rather than a 'determining' factor.

Many more examples can be adduced, to show that it is best not to quickly generalize. Each example encountered should be analyzed individually, to understand both its power of conviction and its hidden sophistries.

6. Relational Expressions

When considering a propositional form commonly used in our thought and discourse, we should identify its minimum meaning, the most widely applicable interpretation.

Thus, the form "**Unless P, Q**" means that if P is absent (or false), Q is surely present (or true), though it does not really tell us whether in the presence of P, Q is necessarily or just possibly absent. Thus, this form implies "if not P, then Q" – and "if P, *not-then* Q", though possibly (in some cases) also "if P, *then not* Q".

The form "**Though A is B, C is D**" may be variously interpreted. This could just be intended as a statement of *contrast*, drawing attention to the divergent attributes (respectively B, D) of the subjects (A, C). Or it could be a statement intended *to undermine or incite rejection of* some theory of consequence – i.e. perhaps someone thought that "if A is B, then C is *not* D", and here we are told that this alleged connection is in fact absent. In either case, note, the underlying relation (between the theses 'A is B' and 'C is D') is conjunctive rather than conditional.

The form "**As a B, A is C**" may be expanded to the syllogism: "A is B and all B are C, therefore A is C". Notice the underlying general statement involved (tacit major premise). Incidentally, this form is often used as a means of ego construction: we (A) identify with a certain denomination (B), and on this basis attach to a certain behavior pattern (C); for example, "as your father, I advise you not to do this!"

More generally, a statement of the form "**Since P, Q**" is not simply a proposition, but an abridged argument. It apparently intends the apodosis: "If P, then Q; and P; therefore, Q". Usually in practice, it means somewhat more, in that there

may be a tacit major or minor premise R that we take as granted and understood. In such cases, we would render it as: "If (R +) P, then Q; and (R +) P; therefore, Q" (the argument is traditionally then referred to as an 'enthymeme').

Note also: very often in practice, the relationship between the antecedent and consequent in "Since P, then Q" is not mechanical, but volitional. For example, "Since you did this, I will do that!" In such cases, though the underlying conditional proposition has natural modality, and the consequent does not automatically follow the antecedent – i.e. the "then" is a bit of an overstatement.

Such overstatement of connection is common in discourse, even in purely mechanical contexts, to repeat. As long as some conditions remain tacit, the "then" involved is not to be taken literally. For example, in "if the machine has this extra gadget, it functions continuously", it is clearly intended that all the other parts of the machine, in addition to the gadget mentioned, also play a role in producing the movement described.[31]

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[31] Generally, in causation (ignoring natural spontaneity) in contrast to volition, sudden motion cannot emerge from static conditions – a trigger is needed. Thus, as I mention in *Volition and Allied Causal Concepts* (chapter 8.1) causation of motion refers to the transition from "if x, then y" to "if not x, then not y" or vice versa, rather than to a state x (or non-x) completely causing a movement y (or non-y). Although some if–then statements seem to suggest otherwise, it is only because they refer to partial causation, i.e. they conceal tacit factors.

Another form worth mentioning is "**It (P) is as if Q**". Here, 'it' (P) refers to some event, condition, result, or connection, and 'Q' to another; and 'is as if' indicates that if the two are compared they will be found similar to some degree. The degree of resemblance might be qualified by adding "a bit" or "much" to "as if".

7. Disjunction

With regard to disjunction, the following insights are worth adding to my past comments, because I have found many people to be confused by the varieties of senses the operator 'or' may have in ordinary discourse.

The expression "P or Q or …" is very vague; it only informs us that *some* manner of 'disjunction' is involved, but does not tell us *what* form it has. The operator 'or' is thus, in formal logic, to be understood very broadly.

This indefinite sense is somewhat narrowed down by making the distinction between 'exclusive' disjunction, for which the form "P or else Q …" may be agreed, and 'inclusive' disjunction, for which the form "P and/or Q…" may be agreed.

Thus, "P or Q…" may be taken to formally mean: "P or else Q…" and/or "P and/or Q…" is/are true. The exclusive and inclusive forms of disjunctions are thus more specific and explicit; and each of them implies the more generic and indefinite form.

If only two items (P, Q) are involved, exclusive disjunction just means “if P, then not Q” (and vice versa), whereas inclusive disjunction just means “if not P, then Q” (and vice versa). Thus, the first refers to the logical relation of incompatibility, while the second refers to exhaustiveness.

Moreover, exclusive and inclusive disjunctive propositions, though not as indefinite as generic disjunction, are themselves vague or open forms. The form “if P, then not Q” leaves unanswered the question as to whether not-P implies or does not imply Q; and likewise, the form “if not P, then Q” leaves unanswered the question as to whether P implies or does not imply not-Q.

If the two forms are combined, as is formally possible, they together imply P and Q in contradiction; if P and Q are incompatible but not exhaustive, they are contrary; if they are exhaustive but not incompatible, they are subcontrary. In common discourse, contradictories are placed in the form “either P or Q”; contrariety is expressed through the form “P or Q or neither”; and subcontrariety, through the form “P or Q or both”.

Therefore, we could say that “P or else Q” means: either “either P or Q” or “P or Q or neither”; and likewise, “P and/or Q” means: either “either P or Q” or “P or Q or both”. Thus, the indefinite form “P or Q” can also be read as: “P and Q are either contradictory or contrary or subcontrary”.

Note that our choice of the words “P and/or Q” to express the generic relation “if not P, then Q” is clearly not very

appropriate, suggesting that P and Q are compatible, whereas they need not be so. The term ‘inclusive’ disjunction suffers from the same imperfection, seeming limited to subcontrariety. Since that terminology is too well established to be changed, we must simply ignore these misleading verbal connotations.

Thus, to summarize, disjunction may be considered as a generic relation between two terms or theses. This relation may be specified as exclusive or inclusive (or both); or even more precisely as contradictory, contrary or subcontrary. Contradiction occurs when both exclusive and inclusive disjunction are applicable.

> All this can be compared to saying of two items (P, Q) that they are “related by implication”. This does not tell us whether “P implies Q” or “P is implied by Q” or both. If both directions of implication are true, P and Q are mutual implicants; if only one is true, then either “P subalternates Q” or “P is subalternated by Q”.

If more than two terms are involved (P, Q, R…), the formulas are more complex. Namely, in exclusion: *if any one item is true, all the others are false*; in inclusion: *if all but one item are false, the remaining one is true*. Note that, in the former case, no two items are compatible; whereas, in the latter case, the exhaustiveness concerns the complete set of items, but if we take any two of them at random, it does not have to apply.

These two relations between three or more items may, as with two items, occur in combination or separately. In such

cases, distinguishing between ‘or else’ and ‘and/or’ becomes impractical, and the best course is to use ‘or’ and verbally define the intended set of relations. Note that matters may be further complicated in some cases because some of the items in the set have special relations that the others lack – i.e. we may intend *mixed-form* disjunctions. In such situations, explicit clarifications as to what we mean are all the more necessary.

We should keep in mind that much of the terminology in this field was invented by logicians; it is not a product of popular discourse. The word ‘disjunction’, etymologically connoting negation of conjunction (i.e. separation), first appeared in the 14th Cent. The conceptual distinction between ‘exclusive’ and ‘inclusive’ disjunction was made much later, and these terms were apparently coined only in 1942 (according to the Merriam-Webster Collegiate Dictionary).

The clear distinction between contradiction, contrariety and subcontrariety is, however, ancient, dating back at least to Aristotle, if not earlier. The concept of incompatibility is doubtless earlier than those of contradiction or contrariety; though these three terms may originally all have had the same meaning. The concept of exhaustiveness, being more subtle, probably arose later; and that of subcontrariety no doubt much later.

However, the word ‘or’ was not invented by logic theorists, but is found (in some form or other) in common discourse since way back. Certainly, the underlying notion must be

very ancient. With regard to its verbal expression, I am not so sure, having noticed that discourse in the Talmud often struggles with this. For instance, it says (*Sabbath* ב"פ): "doubting sunset, doubting not sunset, [don't do so and so]" (where we might have said: "if in doubt as to *whether or not* the Sun has set, don't…"). The items are there listed, but their relation of disjunction is left tacit, as if there was no word for it (though words existed long before in Biblical Hebrew).

The many modern variants of the word 'or' – phrases such as 'or else', 'and/or', and others[32] – are also apparently natural linguistic developments, although evidently much more recent. They presumably arose as more or less deliberate attempts, within some ordinary discourse, to remove some of the ambiguity in the word 'or'. Finally, of course, some logician came along and conventionally 'froze' the predominant meaning of each variant, so as to facilitate formal treatment.

Let us now examine the probable development of the notion of 'or'. In English, the word is etymologically related to the

[32] Note also the forms "Only P or only Q", "P alone or Q alone", "P or alternatively Q", "P, respectively Q", "P or even Q"; and there are probably many more. The meaning may not always precisely or only correspond to the ones considered here. For instance, in "I could use a hammer or even a stone for this job", the hammer is my first choice and the stone is rather a last resort, and I would not use both. Note how, although usually indifferent, in some cases, *the order of listing* of the alternatives (P, Q…) is relevant, signifying an order of preference.

word ‘other’ – suggesting that the second item listed is somehow ‘other than’ the first item listed. Now, ‘other than’ could be interpreted as ‘*opposed to*’ (suggesting exclusive disjunction) or as ‘*different from*’ (suggesting inclusive disjunction).

It might be thought that the first interpretation most accurately reflects the original meaning of ‘or’; some dictionaries seem to claim this. But in my opinion, both interpretations were vaguely intended from the start; for there is a common notion underlying the two.

The ‘or’ within exclusive disjunction means ‘not together’. Here, “P or Q” means P *to the exclusion of* Q, i.e. P only, P alone, whence P without Q (or vice versa, provided P and Q are not both true). The ‘or’ within inclusive disjunction means ‘not same’. The latter is softer: it allows that P may occur *without* Q, but does not insist on it (or vice versa, provided P and Q are not both false). The two forms are thus analogous in some respect, and the difference between them may be viewed as one of degree.

The disjuncts (P, Q) are rightly labeled ‘alternatives’, to indicate the essential fact of their being considered ‘in succession’. In exclusive disjunction, the alternatives displace and replace each other, whereas in inclusive disjunction, they do not necessarily do so. In the latter, the items are *merely listed as individual possibilities*, without prejudice as to whether they have to be separate or may eventually not be so.

We very often need to draw up a list of possibilities, without at the outset deciding whether all the alternatives are mutually incompatible, or even knowing full well that some or all of the alternatives may occur together. Sometimes, in writing, we simply use a comma instead of the word ‘or’ in such lists, so as to just avoid this issue of relation between the disjuncts. Because the practice of simple listing has obviously always existed in discourse, it cannot convincingly be argued that exclusive disjunction antedates inclusive disjunction.

We must thus suppose that *a broad sense of the word ‘or’, which leaves open the issue of whether the disjunction is exclusive or inclusive or a mix of the two*, has always existed (in some form or other). It follows that all senses of the word ‘or’ are equally legitimate in discourse, but we must remain aware as to how it may be intended.

The speaker or writer should opt for clarity; and the hearer or reader should carefully weigh the word in each context. In practice, sometimes, we make no verbal distinction between the disparate senses of ‘or’, letting context determine intent. In case of doubt, only the minimal, most indefinite sense may be assumed – i.e. the sense that is neutral with regard to the exclusive/inclusive distinction, i.e. the common property of all disjunctions.

Note that some people tend to use the unqualified form “P or Q” for exclusive disjunction, and get more explicit in cases of inclusive disjunction; while some people do the exact

opposite. Different people behave differently, and even the same person at different times; so, no hard and fast rule can be handed down.

It is, note well, always possible to say exactly what we mean when we wish to, or when (as in formal contexts) we must. We need only declare our preferred language, and that becomes our convention in subsequent discourse.

With regard to the two constructs "P or Q *or neither*" and "P or Q *or both*", the following may be added. Here, "P" means "P alone, i.e. without Q"; "Q" means "Q alone, i.e. without P"; and "both" means "P and Q", whereas "neither" means "not-P and not-Q". Thus, each form clearly lists all the alternative events acceptable to it, *leaving out* the defining unacceptable alternative – viz. "P and Q" in exclusive disjunction, and "not-P and not-Q" in inclusive disjunction.

The 'or' operator throughout these two forms is therefore the same: it refers implicitly to exclusive disjunction. The final disjunct 'or neither' or 'or both' serves to declare the disjunction not only exclusive, but also exhaustive. Note that we may construct similar forms with more than two disjuncts, of course (using as our last disjunct 'or none of them' or 'or all of them').

The vague "P or Q" form is often intended as an abbreviated version of these explicit forms. That is, when we use it we may be tacitly thinking and implying 'or neither' or 'or both', as the case may be, but we omit to say that explicitly out of laziness or the desire to be brief. More often than not, we

leave the matter open, simply because it is not very relevant to our present discursive needs. Very often, too, as already pointed out, we have not yet determined the interrelations between the theses.

Lastly, note the function of the word ‘either’ at the beginning of a disjunction, be it exclusive or inclusive. This word serves to signal that the set of (two or more) alternatives listed is *exhaustive*, i.e. that the list is complete and there are no more alternatives to consider. Thus, in the case of “either P or Q”, the intent is that “P without Q” and “Q without P” are the two only acceptable outcomes.

Similarly in cases with more than two alternatives, i.e. “either P or Q or R or…”: all possibilities are declared foreseen. If the multiple disjunction is meant exclusively, the final outcome will consist in affirmation of *only* one of the alternatives and denial of all the others. If the multiple disjunction is meant inclusively, the final outcome will consist in affirmation of *at least* one of the alternatives, though possibly more or even all of them.

The word ‘either’ delimits a list. A list without it (i.e. just “P or Q or…”) is normally considered open – i.e. it may be incomplete: we may have intentionally or unintentionally ignored some other alternative(s).

It is a redundancy to add the word ‘either’ in front of a disjunction ending in the words ‘or neither’, ‘or both’, or the like – since, as we have seen, these words already signal exhaustiveness. The word ‘neither’, by the way, simply

means ‘not either’ – i.e. it indicates that there are indeed other alternatives than those listed. Thus, in “P or Q or neither”, the ‘neither’ refers directly to “not-P and not-Q” (i.e. “neither P nor Q”), but also less directly to unstated alternatives “R or S… etc.”

Finally, it should be kept in mind that there are different modes of disjunction. In addition to the logical mode, there are the natural mode and the extensional mode, as well as the spatial and temporal modes. These are often mixed and undefined in ordinary discourse. For example, ‘or both’ or ‘or neither’ may be intended as a statement of fact (*de re* modality) or as something logically conceivable given our ignorance of the facts (*de dicta* modality). Failure to take such ambiguities into account can lead to some quite fallacious interpretations!

8. Material and Strict Implication

Material and strict implication exhibit significant formal differences in behavior. This can be made manifest as follows.

In the case of material implication, which refers to *inactualities* of truth, the hypothetical “if P then Q” means “(P and not Q) *are not* both true”. Here, the reverse is also valid; i.e. “The conjunction of P and not Q is not true” formally implies “P (materially) implies Q”.

In the case of strict implication, which refers to *impossibilities* of truth, the hypothetical "if P then Q" means "(P and not Q) *cannot be* true together". Here too, the reverse is also valid; i.e. "The conjunction of P and not Q cannot be true" formally implies "P (strictly) implies Q".

The relations involved are parallel. However, when we mix the two categories of modality, the result is significantly different. Since impossibility implies inactuality, but inactuality does not imply impossibility, it follows that "P and not Q are incompatible" implies but is not implied by "P and not Q are not jointly true".

Thus, whereas in material implication "if P then Q" is fully equivalent to "(P and not Q) are not both true", i.e. these two forms mutually imply each other – in the case of strict implication, "if P then Q" implies *but is not implied by* "(P and not Q) are not both true", i.e. the implication between these two forms is unidirectional. Knowing actual negation of conjunction does not justify assuming strict implication. [33]

It should be added that these reflections provide us with an unbeatable argument in favor of strict implication, against the advocates of material implication. If we ask: what is the "formal implication" or "implication between forms" that we refer to in this very discussion (and indeed in all discussions

[33] This is why I insisted, in the original version of *Future Logic* (chapter 24.3), that the truth-table relative to implication is only an effect, not a cause.

of formal logic - or of mathematics, for that matter)? Is it material or strict? The answer has to be: strict implication.

When we say: "(P materially implies Q) implies and is implied by (P and not-Q are not both true)", the implications between the bracketed items are strict implications, even though the implication within the first item is material. *Formal implication is logical necessity*; i.e. it is applicable under all possible conditions, whatever the content of the forms involved. Therefore, strict implication is more important to logic than material implication.

Does material implication then have any place in natural discourse, or is it artificial? I believe it still does have a place, due to the fact that all implication is denial of conjunction. When we know that, say, "P and not-Q are not both true", we may indeed *turn it around in our minds*, thinking "well, that means if P is true, Q is not false, etc." This shows that material implication is useful to the understanding, helping us *mull over* certain indefinite statements.

Note well, then, strict implication is essential to logic, and cannot be ignored or discarded in favor of material implication, as some logicians (and mathematicians) think, even though the latter has some utility.

Additionally, an oft-ignored advantage of strict over material implication is the negative form it provides us. If we understand "if P, then Q" in the strict sense, then its contradictory is the negative form "if P, *not-then* Q" (or "If P, it does not follow that Q"), meaning: "(P and not-Q) is a

possible conjunction"; whereas, in the material sense, its contradictory would simply be the actual conjunction "P and not-Q".

Clearly, the negation of strict implication gives discourse an important formal tool. We can, for instance, use it to point out the common fallacy of confusing a non-sequitur demonstration with a disproof. If we show that a conclusion does not follow from certain premises ("if P, not-then Q"), it does not mean we have disproved the conclusion ("if P, then not Q").

With regard to logic history, I would like to here correct a suggestion I made in [the original version of] *Future Logic*, that the Megarian Philo's view of implication may have not corresponded to our modern concept of material implication. The following quotation from the *Encyclopaedia Britannica* (2004) convinced me:

> "Diodorus also proposed an interpretation of conditional propositions. He held that the proposition "If p, then q" is true if and only if it neither is nor ever was possible for the antecedent p to be true and the consequent q to be false simultaneously. Given Diodorus' notion of possibility, this means that a true conditional is one that at no time (past, present, or future) has a true antecedent and a false consequent. Thus, for Diodorus a conditional does not change its truth value; if it is ever true, it is always true. But Philo of Megara had a different interpretation. For him, a conditional is true if and only if it does not

> now have a true antecedent and a false consequent. This is exactly the modern notion of material implication. In Philo's view, unlike Diodorus', conditionals may change their truth value over time."

Following this reading, we can safely assert that strict implication was first elucidated by Diodorus Cronus (also a Megarian, d. *circa* 307 BCE)[34]. Note that Philo was a student of Diodorus.

One last note on this: material implication is a logical (i.e. "de dicta") relation – and is not to be confused with any of the "de re" types of conditioning, i.e. with natural, temporal, extensional or personal conditionals. Some logicians are led into this confusion by the name "material" implication and its implied contrast to "formal" implication. But the truth is that so-called material implication is a subcategory of logical relations, just one that is weaker than strict implication.

9. Nesting of Hypotheticals

Concerning nesting of hypothetical propositions: the nested form "if p then (if q then r)" may be considered as equivalent to (implying and being implied by) the form with a compound antecedent "if (p and q) then r"[35]. From which it

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[34] For comparison, Aristotle died 322 BCE.

[35] The first form means "p and (q and not r) is impossible"; the bracketed conjunction of q and not r is impossible in the context of p, which is the same as "the conjunction of all three

follows that it also means: “if q then (if p then r)”. And since the nested clause can be contraposed to “if p then (if not r then not q)”, we can further educe: “if (p and not r) then not q” and “if not r then (if p then not q). Or again: “if q then (if not r then not p)”; whence: “if (q and not r) then not p” and “if not r then (if q then not p)”.

No matter which of these forms we choose to use in our discourse, they all mean the same thing, namely “(p + q + not r) is an impossible conjunction”, all seven other combinations of p, q, r, and/or their negations, being left open, i.e. remaining logically possible in the stated context. This is the underlying ‘matrix’ of meaning, which remains constant for the form concerned, however complicated the way we express it. If in a given context, additional forms are specified as true, one or more of these combinations left open is declared impossible, and the range of logical possibilities becomes narrower.

The laws of thought teach us that there are only eight ways p, q, r, and/or their negations, can combine together. They cannot all be false: one of them must be true; no ninth way is ever logically possible (law of the excluded middle). Furthermore, if one of these combinations is true, all seven others are false; i.e. no more than one of them can be true in any given case or context (law of non-contradiction).

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items is impossible”. The second form means “(p and q) and not r” is impossible, which is equivalent to “(p + q + not r) is an impossible conjunction”.

Conjunctions as such are compound categorical propositions. Hypothetical (if-then) propositions, on the other hand, are defined by general[36] negations of such conjunctions. Whereas (positive) conjunctions are directly about the truth or falsehood of the combined propositions, the general negations of conjunctions (i.e. hypotheticals) are about the logical impossibility of specified combinations – i.e. they determine truth and falsehood more vaguely.

When we say that a conjunction of propositions is logically "possible", we mean that, as far as we know, or can logically predict in the given context of knowledge – that conjunction may yet turn out to be true, i.e. that form may well be realized in the case concerned. A combination is logical "impossible", on the other hand, if no matter what its content or eventual changes in our knowledge context, we can predict with certainty that it will never be found true.

If all eight conjunctions (of our three items) are still possible, it is as if nothing has been said (since this is logically given universally). We begin to say something significant, when we narrow down the possibilities by declaring (for whatever reasons) one or more of the conjunctions impossible. The more combinations are negated, the more specific our statement. If it turns out eventually that seven conjunctions

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[36] I say "*general* negations" to stress that we are here dealing with strict implication. We do not just deny the actual truth of a combination, but its logical possibility ever. In this framework, the negation of an "if – then" form is not a conjunction, but an "if – not-then – " form.

have thus been eliminated (for various reasons), the leftover conjunction has got to be "true". Of course, this implied truth is contextual, i.e. it remains dependent on the correctness of all experience and reasoning that led up to it; but granting the latter, it is true. [37]

[37] It is interesting to analyze the specific case of nesting: "if p then (if p then q)". Clearly, it is equivalent to "if (p + p) then q", which just means "if p then q" or "(p + not-q) is impossible". An Internet correspondent, David Brittan, asked me the question: how to interpret such a form when its consequent is contraposed: "if p then (if not-q then not-p)"? This eduction would seem to suggest the possibility of contradiction – i.e. the coexistence of p and not-p, at least in the context of not-q, which might be taken to imply that not-q is impossible!

But the answer is simply: if we rewrite it as "if (p + not-q) then not-p", it becomes clear that this form is not per se illogical – it is merely paradoxical, telling us that "if not-q then (if p then not-p)". The consequent of this hypothetical proposition, viz. "if p then not-p", is logically quite viable; it just implies "not-p" categorically. Thus, the overall conclusion is still "if not-q then not-p" (which is merely the contraposite of our initial conclusion "if p then q"). Note well that the inference is *not* "if not-q then (p and not-p)" – if that had been the case, then indeed "not-q" would have been logically impossible (as my correspondent feared).

10. Compound Theses

The logic of hypotheticals with compound theses. Nesting may be viewed as anticipation of the consequences of gradual realization of a compound antecedent. This gives us, for an antecedent compounding two propositions:

- "(p and q) implies r" implies and is implied by "p implies (q implies r)".

The same can be done, by successive application of the preceding argument, with compounds involving any number of elements (as with the example with three below):

- "(p and q and r and…) implies s" implies and is implied by "p implies (q implies (r implies… s))".

Having considered the logic of conjunctions in the antecedent of hypotheticals, let us, in passing, also mention the corresponding logic for their consequents. Note specifically the following useful arguments, which are easy to validate (by referring to the underlying conjunctions, as usual):

- "p implies q" implies and is implied by "p implies (p and q)"[38]. This may be labeled 'adding the antecedent to the consequent', or in the reverse direction 'subtracting it'.

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[38] One might add: since "p implies p", but that premise being universally true need not be mentioned. Note also that if the theses p, q are not synchronous in the premise, they are of course not synchronous in the consequent of the conclusion. This is important

- "p implies q" and "p implies r" together imply and are implied by "p implies (q and r)". This may be labeled 'adding together consequents of the same antecedent', and in the reverse direction 'splitting them apart'.

These arguments may be compounded with the following hypothetical syllogism:

- "p implies q" and "q implies r" together imply (though are not implied by) "p implies r"

… to yield the following two derivative arguments:

- "p implies q" and "q implies r" together imply (though are not implied by) "p implies (q and r)".
- "p implies q" and "q implies r" together imply (though are not implied by) "p implies (p and q and r)".

The above mentioned process of 'adding together consequents of the same antecedent' may be viewed as a special case of the following process, of 'merging hypotheticals', i.e. compounding both their antecedents and their consequents:

- "p implies r" and "q implies s" together imply (though are not implied by) "(p + q) implies (r + s)".

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when dealing with natural conditioning: it would be fallacious to ignore the original temporal difference (if any) and regard the theses in the conjunction "p and q" as simultaneous. Similarly in other cases, needless to say.

This process would seem valid *only on the proviso that p and q are compatible*, granting that if the antecedents are not compatible, they couldn't occur in conjunction, and so the shown conclusion would not be possible. Or perhaps we should without fear say it is valid unconditionally, since the conclusion does not in fact affirm the antecedent (p + q), and denial of that antecedent would not logically imply (r + s) to be impossible.

The reverse process of 'splitting' is anyway not conditional, but it concerns only the consequent, *not the antecedent*, note well:

- "(p + q) implies (r + s)" implies "(p + q) implies r" and "(p + q) implies s", and is implied by them together.

Note well: we cannot here reverse the previous merger, and conclude "p implies r" and "q implies s". This would be an 'illicit splitting of the antecedent'. Beware also, therefore, of the following common *fallacious* argument (which could be classed as an apodosis):

If (p + q), then (r + s)

but: if p, then r

therefore: if q, then s.

The erroneous tendency here is to mentally 'subduct'[39] both p and r, leaving q and s. But if we first split the major premise into two, we see that the minor premise eliminates one hypothetical, leaving us with the conclusion "if (p + q), then s", or in nested form "if p, then (if q, then s)". Note well, the latter, correct conclusion is in fact an eduction from the major: we have no need of the minor to infer it. Notice too, the precondition "if p" remains operative in it, until and unless "p" is categorically affirmed; and even then, "if q, then s" should be kept in mind as a mere contextual truth, since strictly speaking there are no 'actual hypotheticals'. If the "if q, then s" conclusion does sometimes seem true in practice, it is no doubt because we tacitly regard the precondition "p" as already satisfied in the case at hand.[40]

Finally, note: it might be worthwhile looking for similar processes with respect to disjunctive propositions.

The logic of nesting and compound theses is considered as having been founded by the Stoic logician, Chrysippus of Soli (Greek, 280-206 BCE).[41]

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[39] I take this term from J. S. Mill's method of residues (see the 2005 revised version of my essay on his methods – in Part II, chapter 1).

[40] Note that I mention this form of argument, as being common in rabbinic reasoning, in *Judaic Logic*, chapter 9.1 (p. 116). Of course, the conclusion I give there is only valid provided the antecedent's conjuncts left out in it are tacitly considered categorically true.

[41] As I mention in *Future Logic*, chapter 63.2. But I do not know on what evidence this claim is based. How many of the

11. Validation of Nesting

Let us look a bit more in detail at the issue of validation in the logic of nesting.

We may refer to the eduction from "if (p and q) then r" to "if p then (if q then r)" as the production of a nest (or nesting); and to the reverse immediate inference from "if p then (if q then r)" to "if (p and q) then r" as the removal of a nest (or 'unnesting'). How are these two processes validated? For a start, they make sense from a common sense viewpoint….

Nesting can be understood as follows. Knowing that a set of conditions (p and q) implies a certain conclusion (r), and knowing that some of these conditions (p) are already satisfied, we can predict that when the remaining conditions (q) are also satisfied, the conclusion (r) will indeed follow[42].

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theorems here listed were known to him, or to anyone since, I also do not know.

[42] It might be objected: but what if (as occurs in some cases) the first conditions (p) are sufficient without the others (q) to imply the conclusion (r); i.e. what if q is *redundant*? This refers to a situation where "if (p and q) then r" and "if p then r" are both true, and the question asked is: is the inference "if p then (if q then r)" still valid? The answer would be: yes, in such a situation, in the context of "p", both "r" and "if q then r" would follow, and these two propositions are quite compatible; if "q" also happened to be true, then "if q then r" would simply reconfirm "r". Indeed, given "if p then r" and that "(p and q) is possible", it follows that "if (p and q) then r", because the given is that "p implies r under all conditions"; note

The reverse process of 'unnesting' can be understood as follows. Knowing that under a certain condition (p) a further condition (q) implies a certain conclusion (r), we can predict that when both conditions (p and q) are satisfied, the conclusion (r) will indeed follow.

On these grounds (exposition), it is reasonable to consider the forms "if p then (if q then r)" and "if (p and q) then r" as equivalent, i.e. that each implies and is implied by the other. We may also argue that both forms have the same underlying meaning, namely that "the conjunction of p, q and not r is an impossible one".

However, if we analyze matters more precisely some doubt might be justified….

The form with a compound antecedent means "(p and q) and not r" is impossible, i.e. the bracketed conjunction of p and q is impossible in the context of not r, which is clearly equivalent to "(p + q + not r) is an impossible conjunction"; whereas the nested form means "p and 'not (if q then r)' is impossible", which means "the conjunction of 'p' with '(q and not r) is not impossible' is impossible". The latter form is less clear, because it could apparently be interpreted in two ways: either as meaning that "p" is incompatible with *the possibility of* "q and not r"; or as meaning that "p" is incompatible with *the actualization of* the latter possibility (viz. when "q" and "not r" are both true).

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well however that "p" and "q" must be known to be compatible, before making such an inference.

We know from tropology (the theory of modality) that the necessary implies (but is not implied by) the actual, which in turn implies (but is not implied by) the possible; and similarly the impossible implies (but is not implied by) the inactual, which in turn implies (but is not implied by) the unnecessary. On such grounds, it could be objected that these interpretations are not equivalent.

However, one could reply that "p is incompatible with the possibility of (q and not r)" at least *implies* "p is incompatible with the "actuality of (q and not r)", though the reverse may not hold. In that case, the nested form would be admitted to at least imply (though perhaps not be implied by) the unnested form; i.e. unnesting would be validated, but not nesting.

But I would be inclined to dismiss such objection altogether, and insist that "p is incompatible with the possibility of (q and not r)" is only superficially about conjunction with a possibility and ultimately is only concerned with conjunction of actuals (i.e. p, q and not r). In this view, the meaning of hypothetical propositions, however intricately constructed, is always the impossibility of one or more of the underlying actual conjunctions and the leftover possibility of at least one such actual conjunction[43].

[43] In this view, the 'matrix' of any form refers to all logically possible combinations of the items concerned (in the case of three items – as here – there are 2*2*2 = 8 formally conceivable combinations), labeling some as 'impossible' and leaving the others as 'possible'. The mode of modality intended by the word possibility here may admittedly vary slightly: sometimes it means

Admittedly, some flavor of doubt remains, and some people will surely subscribe to the dissident view. But it occurs to me that we do have a reliable technical means to settle the issue once and for all – viz. the advanced methods of matricial analysis I have developed in phase II of *The Logic of Causation* (microanalysis). I shall have to eventually look into this matter in that context (and might conceivably find that my intuitive assumptions here are simplistic).

Note these techniques will also make possible the clear interpretation of intricate forms involving *negative* hypotheticals – such as "if (p and q) *not-then* r", or such as "if p then (if q *not-then* r)"[44]. The mental acrobatics involved in the comprehension of such forms are daunting, and there is an obvious need for more objective and mechanical methodology. I look forward to developing software for this purpose.

12. Brackets in Logic

In my past treatment of logical compositions[45], I did not fully deal with the issue of whether brackets in logic transmit

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'formal logical possibility', in other cases it means 'possibility by virtue of ignorance'; but such distinction is academic, the effect on discourse being the same.

[44] I would also like to investigate conjunctions of hypotheticals. For instance, what is the conclusion given the two premises: "if p then (if q then r)" and "if not p then not (if q then r)" ?

[45] *Future Logic*, chapter 28.

polarity as they do in mathematics. The answer to that question is: not always – i.e. the analogy between symbolic logic and algebra should not be pushed too far or blindly applied.

Our analogy begins by labeling the affirmation of a thesis as positive polarity, and its negation as negative polarity. Thus, "P" may be written "+ P" and "not P" must be written "– P". Then we ask whether "– (– P)" equals "+ P"? The answer is yes, this mathematical formula applies, since "not (not P)" means the same as "P".

The brackets seem to also transmit polarity in the following case:

"– (P v Q)" = "– P – Q"

since "not (P or Q)" means "not (not (not-P and notQ)", whence "not-P and not-Q". This suggests further analogy between logic and mathematics, albeit in somewhat forced fashion.

However, the analogy breaks down entirely in view of the following invalid case:

"– (P – Q)" = "– P + Q"

This process would be fallacious, since "not (P and not-Q)" is not logically equivalent to "not-P and Q", but also allows for the alternatives "P and Q" and "P and not-Q".

Thus, we should avoid attempting to make parallels between logic and mathematics; it is artificial and misleading.[46]

[46] Note also, in passing: a logical disjunction is sometimes in the sciences replaced by an average. For instance, if we know the value of some physical variable is "either 0 or 1", we may suppose, granting equal probabilities for both outcomes, that on average its value is ½. Such reasoning is partly logical and partly mathematical. The logical part is the (presumably exclusive and exhaustive) disjunction, and the awareness that one of the disjuncts will ultimately turn out to be true and the other(s) false; logic also admits of the existence of probabilities, ranging from 100% on one side or the other, or somewhere in between. However, the task of *calculating* probability belongs to mathematics. Additionally, by the way, physical science is involved here: in gathering the relevant empirical data, and also (at least in quantum mechanics) in the discussion as to whether the probabilities are factual or epistemic.

5. ABOUT PARADOXES

1. On the Liar Paradox

Once we grasp that the meaning of words is their intention, singly and collectively – the solution of the liar paradox becomes very obvious. Self-reference is meaningless, because – an intention cannot intend itself, for it does not yet exist; an intention can only intend something that already exists, e.g. another intention directed at some third thing.

In view of this, the proposition "this proposition is false" is meaningless, and so is the proposition "this proposition is true". Both may freely be declared equally true and false, or neither true nor false – it makes no difference in their case, because the words "this proposition" refer to nothing at all[47].

Although the words used in these sentences are separately meaningful, and the grammatical structure of the sentences is legitimate – the words' collective lack of content implies their collective logical value to be nil. Self-reference is syntactically cogent, but semantically incoherent. It is like circular argument, up in the air, leading nowhere specific.

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47 See *Future Logic*, chapter 32.2.

Regarding the exclusive proposition "*Only* this proposition is true", it implies both: "*This* proposition is true" and "*All other* propositions are false" – i.e. it is equivalent to the exceptive proposition "*All* propositions *but this* one are false". The latter is often claimed by some philosophers; e.g. by those who say "all is illusion (except this fact)".

My point here is that such statements do not only involve the fallacy of self-reference (i.e. "this proposition"). Such statements additionally involve a reference to "all others" which is open to criticism, because:

- To claim knowledge of "all other propositions" is a claim to *omniscience*, a pretense that one knows everything there is to know, or ever will be. And generally, such statements are made without giving a credible justification, though in contradiction to all prior findings of experience and reason.
- Surely, *some* other propositions are in fact regarded and admitted as true by such philosophers. They are generally rather talkative, even verbose – they do not consistently *only* say that one statement and refuse to say anything else.
- And of course, formally, if "this" is meaningless (as previously shown), then "all others", which means "any other *than this*" is also meaningless!

The liar paradox, by the way, is attributed to the ancient Greeks, either Eubulides of Miletus (4th Cent. BCE) or the

earlier Epimenides of Crete (6th Cent. BCE). I do not know if its resolution was evident to these early logicians, but a (European?) 14th Cent. CE anonymous text reportedly explained that the Liar's statement is neither true nor false but simply meaningless. Thus, this explanation is historically much earlier than modern logic (Russell et alia, though these late logicians certainly clarified the matter).[48]

2. Making No Claim

The Buddhist[49] philosopher Nagarjuna (India, *c*. 150-250 CE) attacked every thesis he regarded as rational by every means he regarded as logical, and declared his own discourse immune from scrutiny and criticism, by saying (according to one translation):

> *"If I had a thesis, I would be at fault; since I alone have no thesis, I alone am without fault"* (VV 29)[50].

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[48] See *Future Logic*, chapter 63, sections 3 and 6.

[49] Needless to say the following comments are not an attack on Buddhism, but on the rhetoric of Nagarjuna. Buddhism is not well served by such games. I think of Nagarjuna whenever I read v. 306 of the *Dhammapada*: "He who says what is not… and he who says he has not done what he knows well he has done… sinned against truth". For me, he is just a philosopher like any other; his interest in Buddhism is incidental (as is his saintly status in the eyes of many).

[50] Nagarjuna in *Vigraha Vyavartani* (*Averting the Arguments*), verse 29. The translation used here is given by 'Namdrol' in the E-Sangha Buddhism Forum (http://www.lioncity.net/buddhism/

The first aspect of Nagarjuna's statement is a brazen **claim to have no claim.** This is of course self-contradictory. Every proposition that claims to be meaningful and true (whether about some experience or about abstraction, whether positive or negative) is an assertion, a claim. To pretend making no claim even as one plainly makes one is a breach of the law of identity: it is denying that a fact is a fact.

There is no logical way to deny or criticize the theses or methodologies of others without opening one's own discourse to evaluation. All denial or criticism is discourse, and all discourse is subject to logical review. To pretend the logical possibility of dispensation is dishonest (and if such pretense implicitly is bad enough, it is all the more dishonest if made explicitly).

Nagarjuna's discourse was, in fact (as I show in *Buddhist Illogic*), shock full of fallacious arguments, a mere parody of logic posing as logic. But he knew that people untrained in logic would fall for it, and he sealed their intellectual fate with the said eyewash claim. To neutralize further discussion, he misled them into believing he had simply shown up the logical absurdity of logic, and all doctrines based on it, but had himself posited no methodology or doctrine of his own.

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index.php?s=d8946a5bcb1f56f3e9e21a108125823f&showtopic=5604&st=100&#entry82577). Note however that the word "alone" in this translation may not be in the original, judging by other translations I have seen, even though it does seem to be Nagarjuna's intent.

Not only was his alleged refutation of reason full of errors of reasoning, but his concluding 'no-claim claim' was also a mockery of logic and sincerity. He, of course, just says 'I make no claim' – and he persistently denies that this statement constitutes a claim. I call that shameless psychological manipulation, motivated by one-upmanship. He cynically takes advantage of the credulity of some people, to dominate them intellectually.

The second aspect of Nagarjuna's above statement can be viewed as a 'soft' version of the liar paradox, since he tells us: **everyone but me is in error**. Although such a statement is not in itself inconsistent (God could conceivably utter it truthfully) – it is logically open to doubt due to being *self-exempting*.

Effectively, it says: 'I am the only human who has knowledge; I know everyone else is incapable of true knowledge'. Only a fool is tricked by such an unsubstantiated claim to privilege. Reason regards all people as technically within range of knowledge given enough effort, even if they do not all fulfill their potential equally. Reason demands that discourse be reasoned and fair – i.e. based on *common general norms* as to how truth and falsehood are to be determined.

If Nagarjuna were basing his criticism of ordinary human means to knowledge on a claim to have attained a *'higher level' of consciousness* (i.e. Buddhist enlightenment or Biblical prophesy), we could not convincingly oppose him

(being unable to prove or disprove such experiential claims). But he is not using such as claim as his basis – he is attempting to debunk reason through *ordinary* logical discourse. In that case, he is fair game for logic.

The statement of infallibility is then seen as manifest arrogance, a lack of respect for other thinkers. By saying 'I alone am exempt from any criticism' the author aggressively grants himself a special dispensation: he alone is endowed with the way to knowledge; everyone else is an idiot or a dishonest person. It is totalitarian, dictatorial speech.

Compare this dismissive 'you all know nothing', to the self-inclusive statement 'I (or we) know nothing'. The latter – even though it implies 'I know that I know nothing' and is therefore self-inconsistent – is at least modest; so much so, that such admission is widely considered a mark of wisdom (and it is commendable, in modified form, i.e. as 'I know *close to* nothing, very little').

Self-exemption is a hidden form of self-inconsistency, because it resorts to *a double standard*. The one making such a claim presents superficially rational arguments against human experience and logic, but does not ask himself or tell us how he (an ordinary human) managed (using the very cognitive means he rejects) to attain such allegedly true knowledge. The author criticizes others, but does not equally well criticize himself.

This is a fallacious mode of thought often found among would-be skeptical philosophers. It comes in many subtle

forms. It is wise to always be on the lookout for such practices, applying the reflexive test here demonstrated.

3. Nagarjuna's Trickery

Looking at Nagarjuna's above statement in more detail, the following may be added.

To begin with, what is meant here by "***having a thesis***"? This refers to any explicit or even wordless belief, any clear or even vague opinion upheld (considered to constitute knowledge), any proposition one advocates or implicitly logically condones. The subject that Nagarjuna is here discussing is any outcome of human rational cognition, any belief, opinion or doctrine that one may arrive at, rightly or wrongly, by means of ordinary consciousness, i.e. through experience, negation, abstraction, hypothesizing, inductive or deductive argument.

And what is meant here by "*being at fault*"? This refers to making a mistake in the course of observation or reasoning, so that some thesis one has adhered to is in fact an illusion rather than a reality, false rather than true, erroneous instead of correct.

How do we know the status appropriate to a thesis? We know it (I suggest) *by holistic application of the whole science of logic to the totality of the data of experience*. Our concepts of cognitive right or wrong are themselves all constructed by logic and experience, without appeal to some extraordinary

outside justification (like prophetic revelation or mystical realization, or simply the authority of some great personage or of a religious document or institution).

Now, Nagarjuna is evidently well aware of all that, but is intent on annulling the independent reliability of ordinary experience and reason. His strategy and tactics to this end, in all his discourse, as I have shown throughout my *Buddhist Illogic*, is to give the impression (however paradoxical) that logic may be invalidated by means of logic. And this twofold sentence of his, "If I had a thesis, I would be at fault; since I alone have no thesis, I alone am without fault", fits neatly into his destructive philosophical programme.

On the surface, this sentence might be construed as a single argument:

> If X (a proposition is proposed), then Y (an error is made)
>
> but not X (no proposition)
>
> therefore not Y (no error)

Although the above apodosis is logically invalid, since it denies the antecedent to deny the consequent, Nagarjuna is not above letting it pass without comment, knowing it will suffice to convince some people, although he is well aware that the logically trained will spot it and object. But for the

latter audience, he reserves a more subtle form of manipulation.

It has to be seen that the purpose of this famous Verse 29 in Nagarjuna's discourse is designed *to make a show of logical consistency*. He wants by means of it to give the impression that his anti-rational discourse is justifiable, that it has the stamp of approval of logic. Yes, he is actually attacking logic; but at the same time, he has to pretend to use it, because he knows this measure is required to convince people. For most people, a veneer of logic (i.e. mere rhetoric) suffices to put their reason's critical faculty at rest. We shall now see how he goes about this task.

The first part of Nagarjuna's statement, viz. "If I had a thesis, I would be at fault", is not intended (as some have assumed) as a justification for his overall discourse. It is not placed here in his discourse as an argument with intrinsic force, which directly buttresses or proves his philosophy. It is certainly not an obvious logical principle, or axiom, which everyone would agree on without objection, from which his discourse can be inferred or even generalized. No – it is itself an inference and application from Nagarjuna's main thesis, namely the claim that 'All human knowledge based on ordinary experience and reason is necessarily erroneous'.

The latter underlying claim is his major premise in a (here tacit) productive eduction, i.e. one that deduces a particular

hypothetical proposition from a more general categorical one[51]. This argument is formally valid, running as follows:

> All X (opinions) are necessarily Y (erroneous);
>
> therefore,
>
> If this is X (a proposition is proposed), then this is Y (an error is made).

In this way, the first part of Nagarjuna's statement is made to seem something inferred, rather than an arbitrary claim. It is cunningly presented as an application of already admitted information, rather than as an isolated assertion. Granting the premise, the conclusion indeed logically follows (this is the veneer of logic) – but has the premise already been granted? No. Also note, once the conclusion is seemingly drawn, it can by generalization be used to reinforce the premise; although this is a circularity, it works psychologically.

Moreover, Nagarjuna manages through this implicit productive argument to pretend he is being consistent with himself: he is telling us, effectively: 'See, I am not just attacking other people's knowledge, but am prepared to apply the same stringent critique to my own!' This virtuous declaration is of course dust in your eyes, because he is not here putting the broader principle in doubt but merely

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[51] See *Future Logic*, chapter 29.3.

reaffirming it. He has nowhere established that 'All propositions are false'. His is a pseudo-logical posture.

As the next part of his statement clarifies, he does not consider his discourse as falling under the critical rule he has formulated. The proposition "If I had a thesis, I would be at fault" is a counterfactual hypothetical; his own discourse is never made into an issue open to debate. It seems open-minded, but it is a foregone judgment. His intention is to 'avert all arguments' and place himself at the outset outside the fray. He seemingly at first admits and then vehemently denies that his own discourse is a product of ordinary consciousness. This convoluted avoidance of cognitive responsibility has fooled many a poor soul.

Moving on, now, to the second part of Nagarjuna's statement, viz. "since I alone have no thesis, I alone am without fault". As already pointed out, this can be viewed as the minor premise and conclusion of an invalid apodosis in which the first part of the statement is the major premise. But we could also more generously assume that Nagarjuna intended a valid apodosis, using as its tacit major premise the obvious proposition: 'If one has no thesis, one cannot make a mistake'.

It can be correctly argued that this premise was left tacit simply because it is so obvious to and readily granted by everyone. It is indeed true that if one ventures no utterance, thought or even intention, if one holds no opinion, makes no claim to knowledge, if one remains inwardly and outwardly

silent, one will never make any errors. *For the status of truth or falsehood is only applicable to meaningful assertions.*

A stone is never in error, because it has no thoughts. Likewise, a thoughtless person may by his or her ignorance, blindness or stupidity make many errors of living, but makes no error in the logical sense of having proposed an inappropriate proposition. All that is so obvious (and vacuous) no debating it is necessary. The following apodosis is thus implicit in Nagarjuna's declaration:

> If not X (no proposition is proposed), then Y (no error is made)
>
> but not X (no proposition)
>
> therefore not Y (no error)

This argument has a true major premise, as well as a valid form. This gives his discourse a veneer of logic again, helping him to persuade more victims. However, his minor premise remains well open to doubt, and decisively deniable! (As a consequence of which, his conclusion is of course also open to doubt.) He takes it for granted that he 'has no thesis' – but this claim is far from granted already. The tacit major premise acts as a smokescreen for the minor premise.

Moreover, note, although 'being correct' implies 'not being at fault', the reverse is not necessary. Nagarjuna suggests that

his alleged faultlessness implies the correctness of his position, but it does not follow! Only if his criticism of all opposing theses was correct (which is by no stretch of the imagination true), and his thesis was not liable to similar criticism and was therefore the only leftover logical possibility, would such inference be drawn.

Nagarjuna does indeed 'have a thesis'. His main thesis, the goal of his whole philosophical discourse, is as already mentioned the claim that 'All human knowledge based on ordinary experience and reason is necessarily erroneous'. This, for a start, qualifies as a thesis – boy, it is a big skeptical thesis, full of negative implications. It is a principle of logic that *to deny any thesis is to affirm an opposite thesis.* His claim that his doctrine is not a thesis, in the minor premise here, is mere arbitrary assertion.

Furthermore, he 'has a thesis' every time he makes a specific assertion of any kind, including the assertion under scrutiny here, viz. "If I had a thesis, I would be at fault; since I alone have no thesis, I alone am without fault". Note that Nagarjuna thinks that making a negative statement is somehow 'not having a thesis' – but the polarity of a statement does not diminish the need for justification; if anything, one can argue that on the contrary negative statements are harder to establish than positive ones!

And we should strictly include as 'theses' of his not only such explicit statements, but also all the implicit assumptions and suggestions within his discourse (like the implicit major

premise and resulting apodosis we have just highlighted). It makes no difference whether these explicit, or unstated and unadmitted, items constitute information or logical method, content or process.

For all these elements of discourse, be they spoken or otherwise intended, in all fairness fit in our common understanding and definition as to what it means to 'have a thesis'. For none of these categorical or hypothetical propositions (except perhaps 'if silence, no error') is self-evident. They did not arise *ex nihilo* in Nagarjuna's mind, ready-made and self-justified.

They are all complex products of ordinary human cognition, based on experience and produced by reason (even if, in Nagarjuna's case, the mind involved is deranged). They undeniably together form a specific philosophy, a theory of logic, an epistemology and ontology. The mere fact that we can (as here done) at all consider and debate them is proof that they are 'theses'.

The law of identity (A is A) must be maintained: facts are facts and it is no use pretending otherwise. Nagarjuna may eternally refuse the predicate of "having a thesis", but we confidently insist on it. His arguments have in no way succeeded in averting this just and true judgment. Consequently, his doctrine is self-contradictory. Not only does he 'have a thesis', but since his thesis is that 'to have a thesis is to be in error', he has (by its own terms) to be recognized as being in error.

Thus, to end it: Nagarjuna's statement "If I had a thesis, I would be at fault; since I alone have no thesis, I alone am without fault" weaves a complicated web of deception. It misleads, by means of subtle ambiguities and superficial imitations of logic. Once its dishonesty is revealed, it should be decidedly rejected.

The mere historic fact that Nagarjuna is famous and admired by many does not justify hanging on to his doctrine *ad nauseam*, trying ex post facto to find ways to make it consistent with logic. Celebrity is not proof of some hidden truth – it is vanity. Most who do so are merely grasping for reflected glory. Anyway, attachment to authority is argument *ad hominem*. The religious and academic 'groupies' who gave him and perpetuate his authority are not logically competent, however numerous they be. It is a case of the blind leading the blind.

4. Non-apprehension of Non-things

Nagarjuna defends his 'non-thesis' idea in the next verse (VV 30), describing it as "***a non-apprehension of non-things***" (according to one translation[52]). Now, this is a very funny

[52] By Frederick J. Streng. The full text of his translation seems to be that posted in the Internet at: http://www.orientalia.org/article491.html. Note that the phrase "non-apprehension of non-things" is considered an incorrect translation by Plamen Gradinarov. However, while willing to admit the latter's objection, I do not agree that Streng's freer translation

phrase. To the impressionable, it sounds very deep, pregnant with meaning. It seems to suggest this man has some privileged higher way of knowledge that goes beyond ordinary experience and reasoning.

But in truth, taken literally, we are all quite capable of "non-apprehension of non-things" and daily practice it, for the simple reason that non-things cannot be apprehended! Logically, this is all this phrase means, note well. What then is the old fox up to, here?

Nagarjuna is trying to project his 'not having a thesis' position as far as logically possible from our plebian 'having a thesis' – i.e. from ordinary consciousness, which consists in 'the apprehension of things'. He has logically only three alternatives to choose from:

- the 'non-apprehension of things' (unconsciousness);
- the 'apprehension of non-things' (an otherworldly consciousness);
- or the 'non-apprehension of non-things'.

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is entirely inadmissible. In my view, it may not be literally precise, but it captures Nagarjuna's paradoxical spirit and intent. See our discussion of this issue at http://nyaya.darsana.org/topic3.html. In any case, even if the phrase "non-apprehension of non-things" is best not relied on, the criticisms of Nagarjuna in the present section can still be proposed on other grounds.

Having a marked taste for one-upmanship and dramatic extremes, Nagarjuna of course chose the third of these terms as his vehicle. Even though the obvious sense of this phrase is puerile, it has poetic breadth and appeal. It seems to imply 'knowledge without consciousness' and 'consciousness of the unknowable' all at once.

Thus, his 'non-apprehension' is a mix of apprehension and non-apprehension, or something else again. And likewise, his 'non-things' are things of some sort as well as non-things, or perhaps something quite other still.

In other words, the negative terms in the phrase "non-apprehension of non-things" are not intended by Nagarjuna nor received by his disciples and students as mere negations of the corresponding positive terms, but as **paradoxical terms**, which may (in accord with the tetralemma schema) be all at once *positive or negative or both or neither*.

It is (and isn't) 'apprehension/non-apprehension of things/non-things' all in one.

Nagarjuna stands out in the history of world philosophy as the most unabashed opponent of the laws of thought. Not only does he freely use self-contradictory or middle-including propositions, but he even makes use of terms loaded with contradiction and inclusion of a middle.

Now, some people might say: 'what is wrong with that?' They will argue: 'the real world is extremely subtle and we can only ever hope to express it in thought very

approximately; Nagarjuna is only trying to take this uncertainty into consideration within his discourse; the laws of thought are just arbitrary demands, making us force our thoughts into prejudicial straightjackets'.

But logical laxity is not the proper attitude in the face of an extremely complex and hard to express real world. It is precisely because of the great difficulty of the cognitive task at hand that one is called upon to be very clear and careful. Avoiding checks and balances on our judgments does not increase their efficiency but makes them less reliable.

In the case under consideration, if Nagarjuna does indeed have some privileged form of otherworldly consciousness, he can just say so. The laws of thought in no way forbid him to posit such a claim. He does not need to beat about the bush, and pretend to have something unspeakable and not subject to peer review. He can and should be forthright, and defend his position in an equitable way like everyone else.

If he considers the terms 'apprehension' and 'things' to have some intrinsic logical flaw, he can argue his case openly; he does not need to engage in allusion, suggestion and fallacious argument. Most of us thinkers are open-minded and willing to correct our errors: if these terms are flawed, we are not attached to them; we are flexible, ready to modify or replace them as logically necessary in the light of new evidence and reasoning.

But Nagarjuna is like an accused, who when forced to appear in court refuses to admit his identity, or recognize the

authority of the law and the judges, or plead guilty or not guilty, or argue the defense of his case. Worse still, in utter contempt of the court, he does not even admit his refusal to be a refusal – he calls it a 'non-thesis'. Does that stop court proceedings or make the court declare him innocent? Surely not.

Nagarjuna misunderstands the nature of negation. He thinks that if one person says 'X' and another says 'not X', the onus of proof is on the first more than on the second. He considers that making a positive statement is more logically demanding than making a negative one. *He imagines in his confusion that saying 'no' is equivalent to saying nothing, i.e. to not saying anything*. Most logicians would disagree with him, and argue that any thesis put forward (even if only by insinuation) is equally in need of proof, whatever its polarity.

I would go further and say that, on the contrary, a negative statement is more demanding than a positive one. You can prove a positive statement easily enough, if you point to sufficient evidence in its favor. But how do you prove a negative statement? It is much more difficult, since negatives are not directly experienced but are only experienced by way of the absence of positives. A negative can ultimately only be proved indirectly, by inability to prove any contrary positive.

Thus, in fact, not only does Nagarjuna's alleged self-limitation to negatives not exempt him from proofs, but on the contrary it increases the logical burden upon him. He is right in considering negatives as significantly different from

positives, but he does not realize that the difference is to his disadvantage. He claims to have no epistemological or ontological basis, and yet to be able to reject offhand all theories of knowledge and reality. Such a grandiose fanciful claim surely requires much more justification than any other!

It should be stressed, incidentally, that Nagarjuna's "non-apprehension of non-things" should not be interpreted (as some do) as a defense of non-verbal meditative experience or insight. That is not the thrust of his anti-rational philosophy, although its avowed Buddhist affiliation may lead one to suppose so.

If Nagarjuna were a man deeply absorbed in meditation, he would not be writing philosophy. If his intent were to promote meditation, he would simply teach methods of meditation and not stir up verbal disputes. No – this man has philosophical ambitions. Allegedly, these are meant to put into words some of the 'reasoning' that he considered the Buddha to have gone through before attaining enlightenment. Nagarjuna assumes from the start that this 'reasoning' is necessarily anti-logical, a rejection of reason.

But we must see that this assumption is just a prejudice of his distorted mind. He was a philosophical revolutionary – one who believed that reason has to be overturned, to be transcended. But it is more credible to be evolutionary – and to consider meditation as a way for us to keep moving, beyond the limits of discursive thought, without need to deny such thought within its applicable bounds.

To advocate respect for logic is not to foment endless babble, but rather to require that any thought arising be subjected to responsible cognitive evaluation. Logic is possible entirely without words, by means of silent intentions. Even in deep meditation, some sort of 'reality check' by means of logic occurs, and this need not involve any words. It is only by this means, no doubt, that a Buddha-to-be may steer himself well clear of common illusions and insane imaginings, towards to full realization.

Contrary to Nagarjuna's belief, rationality and spirituality are not necessarily in conflict. Reason and meditation are potentially, to some extent, mutually beneficial. It is not thought as such, much less logic, but only excess of thought, particularly irrelevant chatter, which hinders meditative concentration and contemplation. A certain amount of appropriate thinking is often needed to initially position one's mind for meditation.

5. A Formal Impossibility

In fact, as I will now show, the sentence "If I had a thesis, I would be at fault"[53] is a *formal* impossibility. I earlier interpreted and symbolized it as "If X (a proposition is

[53] Two other translations of this sentence confirm and amplify this reading. "If I would make any proposition whatever, then by that I would have a logical error" (Streng). "Should I have put forward any thesis, then the logical defect would have been mine" (Gradinarov).

proposed), then Y (an error is made)", giving the antecedent and consequent two separate symbols, X and Y. But now let us consider these constituents more closely.

What does "making an error" mean here? It is not an ordinary predicate. The consequent Y does not merely refer to some error in general, but specifically to an error *in the antecedent* X. Y tells us that X *is wrong*. Therefore, Y formally implies the negation of X, i.e. notX! Granting this, Nagarjuna's sentence now reads: "**If X, then not X**", i.e. "If X is true, then X is false" – a paradoxical hypothetical proposition, whose conclusion would be the categorical "X is false" (as earlier suggested).

However, that is not the end of the matter. If we now consider the meaning of X – viz. "a proposition is proposed" – we may fairly suppose it refers to *just any proposition whatsoever*. In that case, the proposition concerned might even be the negation of X; so that we may substitute notX for X throughout the hypothesis. So doing, we obtain "If notX, then not notX", i.e. "**If not X, then X**", or in other words "If X is false, then X is true". This is also, of course, a paradoxical proposition, whose formal conclusion is "X is true".

We thus – by means of a universal reading of "having a thesis", as inclusive of "not having a thesis" – now have, not only a single paradox, but a *double paradox*! That is, our conclusion is not only that X is false, but that X is both true

and false. The latter conclusion is of course contrary to the law of non-contradiction, as in the case of the liar paradox.

This means that Nagarjuna's statement is a formal impossibility: it is a contradiction in terms; it is not only false, but meaningless. It does not constitute legitimate discourse at all, let alone a tenable philosophical position or theory. The words or symbols used in it are logically not even conceivable, so it is as if he is saying nothing. He seems to be saying something intelligible, but it is an illusion.

Now, it may be objected that Y does not necessarily mean that X *is* wrong, but could merely mean that X *could be* wrong. That is, "making an error" could be taken to mean that X is uncertain rather than definitely refuted. In that case, we would have the following two hypotheses: "If X, possibly not X" and "If not X, possibly X"; or in one sentence: "Whether X or not X is proposed, the outcome is uncertain". Indeed, this more modal, ambiguous posture may well be considered as Nagarjuna's exact intent (which some have interpreted as noncommittal 'illocution').

At first sight, due to the use of vague words or of symbols, this objection may seem credible and the contradictory conclusions involved apparently dissolved. But upon reflection, there is still an underlying conflict: to affirm X, or to deny it, is contrary to a position that neither affirms nor denies X. An assertoric statement (affirming or denying X) is *incompatible with* a problematic statement (saying X may or may not be true). One cannot at once claim to *have*

knowledge (of X, or of not X) and claim to *lack* it (considering the truth or falsehood issue open). This is as much a contradiction as claiming the same thing (X) true and false.

Someone unacquainted with the logic of hypothetical propositions might now object that X, or notX, is only proposed hypothetically in the antecedent, and so may well be problematic in the consequent. But this is a logically untenable objection, due to the process of addition (described in the chapter on formal logic); i.e. due to the fact that "If X, then Y" implies "If X, then (X and Y)". In the present case, this means: "If X is asserted, then X is both asserted and uncertain". It suffices for the contradiction to occur conditionally, as here, for the condition to be disproved; therefore, our conclusion *is quite formal*: "X cannot be asserted". QED.

Someone could here, finally, object that the certainty in the antecedent and the uncertainty in the consequent may not be simultaneous, and so not produce a logical conflict. Such objection would be valid, granting that a thought process separated the beginning and end of the hypothetical proposition. However, in the case under scrutiny, Nagarjuna is clearly stating that in the very act of "proposing something", one would be "making an error"; i.e. the error is nothing other than the proposing, itself. So, no time separation can credibly be argued, and Nagarjuna's thesis remains illogical.

Note that all the present discussion has concerned only the first part of verse 29, i.e. the major premise "If I had a thesis, I would be at fault". We have found this hypothetical proposition logically faulty, irrespective of whether Nagarjuna admits or refuses to acknowledge that he "has a thesis". So, let us now reconsider this minor premise of his, and his conclusion that he "is not at fault".

We have here introduced a new twist in the analysis, when we realized that "If X, then Y" (understood as "If X, then not X") implies "If not X, then Y" (since the latter is implied by "If not X, then X", which is implied by the former by replacing X with notX). So, now we have a new major premise for Nagarjuna, namely "If not X, then Y", meaning: "If I do not have a thesis, I will be at fault".

Taking this implied major premise with Nagarjuna's own minor premise, viz. "I have no thesis" – the conclusion is "I am at fault". This conclusion is, note, the opposite of his ("I am not at fault"). Thus, even though Nagarjuna boasts his thinking is faultless, it is demonstrably faulty!

For – simply put, leaving aside all his rhetoric – all he is saying is: "no thesis is true"; it is just another version of the liar paradox. And his attempt to mitigate his statement, with the afterthought "except my thesis", is logically merely an additional statement: a particular case that falls squarely under the general rule. Moreover, before an exception can be applied, the rule itself must be capable of consistent formulation – and this one clearly (as just shown) is not.

Note lastly, none of this refutation implies that silence is impossible or without value. If (as some commentators contend) Nagarjuna's purpose was to promote cessation of discourse, he sure went about it the wrong way. He did not need to develop a controversial, anti-logical philosophy. It would have been enough for him to posit, as a psychological fact, that (inner and outer) silence is expedient for deep meditation.

6. The Analytic/Synthetic Dichotomy

All belief-systems are *not* on a more or less equal footing. Some are elaborate mazes, concealing numerous self-contradictions. Others more sneakily rely on logical sins of omission, by effectively exempting themselves from scrutiny. The peculiarity of epistemological theorizing, which too many philosophers fail to realize, is the requirement of self-examination, both to develop a realistic methodology and *to test one's theories on one's own practice*.

The system proposed by Immanuel Kant (Prussia, 1724-1804) is a case in point. The **"**analytic/synthetic" dichotomy, in spite of the prestige of its inventor and later defenders, is full of logically arbitrary declarations and circular arguments. The dichotomy is nonsensical, i.e. not a viable philosophical construct, because it fails to explain and justify itself, i.e. its own genesis.

Kant's analysis, rather than being *a priori* and necessary (as he claims), is quite *a posteriori* and contingent. Moreover, it proposes a *static* ordering of knowledge, whereas knowledge can only be understood and validated by consideration of its *dynamic* aspects, its conceptual genesis and development.

Knowledge is not established by linguistic analyses of axiomatic tautologies, or by syntheses of particular empirical data – but by an active, flexible combination of all one's experience and the full range of logical techniques. It is a holistic, ongoing enterprise, depending on the whole of one's knowledge context and all our rational means.

Language plays an important technical and creative role in this genesis, by locking our attention onto a clearly pointed-at or a vaguely known and still-unfolding phenomenon or abstraction. Logic is used to rationalize experience, but it is not arbitrary. Experience is a sine qua non of all conceptual work – i.e. all propositions, even 'logical' ones are to some degree 'synthetic'.

What is missing in the 'knowledge is either analytic or synthetic' proposal is the full realization of the *inductive* nature of knowledge. Many philosophers seem to understand the term 'logic' only in its sense of 'deduction', but the truth is that deduction is only one tool within logic as a whole, which is essentially 'induction'! Induction too has its rules[54].

[54] As I believe I convincingly demonstrated in *Future Logic*.

In this perspective, different items may indeed be assigned varying degrees of "immunity from revision[55]", which may change under appropriate conditions. For example, the laws of thought are most immune. The law of conservation of matter and energy is more immune than the finding that water boils at 100 deg. C, say. All depends on the amount of data an assumption is based on and how much a change in such assumption would affect the rest of knowledge.

Although the 'analytic' notion was proposed as an explanation of logical necessity, it of course does not follow that its rejection constitutes rejection of logical necessity (let alone of natural necessity, i.e. that of empirical "laws", which it implies but is not implied by). Necessity is a valid, accessible and unavoidable concept.

Logical certainty is possible not only by logical insight (when the negation of a proposition is contradictory, for instance; or again, when a notion is seen to be based on circular arguments), but also by generalization or adductive argument from natural necessity, itself based on previous

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[55] I took this term (in 2003) from an essay called *Revisionary Immunity*, by a Dr. Greg Bahnsen (d. 1995), posted on the Internet at www.cmfnow.com/articles/pa018.htm, in the website of the (Christian) Covenant Media Foundation. This essay is on the whole a brilliant and important piece of work, an excellent example of logical criticism of confused notions – although the author, motivated by an agenda of religious apologetics (Christian), seems ultimately to advocate a rejection (or rather, an excessive relativism) of empiricism and logic.

generalizations or adductive arguments, and ultimately on experiences.

All such knowledge remains in principle revisable, but that does not mean that we indeed always find convincing reason to revise it! The choice of our ultimate principles is thus not purely arbitrary or relative, but depends on sincere and conscientious application of logical methodology, including for a start careful observation.

7. On the Russell Paradox

A class may be viewed as an imaginary envelope, which flexibly wraps around all the class' purported members, however dispersed in place and time, to the exclusion of all other things. The question arises, can the figurative envelope of the class "classes" wrap itself too, or not?

Reviewing the Russell paradox[56], we must conclude that *not all 'word-objects' are 'things'* – measures of things are not themselves to be counted as things. Since classification is an expression of our measurement of things, it cannot itself be counted as a thing. To do so gives rise to a paradox, we should avoid it.

In other words, the problem involved is that the iterative form ("class of classes") is not identical with the simple form ("class"), except very superficially and verbally – so the

[56] See *Future Logic*, chapters 43-45, on class logic.

former cannot logically be subsumed under the latter. There is a sufficiently significant modification of the subject-predicate relation involved, caused by the iteration of the same term, to exclude the reflex of subsumption. The paradox arising if we do not restrain this impulse is precisely what teaches us to exercise such restraint.

The word 'things', note, has many meanings. Sometimes, we intend by it all possible objects of thought. Sometimes, we mean to exclude words from it[57]. Sometimes, we mean to exclude classes; or more narrowly, as just pointed out, classes of classes; ditto, with regard to concepts or to concepts of concepts. Sometimes, the word 'things' includes only material objects, whatever their category. Sometimes, we mean by it 'entities[58]' (material, mental or spiritual bodies, or delimited substances, individual cases of which are generally subjects of propositions) in contrast to their 'properties' (the predicates of place, time, quality, action, quantity, relation, and so forth). Sometimes, in everyday discourse, we refer to 'things' in contrast to 'persons' – i.e. 'things' here means inanimate or non-volitional entities. And there are yet more senses of the word.

Thus, whenever logicians refer to 'things', they ought to try and first make clear just what is to be included under that heading.

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[57] Though of course, this distinction may be paradoxical, since the word 'word' refers to words.

[58] The word 'entity', of course, is sometimes meant more generally, with reference to any existent.

Incidentally, even worse than 'self-membership' as a concept to swallow, is the notion of "*classes that seem contradictory to what they include*" – the latter seems inconceivable at the outset, at least in verbal appearance! Thus, for instances: "no relationship" is a relationship of sorts; "non-classes" is in a sense a class. There has to be some fallacy involved in such terms, which needs to be clarified. Perhaps the problem is a hyperbole or misnomer?

The answer to this question would be that we are here again dealing with *classes of classes*, and these need not be outwardly consistent with their member classes. Thus, the class of non-relationships still involves a relationship. The class of non-classes is nonetheless a class. The class of empty or null classes does have members. The class of meaningless or self-contradictory classes is itself neither meaningless nor self-contradictory. And so forth.

8. An Illustration of Russell's

More on the Russell paradox: Bertrand Russell illustrates his paradox with reference to:

(a) a catalogue of all books that mention themselves, and

(b) a catalogue of all books that do *not* mention themselves.

Case (a) presents no problem: the catalogue can list itself without contradicting its own definition; whereas, if it does not list itself, it betrays that definition. Case (b), on the other

hand, is a problem: if it does not list itself, in accord with its own definition, it thereby becomes eligible for inclusion in itself; but, if it does indeed list itself, it contradicts its own definition. The latter is the double paradox under discussion.

Now, my first objection would be as follows. The catalogue's title (and even, perhaps, a brief description of its contents, an abstract) could perhaps be listed within the book itself– but such a book would not and cannot include a reproduction of the whole book inside itself (not to mention all the other books it lists or reproduces), for the simple reason that the task would be infinite (a book within a book within a book… etc., or the same in the plural).

The book is therefore not *itself* a member of itself; strictly speaking, only words *about* the book are mentionable in it. The terms inclusion or membership, as used here, then, have a very limited meaning. Thus, the plausibility of Russell's example is very superficial, spurious; he is being fallacious, sophistical, suggesting something impossible.

Moreover, every book "includes itself" in the sense that it consists of whatever contents it has and no more. But if a book is conceived as including a number of other books, defined by some statement (e.g. all English books), the book cannot include itself in the sense that this content is *only part of* itself. This would not only signify infinite regression (a book with other books plus itself in it, the latter in turn with other books plus itself in it, and so forth), and infinite size, but it would constitute a contradiction within the definition.

The book cannot both be all its content and only part of its content.

In this perspective, defining the book as 'the catalogue of all books that do not include themselves', the Russell paradox is akin to the liar paradox, since the projected book is an entity that has no finite dimension; it can never be pinned down.

A second objection would be the following. Even if we take Russell's construct as a mere list of books, defined as 'the catalogue of all books that do not *mention* themselves', the definition is absurd, since *it cannot logically be realized*. We simply cannot write a book listing all books that do not mention themselves (Conrad's *Lord Jim*, Hugo's *Notre Dame*, etc.), in view of the stated dilemma, that whether we list or not list the book itself in it we are in a contradiction. Therefore, this concept is of necessity a null-class and meaningless.

Logic has not been stumped by the paradox, but has precisely just been taught that the proposed concept is unsound and unusable; it must therefore simply be dropped or at least changed somewhat. There is nothing dramatic in the paradox; it represents one of the functions of Logic. We might try to propose a modified concept, as follows. Perhaps we should instead refer to a library.

(a) Consider a catalogue of all books in a certain library, which is to be placed in that same library. If the book lists itself, it presents no problem. If the book does not mention itself as being in the library, it is simply incomplete and

should be expanded; or its title is incorrect and should be modified ("all books but this one"); or it should be left out of the library.

(b) Now, with regard to a catalogue of all books *not* in our library: such a book cannot both mention itself and be put in the library. If we want to keep it in our library, we must erase its mention of itself. If we want it to mention itself, we must leave it out of the library. These are practical alternatives, which present no problem.

In this perspective, as we seek a practical expression for it, the Russell paradox becomes more akin to the Barber paradox.

9. On Grelling's Paradox

Grelling[59] labels a word 'homological', if it has the quality it refers to (e.g. the word "short" is short, or the word "polysyllabic" is polysyllabic), or 'heterological', if it lacks the quality it refers to (e.g. "long" lacks length, or again "monosyllabic" is not monosyllabic). He then asks whether these two words, themselves, are to be categorized this way or that, arguing:

- If "heterological" is homological, then it is heterological (contradictory predicates).

[59] See *Dict. of Philo*. p. 135.

- If “heterological” is heterological, then it is homological (contradictory predicates).

But it is a misapprehension of the meanings of these words to even try to apply them to themselves. In their case, the references are *too abstract* to have visible or audible concomitants. *Neither* term is applicable to either of them.

Note first that the apparent contradictions in predication either way apply to the word “heterological” only. For, using similar reasoning with regard to the word “homological”, although it might seem more consistent to say that “homological” is homological than to say that it is heterological, the sequence of predicates would seem consistent both ways, i.e.:

- If “homological” is homological, then it is homological (consistent predicates).
- If “homological” is heterological, then it is heterological (consistent predicates).

This could be taken to suggest that the term homological is somehow better constructed, while the term heterological has a structural fault. But this is not the real issue here.

The real issue is distinguishing between the physical words “homological” and “heterological” and their respective

intended meanings, viz. homological and heterological. When we intend a word as such, we traditionally place it in inverted commas; and when we intend its assigned meaning we use it simply. In the above propositions, through which a paradox apparently arises, the subjects are words as such (in inverted commas) and the predicates are the meanings of such words.

In this perspective, there is no basis for the claim that "heterological" is heterological implies "heterological" is homological, or vice versa. The inference is very superficial, because it confuses the word as such (intended as the subject) with the meaning of the word (intended as the predicate). That is, the inverted commas in the subject are not used sincerely, but we secretly intend the underlying meaning as our subject.

How did we draw out the consequents from the antecedents? Could we see at a glance that the first thesis implies the second? Let us look at the hypothetical propositions in question more closely:

If in the antecedent we place the emphasis on *the property referred to* by the word "heterological", viz. some presumed quality called heterologicality, we would formulate the paradoxes as follows:

- If the word “heterological” has the property it refers to (i.e. it is heterological), then it apparently lacks the property it refers to (i.e. is homological).
- If the word “heterological” lacks the property it refers to (i.e. it is homological), then it apparently has the property it refers to (i.e. is heterological).

If on the other hand, in the antecedent we place the emphasis on the word “heterological” *having or lacking* the property it refers to, we would instead formulate the paradoxes as follows:

- If the word “heterological” has the property it refers to (i.e. it is homological), then it apparently lacks the property it refers to (i.e. is heterological).
- If the word “heterological” lacks the property it refers to (i.e. it is heterological), then it apparently has the property it refers to (i.e. is homological).

In any of these cases, the consequent is constructed by comparing the subject “heterological” to the antecedent predicate heterological or homological; if they are the same word, we ‘infer’ homological as our consequent predicate, while if they verbally differ, we ‘infer’ heterological. But in truth, in making these comparisons between antecedent

subject and predicate, we have not spotted any quality in the word "heterological" as such, but have tacitly referred to its underlying meaning, and faced that off against the hypothesized predicate.

In other words, the statement that "heterological" is homological (or for that matter that "homological" is heterological) is not as self-contradictory as it appears at first glance; it could conceivably be consistent. In truth, it is indeterminate and therefore meaningless.

More precisely, to resolve the paradox we have to remember how our terms were induced in the first place. We can tell that "short" is short *merely by seeing or hearing the word* "short" (supposing that any one syllable, however written or pronounced, counts as short). But in the case of a term like heterological, you cannot tell whether the word has or lacks the property it refers to, because that property is not a concrete (visible or audible) quality of the word, but something abstract that we apply to visible or audible components of words. If the quality sought is not visible or audible, it is unknowable and there is no way for us to tell which predicate applies.

That is, our initial definitions of those terms, which mention "a word having/lacking a certain quality it refers to", are not clear and precise, because they do not specify as they should that the qualities intended are phenomenal, i.e. perceptible aspects of the word. If the word labels something not included in its physical aspects, the terms homological and

heterological simply do not apply. To apply them is to play verbal tricks. Thus, neither of these predicates is applicable to either of these words as such.

It might be objected that words do have non-phenomenal attributes. For example, we often consider a word useful or useless. In such case, we might ask: is the word "useful" useful or not? Yes, I'd reply to that. Therefore, "useful" is homological. Likewise, "useless" is useful, therefore "useless" is heterological. In this perspective, one may doubt the exactitude of what we have just proposed, that homological and heterological are terms that presuppose concrete (rather than abstract) predicates.

But to this objection, one could counter that the utility of a word is ultimately something concrete: a word is useful if it makes a perceptible practical difference in the development of knowledge. In that case, our definition could be modified slightly, specifying that the terms homological or heterological are only applicable when we can first *directly or indirectly* anchor them to some concrete property.

In sum, *these terms must refer to something other than themselves before they can at all be used*. The fallacy involved is similar to that in the liar paradox, where the term "this" is used with reference to itself, whereas it only acquires meaning when it has something else to refer to. Such terms are *relational*, and so cannot refer to other relations in a circular manner or ad infinitum: they need to eventually be anchored to some non-relational term.

Notice, by the way, that if we changed the word “short” to say “shortissimo”, with reference to the same meaning, the word would change status and become heterological, since “shortissimo” is not shortissimo. On the other hand, whatever other word we substitute for the word “heterological”, Grelling’s paradox in relation to it remains apparent. This test shows that in the latter case it is not purely the word that we are thinking of, but rather its underlying meaning. With regard to the word “useful”, we could also say that it is useful by virtue of its content, or at most by virtue of its being a word (a unit of language), and not because of its specific shape or sound.

6. ABOUT "MODERN LOGIC"

1. A School of Logicians

"Modern logic" is the name of *a school* (or set of schools) of logicians. The term refers specifically to logicians with certain anti-traditional tendencies; it is not intended to include all logicians of modern times.

For example, though Jean Piaget is a 20th Century logician, I would not class him as a "modern" logician in this sense. Moreover, most logicians are only in part "modern" in this pejorative sense; they still adhere to some traditional premises and conclusions. An example of this half-half class in my view is Bertrand Russell.

2. Alleged New Methods

Some "modern logicians" claim to have developed "new methods" of validation of syllogism. This claim seems pretentious to me, just a way for these people to give themselves a place in the history of logic. For the question is: *do these new methods arise in response to actual problems – i.e. errors – in the old methods*, or were the latter only a bit wishy-washy? Why is Aristotle's exposition of 'Barbara',

say, considered insufficient? It causes no error, as far as I know; at worst, it is perhaps a bit vague. Also, *are these methods really new, or just applications of Aristotle's teachings*? If we look closely, we notice the latter.

Any improvements in clarity, rigor and credibility, the moderns have made are of course welcome. But this achievement remains relatively modest in comparison to Aristotle's original work in that field, unless they have identified errors in the latter's approach. If their only claim to fame is that Aristotle was 'too intuitive', we can reply that their allegedly 'more scientific' insights are also ultimately just intuitions. That is, all logical science is ultimately based on conceptual insight.

As for the specific techniques used by the moderns, they are all mere derivatives of the Aristotelian schema of syllogistic reasoning; they do not stand over and above it, or prior to it. They are just further ways of better digesting the already known – which is all well and good, but does not justify blowing any trumpets.

The modern revolutions that occurred in mathematics – such as non-Euclidean geometry – were (so I have been taught) due to the perception of errors in the old methods, which made it necessary to develop new foundations. I do not see such necessity involved in the development of modern logic; the motive seems rather to have been an intense desire of self-assertion by certain academics. Logic was already adequately "validated" – legitimatized.

Aristotle's work has not been displaced by modern logic, in the way that Ptolemaic astronomy was replaced by Copernicus. The relationship between Aristotelian and modern logic is not even one of inclusion in a larger theory, akin to that between Newton and Einstein, because whereas Einstein found limits to Newton, the moderns did not fundamentally circumscribe the applications of Aristotle. The syllogistic he developed remains valid.

This does not mean that new discoveries have not been made. Some have indeed been very enlightening and fruitful. For example, the studies of classification, hypothetical propositions, of paradoxes, of modalities, of induction, have greatly evolved.

For my part, I think the most important rule for logicians to follow is this: ***any theory of knowledge proposed must fully account for its own genesis within the theory***. A logician must always consider his own thought processes, and whether he has verified their consistency, explained their role and demonstrated their validity within his theorizing about logic. And with regard to this crucial criterion, I must say that so-called modern logicians have all too often fallen short.

3. Non-Aristotelian "Logic"

As already stated, many "modern logicians" – since the late 19th Century – have yearned to do for (or to) Logic, what Copernicus did in Astronomy, or later what Einstein did in

Physics. Each one of them was, it seems, fired by the grandiose desire to be the equivalent great modern revolutionary in the field of logic.

They thus inaugurated a persistent assault on Reason, a veritable carnival of Unreason, which has lasted for over a hundred years, with disastrous consequences for many a poor mind and for social peace and wellbeing.

Their conceptual model was non-Euclidean geometry. Just as modern mathematicians came to consider certain Euclidean axioms to be debatable, if not arbitrary, so these modern logicians sought to put in doubt or discard the Aristotelian "laws of thought", and found some new system – a "non-Aristotelian logic".

But this is an impossible exercise, because[60] the laws of thought are more fundamental to reason than Euclid's axioms (in particular, that regarding parallels). *The geometrical model of axioms and theorems is only superficially applicable to logic, because it is itself an aspect or teaching of (Aristotelian) logic*.

When mathematicians decided to review the traditional axioms of geometry, they were using reasoning *by means of* the laws of thought. They argued: "we see no self-contradiction, or doctrinal inconsistency, or even (eventually) contradiction to experience in proposing some alternative

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[60] As I have explained repeatedly in *Future Logic*.

axioms and systems; therefore, Euclid's assumptions are not exclusive and irreplaceable."

The same cannot be argued in the case of logic itself, without self-contradiction. We cannot, say, point to the particle-wave duality and say "it seems that contradictions do exist in the world, therefore we shall review the logical axiom of non-contradiction" – we cannot do so, for the reason that such review is motivated and rendered credible precisely by the law of non-contradiction, in the way of an attempt to restore an apparently lost consistency.

The very method used of reviewing one's premises in the face of contradiction and abandoning or at least modifying one or more of them to recover consistency – this very methodology is a teaching of Aristotelian logic! We cannot say: "I understand that if I advocate contradiction, I open myself to being contradicted; but that does not bother me, because it is a consistency of sorts – I accept self-contradiction."

In the very act of making such a superficially reasonable proposal, we are reasserting the universality of the laws of thought, their being at the very root of reason, inherent in the very act of reasoning. The only way we could conceivably abandon these laws would be to give up all thought, all attempt at rational knowledge. Logic cannot be used against itself: it is the very paradigm and paragon of consistency.

We can suggest: "A can be non-A", or some such "new axiom" for logic, but the resulting discourse will still be

nonsense – however nicely wrapped up and ordered, however well "systematized" stealing the methods of Aristotelian logic. Such proposals are an imposture.

Those who propose such ideas are swindlers, profiting from the gullibility and intimidation of many people. It is like in the story of the emperor's new clothes, in which con men sold the emperor invisible clothes, which no one dared to deny were clothes – till a child pointed out he was naked.

There simply is *no such thing* as "non-Aristotelian logic" (i.e. a logical system that denies one, two or all three laws of thought). To come forward with such a system is merely to pronounce words. These words have no collective content, no meaning; there is nothing behind them other than the imagination that there might be something behind them because the phrase is composed of individually meaningful words.

No "Copernican revolution" is conceivable in the field of logic: it would not merely be anti-Aristotelian but anti-rational. Logicians must abandon such vain ambitions, and more modestly continue to expand the scope of logical analysis and the depth of understanding of logic. The role of logicians is to do logic, not undo it. Reason is a precious value for mankind, and logicians ought to be its guardian.

Would you entrust your life to, say, an airplane built by engineers practicing "non-Aristotelian logic", people who feel cozy in the midst of contradictions and in between truth

and falsehood? Similarly, in all fields of human endeavor and interaction: logic is a guarantee of sanity and safety.

4. Postmodern "Logic"

As if such irrational currents were not enough, there is (I gather) a new generation of "postmodern" logicians and philosophers who eschew even the pretense of accountability, considering that any discourse that seems to be about "logic" is acceptable. These are of course part of a wider trend, not limited to our field.

Being relativists, these people are not directly attacking anything or anyone. They are not mere anti-rationalists: they are so indifferent to the niceties of reason that they feel no need to justify themselves. They are of course the natural offspring of the moderns, taking their teachings to their 'logical' conclusion. They are more consistently illogical than their predecessors, no longer owing a semblance of allegiance to reason, not needing even to pay lip service to it. Absurdity does not bother them, so they need no logical window dressing for their doctrines.

Indeed, these people take pride in their fashionable madness. They *strive* to be as confusing and incomprehensible as possible, considering that what others cannot possibly understand must be very deep indeed. They have only a very vague notion of what logic is about, but seek to impress other people with meaningless symbolic constructs and use of

fancy pseudo-scientific terminology. They prattle away, eruditely formulating fake theories immune to any empirical or rational review. They function as (con) artists rather than scientists.

Yes, such people do exist; some even have teaching positions in prestigious universities. Because most people – including some in high academic positions, including some who are hired to teach logic – know or understand little about logic, they are easily intimidated by such intellectual posturing and imposture. They fear to reveal their own poverty in the course of questioning or debate.

Besides, it is no use denouncing the swindle; no one apparently cares, because few people realize the importance of logic (apart from some simple formulas needed in computer programming). Reason is out of fashion, has been for generations. Logic is too abstract; you cannot show artistic footage of it on TV. It cannot be very entertaining: it requires an effort of thought.

5. Mere Manipulations

Most "modern logicians" base their approach to logic on *the manipulation of pre-existing knowledge*[61]. They do not

[61] I would classify this approach as Neo-Cartesian, save for my respect for Descartes. Worse still, they end up manipulating mere symbols (becoming Nominalists). Among the "logicians" intended here, I count even Bolzano, although in his case the

properly ask: "how are concepts and propositions in the first place produced?" but are content to look into how they think these ready-made products should be ordered relative to each other. Another example: relations between the modalities are discussed conventionally, without having clarified how they are apprehended and how they may be comprehended.

What logicians develop in such manner cannot even rightly be called (as they call it) a "**deductive system**"; it is just a set of invented schemas for ordering given units. Some place the chicken before the egg; others prefer placing the egg before the chicken. They do not ask where both chicken and egg came from. They place their systems in orbit, but do not ground them anywhere. But the proverbial buck has got to stop somewhere!

They do not consider the possibility that their proposed epistemology is bound to skew the results, i.e. give a misleading image of the nature of knowledge.

They have not understood that deduction is only fully comprehensible within an "**inductive system**" of logic (such as the one proposed in *Future Logic* and my other works). These people fail to grasp the essentially epistemological *task* of logical science, which is to find out how humans tend to and should organize knowledge, i.e. how knowledge actually develops and how such development can be optimized.

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manipulation involved is not one of symbols, but of artificial concepts.

A true system of logic is one that treats the issue of knowledge as a whole – and in that perspective, knowledge is essentially an inductive enterprise, in which deduction is one of the tools used. Knowledge cannot be likened to a construction using "building blocks" (or atoms of knowledge). It is something much more fluid, a process; yet it has apprehensible behavioral patterns and rules.

Knowledge starts with experience of appearances (phenomena, intuitions, and logical insights), out of which cognitive entities (concepts, propositions) are gradually formed (through more or less logical arguments) by humans, in an effort to comprehend and sort out the experiences. *Appearances are the ground of all knowledge*.

Symbols invented by logicians can never be effective "placeholders" for such basic data. Logicians must never forget that their theories are abstractions without meaning if not firmly anchored to their empirical sources. Logic is not only about final, static relations; the ongoing process of induction must always be kept in mind.

6. Thinking Reflexively

Logicians and philosophers must learn to think reflexively – and always ask themselves how they arrived at and can justify their own beliefs and proposals. Even concepts and propositions that seem obvious and reasonable enough must be subjected to reflective scrutiny.

For example, when Wittgenstein II claims that 'understanding' consists in knowing the conditions of truth, i.e. the rules of verification – he sounds credible. But upon reflection, one might ask how such knowledge (of correct procedures) is itself to be discovered and established. Surely, the basis of it cannot be previously known procedures, and so on *ad infinitum*. If we only refer to the said thesis, 'understanding' remains ultimately unexplained. Therefore, it is inadequate to the theoretical task at hand.

That is, some 'understanding' must be accepted as primary – i.e. some knowledge content and logical insights must be irreducible, capable of informing and convincing us directly and fully. Broad principles like the laws of thought must be among these first understandings. Only after they are apprehended and comprehended is it possible to develop specific deductive, and indeed inductive, verification procedures.

Again, Frege insists that thought is not possible without language[62] – relying for his credibility on a very limited sense of the word 'thought' and totally ignoring the issue of how

[62] Incidentally, if it were true that thought without language is impossible, one would have to continuously speak to oneself, whether in one's head or out loud. Yet, when we become conscious of doing that, we commonly reprove ourselves for being excessively talkative, i.e. for verbalizing things much more than necessary. This shows that we commonly consider words not always needed for thought. The same is true in interpersonal communication – we are annoyed by people who speak too much, preferring those who can control their tongues.

language itself is to be grasped without prior thought. He demands defined terms throughout – but such a starting premise for 'language theory' is unjustifiable, since it generates infinite regression. These are just the hang-ups of a narrow-minded formalist.

Very few terms are predefined in the way Frege expects and demands. With careful observation of our mental behavior, it becomes evident that most terms have inductive definitions that develop gradually by trial and error, going through adaptive changes as relevant data and thoughts emerge); and indeed, some terms are *never* defined (very basic ones like 'existence' are irreducible primaries).

It is ironic that such people, who claim to be logicians, have not understood the basic teaching of logic – that cogency depends on complete consistency.

7. Conventional Logic

Logic is not a convention, an arbitrary setup agreed between self-styled logicians.

What do we mean by "conventional logic"? Here is an example: "If the green traffic light goes on, it is permitted and safe to move on; whereas if the red one goes on, it is not." This is a social convention, useful for living in the world of people.

Many of our propositions are of this sort: they signify an agreement among all participants (which may be imposed by authorities, but must be made known to all others) as to what certain symbols are intended to mean. There may be (indeed, must be) some underlying factual (i.e. non-conventional) truth; for example, whether the light is green or red, and whether accidents are less likely if the rules convened are obeyed. But *some aspect is arbitrary, i.e. it could have been otherwise if we had so willed it*; for example, we could have used the red color for "pass" and the green for "wait".

Buddhist philosophers, by the way, use the word "conventional" very freely, with reference to any view they want to discredit. They regard all ordinary – i.e. non-enlightened – knowledge as conventional. That is clearly incorrect usage – at least for those of us who have not *personally* encountered the enlightened view. For the term may only be used in contrast to something non-conventional; it cannot be literally universal without self-contradiction.

In my view, logic in general is very definitely *not* "conventional". Sorting out conventions is one of the tasks of logic, a very minor task. Logic is much broader than that, concerned with the ways to arrive at "knowledge of reality", whatever that be.

> Note also, in passing, that opinions people label as "conventional wisdom" are often neither granted by everyone nor wise. The expression is often just false advertising, to make believe.

8. Absolute Truths

We must admit some truths to be absolute.

Even **if reality is relative to consciousness** in some way, as some philosophers advocate, then *that* observation becomes the framework for "realism" – i.e. *that* is the fundamental truth independent of the observer. Realism does not have to be equated to extreme materialism, but some sort of fixed "fact" must be admitted.

In such case, if consciousness somewhat affects reality – as the idea of relativity here seems to suggest – what sort of impact does the subject and his consciousness have on the object it relates to? Is consciousness (so conceived) a veil, a distortion, or a modifying or creative force? Whatever its effect, the important issue would be *whether we can somehow become aware of such effect and correct our reading for it*.

The techniques of induction are such that they are in principle capable of discovering such eventual effects and correcting our knowledge accordingly. Inductive knowledge is a result of an ongoing process of hypothesizing and confronting our hypotheses with experience. It is a holistic enterprise, which does not statically depend on specific beliefs. It is the cunning way we are able to transcend our actual, or even just conceivable, limitations or faults.

In this context, I hasten to add, the proposed hypothesis of an unknowable (and not merely unknown) "thing in itself" is the inductively weakest speculation, being by definition unverifiable with regard to any experience whatsoever. Consciousness must be admitted to get some part of its object right, if only its realization that it is getting some part of its object wrong. If it were completely wrong, it would not even be able to conceive of an object beyond its ken.

9. Untouched by Consciousness

Beneath all Bolzano's deviant logical terminology, and theoretical misconceptions, one discerns the shadow of Kant. This is part of the ravage caused by the latter's pretentious "**thing-in-itself**", his notion of a "**noumenon**", of something beyond the phenomenal unknow*able* to anyone (but Kant himself, of course) and *yet open* to discussion (somehow, in spite of the inherent contradiction – indeed because of it, because of the perverse twist in it).

In the last analysis, Bolzano is not interested in studying ordinary abstraction from experience, the ways we come to know the unknown; he is instead pursuing a Kant-like "transcendental logic", a means to somehow get to know the unknowable. His sought after object is not real, but "surreal". He wants to do the impossible and inconceivable: to cognize the "in-itself" – i.e. something *untouched by consciousness* –

ignoring that the moment he did cognize it, it would not longer fit his requirement.

Note that I am not taking the position that nothing is untouched by consciousness. I believe some things exist beyond consciousness (at least, human consciousness), based on the observation that my own knowledge is variable and different from that of others. I am merely pointing out that there is no need to look for some pristine object unspoiled by cognition; *everything* is pure and virginal until cognized by someone, and consciousness does *not* necessarily pollute its object.

10. Logical Atomism

Modern logicians are inclined to "atomism", cutting statements or texts into parts and then considering the interrelations between these parts and their relations to the whole. The study of the relations of whole and parts has been dubbed "mereology". The parts are viewed as atoms, and together they build up the whole; the relations between them are the structure that keeps them together, their cohesion.

But my question would be: *are the relations between the parts not themselves parts?* The answer would surely be: yes – if our analysis of the whole into parts is to be fully explicit. In that case, one might go on, and ask if the relations do not have relations among themselves and with the remaining parts? The answer again has to be: yes, they do.

From which it follows that there are an infinity of relations and parts – and the proposed atomistic method of analysis is in fact impracticable. Note that it is not 'infinity' per se that is the problem, here – since presumably the world is a whole made up of an infinity of parts and relations. The problem is the need to verbalize all that, i.e. to repeat an infinite world in words.

Clearly, the error of such atomism is to regard all units of thought as *concrete* items; specifically, they are words. Thought is confused with its outward symbols, the words of our discourse. In this view, even *abstract* items are concrete, since they have no real existence till they are put into words. Clearly, the proponents of this view have not thought their proposal through; had they done so, they would have realized its absurdity.

This is in contrast to the classical, Aristotelian, approach, which makes a distinction between *form and content*. The words, the symbols, are only forms – distinct from their contents, the underlying meanings, the realities (or at least, appearances) that they are intended to refer to. The relations exist abstractly, even when not verbalized; and verbalizing them does not make them concrete, it merely tags on a concrete label to them.

For this reason, there is no infinity of relations over and above the first or second relations. There are (abstract) relations between non-relations; then there are (more abstractly) relations between relations; and then nothing

more. You cannot propose ‘relations between relations and non-relations’, because these are identical to the first category, i.e. ‘relations between non-relations’. You cannot propose ‘relations between relations between relations’ (and so on, ad infinitum) because all these are already covered by the second category, i.e. ‘relations between relations’.

In the latter cases, the words may differ, but the underlying referent is still the same. As soon as you have a ‘relation’ between two or more (concrete) things, you have not only the (abstract) glue between the things, but also the glue between that glue and each of these things. There is no new glue to stick the glue; it is that very same glue all through. On the other hand, comparison between this glue and the glue between other sets of things requires a new, more abstract ‘relation’ – another kind of ‘glue’. But that additional ‘relation’ is singular – it is simply ‘glueness’; that is, no further levels of abstraction are possible beyond it.

Moreover, this concrete image of ‘glue’ to explain ‘relations’ should not be taken too literally. The abstract has a much less ‘real’ existence than the concrete. It refers to common measures or degrees between things in some respect(s). These are in a sense ‘out there’, because we can directly or indirectly compare things; for instance, we can take a measuring tape and observe the proportion between the widths of two bodies. But in another sense, abstracts are not quite ‘out there’, but depend for their *actual* existence on

there being an observer able to compare. Till then, abstracts have only *potential* existence.

The results of comparisons (if carefully made) are 'objective' in the sense that they reflect ultimately concrete events beyond the observer; but they still depend on the presence of an observer – a 'Subject' engaged in measurement. The latter proposition about subjectivity, too, if true, is an objective truth of sorts; note well, it claims to be as factual as any other fact (concerning concretes).

We might thus say that the abstract is a more potential being, compared to the actuality of the concrete, insofar as its existence is observable less directly, i.e. it requires additional cognitive processes (of measurement by someone). Note that results of measurement are in principle repeatable, although in practice the opportunity to do so may pass us by too quickly.

Note lastly: the distinction of 'form and content' may be used not only for 'words and meanings' (as done above); in some contexts, it is intended to refer to 'abstract and concrete' or 'concept and percept' and other such pairs. The underlying image is that of container and contained.

11. Exclusive Judgments

A lot of 'modern' logic and philosophy seems to have arisen because of exclusive judgments of the form "**Q, but not P**", instead of the inclusive "**Q, as well as P**". Instead of

amplifying past ideas with new insights (for example, adding to Aristotle's subject-predicate logic, by investigating comparatives like "A > B"[63]) – the tendency was to provocatively belittle, or try to reject and replace the old, so as to ascribe more importance to the new. I can't help seeing such behavior as pretentious and arrogant.

To discover that some thesis "P" does not cover all the ground of some area of knowledge does not justify saying "not P", but only "not only P" or "P is not the whole story". Because it is only the assumption that P was *all*, the excessive generalization of it, that can be faulted, and not the item P as such. Particularization is only partial denial; to equate it to thorough denial is wrong inference; it is extremism.

Conversely, we might say that such people themselves *over*-generalize. Thus, for example, as I explained in *Future Logic*[64], Godel builds his theory of logic with reference to a too-limited pool of propositional forms. Or again, the underlying fallacy committed by Frege in his linguistic analysis (literally: cutting up statements into constituent parts) – is to take one example, one kind of case, and to generalize his treatment from there, without attention to the possibility of other cases.

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[63] I give this as an example of a proposition not yet permuted into the form "S is P". I could equally give as an example a sentence like "A loves B". See why further on.

[64] Chapter 66.2.

Frege assumes that all statements can be split up (at will, by the imagination) into two parts: an 'argument' and a 'function'. Thus, in "Caesar conquered Gaul", "Caesar" is the argument and "conquered Gaul" is the function; the latter is like a container ('unsaturated') and the former fills it with a definite content, completing it ('saturating' it)[65]. But, as I have shown in *Future Logic*[66], in my treatment of the Russell paradox, such cutting up of a sentence is not always logically permissible: for instance, statements about membership cannot be permuted without producing contradiction.

12. Empty Terms

With regard to **empty terms** – i.e. terms devoid of referents. Human knowledge is built in part through the imagination. A term may be imaginary, meaning that its referents are knowingly fictional (i.e. we know there is no such animal in fact), or tentatively assumed for inductive purposes (until actual cases are observed).

We often conceive of things we have not yet actually experienced, e.g. in constructing a theory, and then try and find out whether our construct can be confirmed. *This is a standard practice of inductive logic.* Sometimes, we

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[65] See Jones, p. 147 – "Never ask for the meaning of a word in isolation," etc. The funny thing is that this is precisely Frege's own error here!

[66] Chapter 45.

eventually come to the conclusion that our assumption was unjustified, and the imagined term is in fact empty. Sometimes, we arrive at such a negative conclusion, after for a long time believing the term not empty, and then after further investigation discovering to our surprise that it is empty.

A proposition involving a term known to be empty is, strictly speaking (i.e. factually), "false". A proposition with a fictional term may be considered conventionally true – for example, "unicorns are horses with a horn and wings". This is conventionally true, in the sense that the definition rightly describes our mental image of a unicorn; but it is factually false, in that there are no unicorns in the material world.

A proposition involving a term of uncertain status in this respect, i.e. we think but do not know for sure that the term has referents, is "either true or false". Frege's claim that such statements are "neither true nor false" is not correct, and sows confusion[67].

Some statements are indeed neither true nor false – for example, "this is false" or "this is true"[68]. But, though composed of words that are meaningful in other contexts and are here put together in a grammatically valid way, such

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[67] As does his claim that the only referents of any statement *are* its truth or falsehood! If this were so, surely all statements would have one of two meanings: true ones the meaning true and false ones the meaning false.

[68] See my analysis of the liar paradox in *Future Logic*, chapter 32.2.

statements are on closer scrutiny found to be meaningless verbal constructs; they have neither referents nor sense. But statements with empty terms, or possibly empty terms, are either true or false.

There are also of course propositions that are false, though all of their terms have referents – because the conjunction of their terms is inappropriate; i.e. the terms do not belong together in the way proposed.

In conclusion, empty terms can only be properly understood through consideration of inductive logic. If they are analyzed with a narrowly deductive logic outlook, like Frege’s, they will be misunderstood.

7. ABOUT COGNITIVE DEVELOPMENT

1. The Fourth R

Logic is essential to human cognitive and psychological development and to successful living, and should begin to be taught from an early age. We speak of The Three R's – reading, (w)riting and (a)rithmetic – as being the fundaments of schooling. But a Fourth R should be added, viz. – **reasoning**, i.e. awareness and use of logic.[69]

Exactly when such educational effort should be carried out is, of course, open to debate. We have to understand the natural development of logical abilities and skills in the absence of interference, before we can determine when best to try and apply some artificial improvements. It is no use trying to impose skills on a child that the child is not biologically ready for; it may even be counterproductive to do that.

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[69] The following reflections on cognitive development are intended to put forward some ideas and recommendations of a logician – they are not the work of an early childhood expert or of a cognitive development experimenter. Information I give here is based on notes I took during a series of lecture on related subjects I attended at Geneva University a few years ago to put myself in the picture.

Of course, the notion of 'natural' development is a bit idealistic – since our individual skills are in practice affected not only by purely biological factors, but also by the thinking abilities and habits of the surrounding society we personally grew up in (although some social currents may affect some individuals more than others). So rather, we should distinguish between subconscious absorption of logical skills, and their more conscious training.

When we speak of 'cognitive development', we refer to a wide, varied field of study – which ranges from the sensory, intuitive and rational (purely cognitive) functions, on to emotional, psychological and social factors.

Clearly, our interest here is the former domain, the purely cognitive aspects. Moreover, we are interested in experience (sensations and self-intuitions) only insofar as it is 'processed' by reason; i.e. the experiential as raw data for logical treatment. With this in mind, we should perhaps consider our present object of study as more precisely: 'development of the faculty of reason'; i.e. it concerns our rational powers and their use, or our logical abilities and skills.

> Note: I understand the term 'cognition' very broadly, as including perception of sense data and their mental equivalents, intuition of self and the functioning of self (including volition), as well as conception and proposition, logical insight and argumentation. Moreover, it is often taken to include physical, mental and volitional

processes preparatory to such cognitive acts, made to position the Subject for cognition; e.g. turning his attention in some direction.

In its initial sense, the term 'cognition' is as wide in extension as 'consciousness' differing from it only in intension. Consciousness refers more to the *relation* between subject and object, or the eventual 'substance' of such relation that connects the two; whereas cognition stresses the impact of such relation on the subject, an intuited *event* of knowing within the self or soul. Both also imply a *state* of 'awareness' in the subject – a readiness to receive information, or alertness.

2. Empirical Studies

It is important for logicians to *empirically* study the development of logic in people's minds, from birth to maturation and onward. Obviously, the use and understanding of logic varies greatly from individual to individual (extensional variation), and within the life of any individual (natural modality change).

Like most formal logicians in history, who work in an ivory tower of sorts, I have not personally studied the matter greatly; but from the examples given by **Jean Piaget** (Swiss, 1896-1980) and his successors (some of who, of course, did not agree with all his viewpoints), I have become convinced of the value of such studies. Armchair logicians like myself

do of course resort to introspection and personal memories, as well as to casual observation and to written history (the histories of popular beliefs and statements, of philosophy and of science); but Piaget ranged more widely or at least in a new direction, studying real children in a purposeful and structured manner, under laboratory conditions.

Logicians had until then tended to concern themselves with the setup of mature minds, almost totally ignoring the fact that logical skills are acquired over time. Such acquisition presumably depends on both nature and nurture.

(a) In part on physiological and neurological maturation (which may vary from one person to the next); and:

(b) In part on cultural osmosis and educational offering (which varies from culture to culture, geographically and across history); and finally:

(c) In part on the efforts of each individual to study logic and train himself or herself in it, and if need be to engage in independent research and thought on the issues involved.

With regard to the development of our organs of cognition, a distinction ought be made between the time of purely physical maturation – and the time needed to learn how to properly use already mature organs. Some children manage to make use of their organs more readily than others, due to different volitional dispositions as well as family and social contexts. Organ development *per se* refers to a potential; the latter must still in turn be actualized.

Logic has evidently got a geography – different peoples, in different cultures, rely on different logical beliefs and skills. To give a common example, East and West are thought to have very different logical paradigms. But marked differences are possible more narrowly, even within cohabiting ethnic, social or family groups. In some societies, males and females may display considerable differences. Even though they do occur, such differences should not be overrated: being all members of the same species our minds are basically similarly constituted and operative. Naturally, people who inhabit different 'worlds' throughout their lives will exhibit different cognitive emphases.

Logic of course also has a history, which logicians would also be wise to take into consideration. I have given some guidelines for such consideration, stressing the need to distinguish between (a) the mere practice of some logical skill, (b) the self-awareness of such practice, and finally (c) the theoretical assimilation of it (formalization and validation, and integration into the larger context of theoretical knowledge). An example I gave in some detail[70] was the a-fortiori argument.

While acknowledging cultural and historical differences in emphasis, logicians should not relativize and withhold judgment. They may pronounce some cultural or historical prejudice or method as inadequate to the task of knowing. For example, with regard to geography, we may pronounce

[70] In *Judaic Logic* and related works.

judgment against the anti-rationalism of certain oriental or western logical practices or systems, such as those of Nagarjuna or of Greek sophism. Or again, with regard to history, we may marvel at the twists and turns of medieval and early renaissance thinking as described in Michel Foucault's *Archeology*[71].

In empirical studies like Piaget's, the methodology used must be rigorous. *This depends in large part on the understanding of logic by the experimenters themselves* – if such knowledge is lacking the wrong questions will be asked, and the answers will surely be misinterpreted.

3. Piaget's Model

It should be stressed that Piaget's work is not only about child psychology or cognitive development – many of his observations and concepts may be considered as pure logic theory, equally relevant to adult cognitive processes. For example, his distinction between assimilation and accommodation is very apt.

> "As modeled by Piaget, the child explores the world and observes regularities and makes generalizations, much as a scientist does. Piaget… recognizes two fundamental cognitive processes that work in somewhat reciprocal fashion. The first is what Piaget called **assimilation**, a

[71] See also my essays on this.

> process that involves incorporating new information into an already existing cognitive structure [or "schema"]… The second process, **accommodation**, [serves] to form a new cognitive structure that can incorporate the new information… Cognitive development, according to Piaget, represents a dynamic equilibrium between the two processes of assimilation and accommodation."
>
> (*Encyclopaedia Britannica*, 2004. Emphases mine.)

These two processes are not limited to developing minds, but continue to be used throughout our lives. They are not limited to one area of logic, but can be adapted to many different fields. For this reason, this terminology is well worth adopting.

For example, I have proposed a distinction between concept-formation by means of similes and that by means of metaphors. Both are ultimately analogical modes of thought, but the latter is less obvious and more creative than the former. The former may be classified as assimilation, the latter as accommodation. In class-logic terms, assimilation is classifying a particular into an already existing class, whereas accommodation is proposing a new class for it. The same distinction could be applied to theory-formation. If one resorts to pre-existing ideas, it is assimilation. If one finds no adequate solution to the problem at hand that way, one is forced to invent something quite new – this is accommodation.

4. Piaget's Experiments

Some of Piaget's experiments, or his conclusions from them, strike me as absurd, or at least unclear.

In one experiment, for example, Piaget seemingly examined whether or when children realized the Lever Principle, i.e. that 'weight times length' is equal on both sides of a balance in equilibrium. Now I ask – did the experimenter expect children to intuitively know what was not known in the history of mankind till quite late, i.e. until a genius called Archimedes discovered it? Surely, each of us remembers having been *taught* this principle at school (although it is not totally inconceivable that some children guessed it before).

More to the point, there is nothing 'innate' or inherently 'logical' about this principle. It is a *physical* truth, which is empirically evident but far from obvious; one can well imagine a world in which matter would behave differently. So, what was Piaget looking for? All he could hope to find out, at best, is when children are able to *understand* this principle, i.e. at what age they can be taught it. For, if they already knew it, it was probably due to having learnt it from adults somehow.

Again, in another experiment, liquid in a short, wide container is poured out into a tall, narrow one, and the child is asked which of the two containers holds more liquid. Piaget found that children younger than about seven tended to regard the taller (though narrower) container as holding more liquid. He apparently considers this as informing us on

when children acquire understanding of the Law of Conservation of Matter.

But it seems to me that this is only one possible interpretation of events. It could be that the younger children wonder whether 'liquids expand or contract like gases, to fit the shape and size of their containers'. This hypothesis concerning physical law is not unthinkable; it is a fair alternative to the 'liquids have constant volume' hypothesis. The latter is not a 'logical' absolute – it is a mere physical law, which happens to be true, but whose truth it has taken mankind a long time to realize. Why should children be expected to have the genius to go straight for the correct alternative? And if they did so, would that be a measure of intelligence, or of narrow-mindedness?[72]

Here again, the onlooker might be tempted to think that knowledge of the law of permanence of matter is considered by Piaget to be a natural development (either innate in human brains or logically inevitable), whereas the principle is more probably learned from others (whether by osmosis[73] or by being explicitly taught it), and maybe in very rare cases

[72] Indeed, I would expect children nowadays, at least those raised on daily cartoon watching on TV, to rather first imagine matter to be almost infinitely elastic!

[73] This causality, cultural "osmosis", is worth studying in detail. For example, the idea of class-inclusion is inherent in the very use of words; therefore, one could say that the moment a child begins to learn a language, it is simultaneously absorbing the notion of class-inclusion. Of course, that lesson may not be immediately clear, but may become clearer with time.

arrived at by personal efforts of inductive logic (i.e. by observation, formulation of hypotheses and elimination of inappropriate ones).

Perhaps I do Piaget an injustice, but regarding instances like these, it seems to me that his experimental goals or the conclusions he drew from his experiments were not always clear. Perhaps his intentions or inferences were clear in his mind but he did not express them clearly enough, making it possible for other people to misread them.

Be all that as it may, we could formulate the point made as a methodological principle: everything must be made clear, so that other people do not misinterpret what was sought or what conclusions were drawn. Scientists should be careful to specify their interpretations, explicitly stating what should *and what should not* be read into them.

With regard to these experiments, it seems to me (without having looked at Piaget's actual research notes) that *the issues of when and why are not clearly distinguished and correlated*. First, we should list the various ways an item of knowledge or a skill might make its appearance in the subjects – instinct (innate tendencies), just logic (application of the laws of thought), personal observation combined with logic (induction), learning through examples, hints or explicit lessons (from peers, parents, teachers or the media). Secondly, when such knowledge or skill does make its appearance, we would want to devise (if possible) some test that would reveal to us which of the aforesaid sources was

the operative one in the individual case at hand. Otherwise, the information obtained is too vague and confused to allow any conclusion to be drawn (other than an age range for *the apparition* of the knowledge or skill in the children examined).

Piaget, in his experiments (both the transverse and the longitudinal), often seems (to me) to confuse *actual* development with *potential*. The conclusion one can draw from them is that the child *happens to have* reached this or that level at age so and so; but the tests do not trace the exact *genesis* of such attainment (explaining why different individuals vary slightly), and they do not make clear whether the child *could have* done better with a bit of training.

Note, however, with regard to the latter issue, I have been told that Piaget (and others) have indeed found that children can often be trained to improve their performance, but what they thus learn remains rather localized to the precise notion or skill concerned and is not readily passed on to other, analogous items. This could be taken to imply that the potentiality and actuality occur pretty much in tandem, and the causes of actualization of potentiality are of little significance. I do not know how far this general conclusion may be relied on. The fact is some children are average, some are precocious, and some are retarded – the questions remain: why and what can be done about it?

The above examples make clear another important criticism (already hinted at) I would put to Piaget, and some other researchers on the ground: *some of this research is billed to be about the development of logical skills, when in fact it is nothing of the sort, but rather about the acquisition of knowledge of basic physical principles*. Now, this is a criticism only insofar as the two topics are confused. The acquisition of knowledge is of course not denied to be an interesting topic; but, though all knowledge acquisition implies a logical process of some sort (which it would be interesting to pinpoint for each item of knowledge in each individual subject studied), this topic is not identical with the issue of logical development.

The latter research is the one most interesting to us in the present context. It is the use of empirical techniques to study the development of logical skills in humans. To engage in such research, one must have a pretty clear idea as to what is meant by 'logical' skills. Clearly, this term must refer to the whole science of logic, and more broadly epistemology; i.e. to all the inductive and deductive notions, acts and processes armchair logicians have identified as used in the acquisition of knowledge. Ideally, each and every notion, act or process should be studied in turn, although in practice this may be hard to do.

Indeed, such finely tuned investigation may be out of our reach in many instances, judging by the way Piaget (and

others) have tended to prefer general conclusions such as the following (which are extremely interesting anyway):

> "Piaget saw the child as constantly creating and recreating his own model of reality, achieving mental growth by integrating simpler concepts into higher level concepts at each stage. He argued for a "genetic epistemology," *a timetable established by nature for the development of the child's ability to think*, and he traced four stages in that development.
>
> He described the child during the first two years of life as being in a **sensorimotor** stage, chiefly concerned with mastering his own innate physical reflexes and extending them into pleasurable or interesting actions. During the same period, the child first becomes aware of himself as a separate physical entity and then realizes that the objects around him also have a separate and permanent existence.
>
> In the second, or **preoperational**, stage, roughly from age two to age six or seven, the child learns to manipulate his environment symbolically through inner representations, or thoughts, about the external world. During this stage, he learns to represent objects by words and to manipulate the words mentally, just as he earlier manipulated the physical objects themselves.
>
> In the third, or **concrete operational**, stage, from age 7 to age 11 or 12, occurs the beginning of logic in the child's

> thought processes and the beginning of the classification of objects by their similarities and differences. During this period, the child also begins to grasp concepts of time and number.
>
> The fourth stage, the period of **formal operations**, begins at age 12 and extends into adulthood. It is characterized by an orderliness of thinking and a mastery of logical thought, allowing a more flexible kind of mental experimentation. The child learns in this final stage to manipulate abstract ideas, make hypotheses, and see the implications of his own thinking and that of others."
>
> (*Encyclopaedia Britannica*, 2004. Emphases mine.)

Although Piaget's theories were later challenged in various respects – for instance, other researchers considered that he "tended to overestimate the ages at which children could first perform certain cognitive tasks" (*op. cit*) – his work rightly deserves to have remained the main reference in this field.

5. Lines of Inquiry

Assuming some ingenious experimenters can come up with appropriate setups, which can indeed yield finite conclusions, I (as a theoretical logician) would suggest the following as some important **lines of inquiry** that they should pursue. Some of these questions have (I acknowledge) already been asked and answered; but many (I submit) have not. For each topic listed, the questions to ask are:

(a) As of what age, or in what age range, perhaps within a given historical and social context, do we acquire the potential for these specific logical skills?

(b) Under what kinds of favorable conditions and triggering circumstances are these potential logical skills actualized?

My wish-list of topics would (offhand) include, though not be limited to, the following:

- When and how do we get to understand *pointing, negating, abstracting, naming,* and other such fundamental acts of reason?
- When and how can *the laws of thought* be said to become operative in thought and action?
- When and how do the basic logical notions of sameness or difference, consistency or contradiction, exhaustiveness or incompleteness, as well as derivative notions like implication and disjunction come into use?
- When and how do the notions of *truth vs. falsehood*, reality vs. illusion, and related modal notions like uncertainty, necessity, possibility, appearance, and so on. – come into use?
- When and how do we begin to distinguish between *our sensory perceptions and our imaginations*?
- What of *introspection*, intuition of self and one's own cognitions, volitions and valuations?

- When and how are different *places and times* respectively distinguished; and when and how are the larger abstractions of space and time generated?
- When and how do children begin to conceptualize, to classify, to formulate categorical propositions, to formulate hypothetical propositions, and so forth?
- When and how do we begin using *adductive processes*, formulating hypotheses and then testing them, and then confirming or weakening them, rejecting or adopting them?
- When and how do we start engaging in *syllogistic and other deductive practices*?
- When and how do we start using *causal logic* – resorting to logical, extensional or natural explanations, or identifying things or agents as causes of events.
- When and how do the ideas of *formal logic* – e.g. symbolizing terms (with X or Y), making general statements about reasoning, distinguishing valid from invalid arguments, and so forth – become understandable to youths?
- As of what age does *the logic of paradoxical propositions* become comprehensible?

And so forth – we can in this way *range throughout the science of logic, and ask the same question of each known logical notion, act or process*.

As far as I can tell, experimenters have far from completed the work of empirically tracing our cognitive development. The questions they have been asking so far have not always been pertinent and systematic enough, because their knowledge of logical science has been rather limited and scattered. For instance, there has been insufficient emphasis on the 'laws of thought' as the basic instruments of logic (although it has been found, for instance, that children before age 6-8 years tend to *juxtapose rather than confront conflicting statements*, i.e. they accept them successively without comparing them and seeking to harmonize them).

Although in my view there is yet a lot of research to be done in cognitive development, I do of course admit that much work of great value has already been done. I have no desire to belittle anyone's achievements. For example, I was interested to learn that a child begins to understand *designation*, i.e. the intent of pointing at things, and even the intent of simple word-sounds, as of nine months of age! Or again, the association of different sensations and their consideration as different aspects of one and the same physical object, is a gradual process, which may take till age 8-9 months or even as late as 18 months.

Differentiation and integration (or analysis and synthesis of percepts), and classification (grouping and subdividing, concept formation), have also been studied. The child at first views objects (e.g. its mother) as a totality, then (till age 3-4 years) distinguishes their various components (e.g. mother's

smell or face), and later still (till age 10) is able to reconstruct wholes from parts. Children become able to classify in two stages: first (at age 4-6.5 years), they group things in single classes, e.g. "red" or "round"; and later (at 7-8 years), they can handle compound classifications, e.g. "red circles", and subdivisions, e.g. "circles may be red or green". All such findings are, of course, of logical significance.

6. Experimental Techniques

With regard to experimental techniques, researchers no doubt do, and if not ought to, keep in mind certain guidelines like the following (very offhand):

- It is important for researchers to ensure they do not project their own thoughts onto the child's. Does the child understand the questions asked by the experimenters; or are these tricky[74], ambiguously stated or stated in terms still unknown to the child, so that the answers are unreliable? Does the mere asking of a certain question teach the child something it did not till then know, and so

[74] For example, a child is shown 5 apples and 3 oranges and asked whether there are more apples or fruits. The child tends to answer "more apples", confusing the subclass of oranges with the genus fruits. This is a tricky question, because it compounds a mathematical operation (5 > 3) with a classificatory act (realizing that apples as well as oranges are fruits). Some adults might be misled by such a question. Of course, the point is that the older the child, the less likely it is to be tricked! (Whence the expression "it's like taking candy from a baby".)

skew the experiment? Does asking a question in a certain way insinuate a certain answer, or reduce the probability of a correct answer? Can the child be intentionally taught some relevant notions in such a way that it can answer more questions, more precisely; i.e. reveal more about itself?

- How far can one generalize results from one or two children in one place and time, to all children? Clearly, researchers should test the limits of their generalizations; e.g. in different cultures. In some cases, the tests used on children should be tried on adults; we might well find many adults (as well as children) failing them. For example, one test found that children (I did not note their ages or other experimental details) tend to regard "If–then" statements as exclusive, i.e. as meaning "If *and only if* – then" (what modern logic has labeled "iff–then"). I think that is kind of funny, because in my experience many adults are still not clear as to the difference between these two forms!

- Experimental queries should be clearly formulated. To avoid all ambiguity, logical statements should be expressed in formal terms, rather than merely descriptively. For examples[75]:

[75] These examples are taken from actual experiments, through which children of about two were found to have the described abilities. I do not remember the details of the experiments, and so cannot comment on their accuracy. All I noted was "refer to article by Gopnik and Astington".

- "Awareness that one changes opinion over time" may be formally stated as "I used to believe X, but now I believe Y (or more vaguely, not X)".
- "Awareness of the differences in perspective by different people" = "I think X, but my friend thinks Y (or more specifically, not X)".
- "Awareness that some opinions are false" = "Someone (I or another) believes X, but in fact Y is true (or at least, X is false)".
- "Awareness of difference between appearance and reality" = "It seems that X, but in fact Y (or at least, not X)"[76].
- "Prediction of belief changes in different contexts" = "If I saw X, I would get to believe Y".[77]

7. Private Languages

The following is mere speculation on my part, but I wonder if a child might not, at some stage in its cognitive development, before discovering and adopting all the language(s) of parents and neighbors, have *a temporary, private language* – a simple, personal invention, consisting of a small number of

[76] E.g. "this looks like a stone, but is in fact a sponge" – though note that this could also be viewed as an example of the act of reclassification.

[77] This is a beginning of hypothetical thinking, note.

words, which might be variable (i.e. a word might formed ad hoc and soon forgotten, to be later replaced by another word for the same thing as needed).

I would not be surprised this to be the case, given my theory that *language is a tool of personal thought, before it is one of interpersonal communication*. I include in the term 'language' not only (imagined or spoken) sounds, but (imagined or played-out) gestures[78]; for the essence of language is *intending* meanings for symbols, intention being an act of volition of the subject (or soul), or more precisely one of velleity.

Note however that, if this hypothesis is correct, the private language of early thought should not be necessarily identified with the sounds uttered out loud by the child or its gestures, because it may be that at this stage the coordination between thought and speech or gestures is not yet perfect. Nevertheless, we should not exclude that some 'baby talk' may be part of the child's private language, while some of it (like papa, mama) may be inspired by the public language overheard in the family environment.

I gather that Piaget considered that children do not grasp language before they are about 18 months old, although they already manifest considerable pre-linguistic intelligence. Granting this, it would be at about that age that a transitional private language might appear. This would allow the child to

[78] Later, of course, a third form of language is developed, namely written language, the use of visual symbols.

begin personally engaging in some verbal thoughts (those it is already able to have), even before having received corresponding generally accepted words from its environment.

Thus, I am suggesting that a child instinctively learns a little *about* language use within himself or herself, before learning the specific, much more developed language taught by the surrounding segment of humanity. The child may first invent a private word, then in an intermediate stage substitute for it a word more or less resembling a public word for the same object, then finally master the public word; in that way, the transition from private to public language would be gradual, with some overlap.

Moreover, it may well be this internal ability's development that makes possible the subsequent external ability's development. This ability to invent language certainly exists at a later age, in older children and adults. Without such an ability, humanity would not be able to develop language further as need arose. And of course, language had to have a beginning, somewhere in the depths of our history. Therefore, the issue here is not whether private language occurs at all, but only at what stage of development it occurs.

> I have heard of an experiment, that a prince ordered made, in which a child was isolated from other people since birth to ensure it did not learn from anyone how to speak. The experiment aimed to discover whether mankind has a natural language. Not surprisingly, as it

grew up the child did not seem capable of any meaningful speech.

This story may be true, but it proves nothing, because the language the child might have invented for personal use would be incomprehensible to others. It was silly to expect the child to naturally speak English, or whatever it was the ruler spoke. Furthermore, the child's internal use of language may never have translated into external speech or gesture.

Moreover, judging by modern findings, a child so imprisoned, one deprived of affection and of sensory and intellectual stimulation, would grow up as an idiot, if it at all survived the ordeal. Therefore, such an experiment would be distortive and not answer the question asked.

As I said, the hypothesis advanced here is speculative. I do not know what modern experiment we could devise that would settle the issue. Not that it is very important to do so; just a matter of curiosity.

8. ABOUT CAUSAL LOGIC

1. Induction of Causatives

Induction of causative propositions, like for most other kinds of proposition, consists largely in the process of *trying to 'fit-in' the empirical data into this or that morphology* (i.e. **m**, **n**, **p**, **q**, etc.).

The proposition is our (working) hypothesis, while our relevant experiences and memories (the phenomenological facts) are the data used for testing that hypothesis. As usual, we seek for the pattern that will best express and assimilate the data at hand.

The reasoning involved is: 'try this form – does the data fit in it?' – 'no! therefore, this form is not quite appropriate, try another'. This is done repetitively for each set of facts and tentative propositional form.

By trial and error, we repeatedly adapt our estimate of the overall causative relation involved to the available database, which we actively seek to expand.

In formation of a causative proposition, terms (or theses) are variously related according to the conjunctions or non-conjunctions of their presences and/or absences, i.e. through

matricial analysis, until the appropriate categorical (or hypothetical) proposition is settled.

Note that this resembles but is not the same as concept formation, where similarity between things is sought and then each new thing is tested for membership.

An example of such 'construction' of a fitting hypothesis (propositional form) is to be found in historical judgment[79] (i.e. trying to formulate general propositions about causation in history) – which is mainly *extensional* in mode.

Note additionally that the disjunction between the specific determinations suggests a possibility of induction by the *factorial analysis* method described in my *Future Logic*.

> Incidentally, the word 'conditioning' (often used there) is an apt adjective for all *non-categorical* relations, including conditional propositions (that tell us one item is true, if another is so) in the various modes of modality (in the logical mode these are known as 'hypotheticals') and their disjunctive forms. The term as such is relatively new, dating I gather from the 15th Century – but its root (the Latin *conditio*) is very old, and its underlying meaning is no doubt as old as human reason.

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[79] See for example Hugh Thomas, *A History of the World*, p. 230 (quote passage) where an explanation for an increase in population is sought (by the above stated means). Many examples may also be found in Darwinist evolution theory. An apt description of extensional causation, by the way, is the phrase "correlation between attributes" (used somewhere by Rosch).

The active form ‘conditioning’ is admittedly originally intended to balance the passive form ‘conditioned’, rather than (as sometimes used, by me and others) a general term covering both directions, i.e. the relations of ‘conditioning and conditioned’ as a whole. But this is a limitation of our language, which in no way renders the term illegitimate. The term is used in this sense not only by logicians, but also by scientists in their theoretical discourse (e.g. by Pavlov) and by common technicians (e.g. ‘air conditioning’), because of its causal connotations.

2. True of All Opposites

It is true of *all* opposites (X and nonX) that they invariably *must succeed each other, sometime and somewhere*, in time (natural modality) and/or space (extensional modality) and/or in thought (logical modality), and therefore such sequences ought not be regarded as *causative* relations in the strict sense.

For example, we cannot say ‘health causes sickness’ or ‘peace causes war’, just because we observe that the first term (health or peace) invariably precedes the second (sickness or war, respectively)!

Therefore, when we define the causative relation, with reference to conjunctions or non-conjunctions of presences or absences of two or more items, we should, if only

parenthetically, except formal relations of mutual exclusion and exhaustiveness between contradictories.

For we normally understand causation as a not-obvious relation, one which we cannot establish a priori. Proposing the sequence of formal opposites as causative provides *no new information* concerning them, since that is a universal given in a world of multiplicity.

Returning to our first example: it is not health that causes sickness, but some germ or virus (say) that attacks the healthy organism and makes it sick. Again, in our second example: it may well be that peace *changes conditions of society in ways that really give rise to* eventual war, or vice versa. But in such case, precise analysis of the causatives involved is required. Certainly, it is not peace *per se* which causes war, but rather (say) the passing of generations and perhaps the rise in wealth and conceit, so that people forget the horror of war and are again willing to engage in it.

3. Extensional to Natural

On tropology or aetiology: We often *reason from extensional to natural modality*, i.e. from transverse observations to longitudinal conclusions, or vice-versa.

Such extrapolation occurs notably in astronomy, where the evolution of stars and galaxies is not observed with reference to one and the same star or galaxy, but by observation of different such entities at presumably different stages of their

development, and then hypothesizing a common course of development for them all, and the assumption that they are each at a different stage along that standard course.

Conversely, in the field of psychology, from the experience of some people with certain pathologies, we assume that under certain circumstances the same could happen to other people. In other words, we are not satisfied with mere ad hoc observations on individuals, but assume some underlying nature or natural structure in common to individuals of the same kind.

Because of such habits, it is important to identify and clarify the forms these reasoning processes take. There are surely many varieties of it, both categorical and conditional. Such leaping from one mode to another *is not formally deductive, but an inductive pattern*. We should perhaps give it a name, to ensure we focus on it – say, "modal extrapolation".

4. Hume's Denials

David Hume denies the very concept of causality – but in the same breath offers us an explanation of our belief in it, viz. that causal argument proceeds by association of ideas. I have criticized this claim elsewhere[80], but here wish to stress that offering an explanation is claiming to know a cause – therefore, Hume's thesis is self-contradictory.

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[80] See *Phenomenology*, chapter 2.5; and *The Logic of Causation*, chapter 16.2.

Nevertheless, there are some grains of truth in his thesis, which by the way explains why it has seemed credible to so many people since he stated it. To see these undercurrents of truth, it is important to distinguish between the issues of how to define causality in general and of how to get to know particular instances of causality.

Clearly, before we can deny causality, we must have some idea what it is we want to deny. Hume admits a simple definition of causality (or rather causation, to be exact) as "constant conjunction". This definition has some truth, but is debatable and ultimately inadequate. Thereafter, the issue arises, can we establish contents fitting this definition. Hume denies it, but (as just pointed out) his denial turns out to be self-defeating.

Hume focused on *our incapacity to apprehend causes immediately*, and suggested that in allegedly 'reasoning' from a cause to an effect (or backwards, from effect to cause) we were merely expressing our mental habit of *ideating certain things together*. Notwithstanding Hume's errors, I would suggest the following to be the undercurrents of truth he was perhaps (though unsuccessfully) trying to bring out:

a. ***Ab initio*, nothing has any apparent cause**. That is to say: causality is not something one can directly observe. 'Objectivity' requires that we do not begin our search for knowledge with a prejudice concerning causality in general and about specific causal propositions. Causality and particular cases of it have to be established gradually

over time, because the facts logically point us in this direction. We cannot at first sight make such claims with certainty – but (*contra* Hume) this does not exclude the possibility that we can eventually arrive at such conclusions through appropriate logical efforts.

b. **Indeed, causes can be found through *induction***. The method appropriate for finding causes is not deductive – nor for that matter Hume's 'association of ideas' – but inductive. Practical ways to attain such knowledge were first elucidated by Francis Bacon (1605), a century and a half before Hume's comments. (I have further clarified and developed these methods in my *The Logic of Causation*.) Hume's thesis rang true in some ears, because he raised awareness that a process was involved. He identified that process as merely psychological; but in fact, it was logical – using inductive logic.

We should, to be precise in the present discussion, refer to volition by others and our less conscious own volitions, as well as to causation, noting that most of our own volitions are known directly and immediately, in the way of self-experience – i.e. 'intuition'. It is worth pointing out that Hume tacitly admits this last claim when he tries to explain knowledge of causation through 'association of ideas' – since *this implies he and the rest of us can look into our mental activities and directly obtain that insight*. Thus, Hume's attempted critique applies specifically to causation and not to volition, note well.

It should be stressed that the present rejection of Hume's identification of causal reasoning with mere association of ideas does not imply a denial that we do engage in association of ideas. This mental process does occur. Indeed, it sometimes occurs on the basis of assumed causal connection – but it also, and more often, concerns objects *known to be without* any such connection. The objects of thought may be mentally associated merely because they happened to coexist in our sight *once* for a moment – even if they have *at all other times* been visibly separate. Moreover, mental association does not require any coexistence *at all ever*, but may occur for quite incidental or accidental reasons. Two things may be mentally associated because of some tiny or vague resemblance, or even simply because we happen to have given them names that sound somewhat the same.

Indeed, Hume's critique depends on these very facts concerning association of ideas for its (illusory) force. If association of ideas was always based on constant conjunction, it would not seem so loose a relation but would indeed suggest underlying causal connection. Thus, Hume on the one hand pretends to equate those two concepts, but on the other hand cunningly exploits their difference, in order to cast doubt on causal reasoning.

Furthermore, he does not explain the distinction we all make between cause and effect, considering that the idea of the effect sometimes (and in some cases, always) mentally precedes that of the cause, even if materially the cause

always precede the effect. Clearly, this opacity is just one aspect of his deliberate confusion between an idea and it object. But such a subjectivist notion is anti-rational, since Hume obviously considers (or wants us to consider) his own skeptical doctrine as objectively true.

5. Hume's Mentalism

It should be pointed out that Hume's position on causation is *'consistent' with his position on sensory perception*. Given his belief that our apparent perceptions of matter are in fact perceptions of the mental images ("impressions", or "ideas") produced by sensations, and not perceptions of the things that triggered the sensations, it is not strange that he should advocate an "association of ideas" view of causation.

Hume is apparently unaware that this position on perception is logically self-contradictory, because it starts with a belief in matter (including a human body with sense organs, receiving sensory signals and passing them on to the mind), and ends with a denial of it (i.e. an affirmation that all we are able to know are mental impressions or ideas). Moreover, Hume leaves unanswered the question as to *who* has these 'ideas'; i.e. he ignores the Subject.

Hume's concept of association of ideas can also be applied to the other type of causality, namely volition, by effectively denying the existence of a willing self. If volition is *identified with* sequences of mental phenomena like desires, aversions,

etc. and perceptible actions of mind and 'body', then there is no need for or place for a concept of a 'self' engaged in willing. Thus, in this view, attitudes, affections and appetites are 'ideas' of sorts, and apparent 'volition' is simply causation at the purely mental level between such ideas and certain 'actions'.

Here, the antinomy consists in leaving unexplained who it is that is associating ideas. If there is no Agent in volition, and no Subject in cognition, no cognitive processes can be depicted as 'in error'. So, how is it that Hume is wiser than the rest of us, and can spot these errors of thought? And moreover, if we have no choice about our mental behavior, what is the purpose of his indicating our errors?

As I have explained elsewhere[81], volition is not a causative relation between *influences* (apprehended conditions) and apparent actions (physical or mental events), but a totally different kind of causal relation, between a soul and its intentions and acts of will. The latter are not phenomenal, but intuited by the Subject. Attitudes, affections and appetites are not substances, but essentially intentions of the self. They influence its acts of will, making them easier or harder; but they are not causatives of them, they are incapable of producing them. The acts of will are caused by the soul, using a causal relation fundamentally different from causation, namely volition.

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[81] See *Volition and Allied Causal Concepts*, chapters 5-7.

In both domains, whether through apparent bodily sensations or directly in the mind, Hume seems to consider the arising of 'ideas' (which are thereafter mentally associated) as spontaneous: he is effectively denying all causality. His skeptical view of causality is not based on a thoroughgoing psychology, but is filled with inconsistencies.

Hume, like many philosophers before him and since, approached the issue of causality and other topics in the way of a 'spin doctor'. He was not scientifically minded, but intent on justifying his philosophical slant of skepticism. I submit: he *wanted* to invalidate our knowledge, and sought pretexts with this goal in mind.

He perhaps only wanted to shock his peers; or maybe he had a perverse wish to destroy human knowledge or to hurt people's minds.

It is legitimate for logic to admonish: such twisted motives are unworthy of philosophers. Philosophers should not bring their personal problems into the public arena in that way. They should approach the subject in a responsible, mentally healthy way, with benevolent intentions. And perhaps the best way to insure such balanced behavior is to lead a pure life….

6. Constant Conjunction

I should stress that Hume's "constant conjunction" is a vague expression.

I have generally taken it to mean "the constant conjunction *of the effect with the cause*", and thus to refer to the positive side of causation, namely "if C, then E" (i.e. "the conjunction C + not-E is impossible") – and I believe that is what Hume had in mind when he used that expression.

I have also considered the inverse or negative side of causation, namely "if not C, then not E" (i.e. "the conjunction not-C + E is impossible"), to be not explicitly intended but still tacitly included in the preceding statement *by way of analogy*. That is, one can likewise refer to "the *constant conjunction* of the absence of the effect with the absence of the cause".

But it occurs to me that, taken literally, the expression "constant conjunction" could intend "C and E are always together", which more neutrally includes both "E is always with C" and "C is always with E". That is, it could be taken to also imply "if E, then C" (i.e. "the conjunction E + not-C is impossible"), which by contraposition means "if not C, then not E".

Thus, the expression could mean not just the positive aspect (complete causation), but also the negative aspect (necessary causation). So, it may be my accusation that Hume missed out on the negative aspect of causation was not very fair![82]

[82] This needs to be checked out again in his works, to be sure one way or the other. Note that it could be that he usually meant one aspect, but occasionally meant both.

With regard to interpreting constant conjunction, note also that when two items occur together invariably, one is either the cause or the effect of the other – *or both are effects of a common cause*, i.e. of some third item yet to be identified of which they are parallel effects[83]. Thus, constant conjunction is not always taken to imply a direct causative relation between the items concerned, but is sometimes interpreted more obliquely (perhaps somewhat conventionally, because the formal relation is identical).

Constant conjunction leaves us with a doubt, then, whether one of the two items is before or after the other in time, or they are simultaneous; for causes and effects may be simultaneous or in orderly sequence, and effects of a common cause may be simultaneous or either one precede the other. The only rule we can lay down at the outset (according to our traditional understanding of causation) is that a cause cannot be after its effects; or conversely, an effect cannot precede its causes; this may be called the rule of 'orderly sequence'.

Note that this concept of "effects of a common cause", though most evident in relation to strong causation, can be extended to the weaker determinations, too.

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83 See *The Logic of Causation*, chapter 2.2.

7. Billiard Balls

Hume claims (in his more materialist phases, i.e. ignoring his 'association of ideas' discourse) that causation is based on observed reoccurrence of a sequence of events, giving the example of a billiard ball impacting another billiard ball.

But Newtonian Physics in this context appeals not merely to a generalization of happenstances, but to *larger adductive hypotheses*, such as the Law of Conservation of Matter and Energy[84], which affect a broad spectrum of phenomena – and not only the specific billiard balls at hand – in tried and consistent ways. On that basis, causation is viewed as an actual *transfer* of 'energy'.

This 'energy', though initially defined with reference to 'work' ('force' times distance), is ultimately taken to imply a 'substance' of sorts (e.g. the energy of light). In this perspective, the first billiard ball has on impact sent energy to the second – we thus *substantiate* the causal relation involved.

There are other situations of apparent causation for which a substratum is similarly conceived, and justified by reference to larger considerations. Thus, causation does not for us

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[84] Quite incidentally: speaking of energy, is the Big Bang considered costless in terms of energy? If all that motion is not free of charge, does that mean the Big Crunch is inevitable? Do such questions suggest the Law of Conservation is open to doubt? As for Creationism, it is not only concerned with the cause of the Big Bang starting, but more radically with the surprising very existence of matter/energy *to* bang!

consist of mere repetition, but we imagine an underlying 'connection' of which the repetitions are but a symptom.

Underlying the idea of causation (and many other ideas of ours) is the postulate of *continuity* of phenomena. If I pass a ball to my friend, we could regard the ball as abruptly disappearing from my hands and spontaneously appearing in his. But this is empirically less justified, since the fact that continuity *appears* to us cannot simply be ignored without justification. We prefer to regard the two balls as *one and the same*, for we seem to 'see' the ball passing from hand to hand.

The continuity is thus reasonably evident. It is a general assumption applicable to such cases (provided the particular phenomena at hand do not suggest another assumption). So, causation rests on larger theses than Hume claims.

This insight is important, because it suggests that we can presume a *singular* causative relation without referring to *general* ones. In which case, general causative propositions are, as their formal quantity implies, sets of singular causative propositions. Even if in practice we may be epistemologically unable to discover singular causations *except through* eduction from generalizations, it remains conceivable that the latter generalities are ontologically mere groups of singular cases.

In this manner, we show that, contrary to Hume, causative 'connection' is based not only on observation and statistics, on direct generalization, but also on wider considerations and

adductive postulates that suggest causative events to be primarily individual. Constancies of conjunction are seen as mere repetitions of individual connections. This justifies (or adds justification to) the concept of Causation.

8. Against Kant on Freewill

Various comments against Kant's view of freedom of the will.

As I explain elsewhere[85], freedom of the will should not be conceived as "doing what you want", in the sense "doing what you desire", for being moved by random desires is not freedom but slavery. It does not follow that, as Immanuel Kant suggests, freewill is "doing what your reason tells you to do".

The colloquial definition of freedom, "doing what you want", should be clarified to mean that our actions express *our personal will*. It is the "you" rather than the "want" which is at the center of that popular definition. "Want" is here not intended to refer to values, wishes or purposes (be they rational or irrational) that may have preceded the "doing", but is merely a *post factum* inference from such doing; i.e. it is an interpretation of the will that did occur after it occurred. The doer or author is thereby held responsible for such "want".

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[85] Again, see *Volition and Allied Causal Concepts*, chapter 5-7.

Freedom of the will refers to our willing irrespective of influences, such as desires or rational judgments or whatever. The point in characterizing will as free is to stress *it is the agent* that wills, and the influences are not determining causes. In that case, *whether the agent wills in accord with or against some ethical injunction, he is indeed responsible for his action*.

Kant seems to claim that the will is only free when it is aligned with the dictates of reason, suggesting that the only alternative to that is slavishly following your passions. He argues: if you disobey reason, you are a puppet, therefore, obey it, and be free. *Non sequitur*!

Logically, if Kant's thesis on volition is true, people have no freedom or responsibility either way, and can neither be blamed nor praised for whatever happens to them. In this perspective, if reason is heard and obeyed, its ethical injunction (or whoever suggested it) becomes *the causative* of virtuous action, and the subject does not merit praise – just as, if reason is ignored or disobeyed, the subject's desires and impulses take control, and he is devoid of blame. Thus, Kant did not think his proposal through sufficiently.

Clearly, we must say that the choice to submit to reason implies an *anterior* act of freewill, which has to be spontaneous, otherwise reason would be controlling the agent against his will. Some people are unmoved by rational arguments, even if reason does influence many of us. Thus, the will is fundamentally as independent of reason as it is of

passions. The agent has a choice between the two. If he fails to follow reason, he is drawn by passions; if he follows passions, he ignores reason. But ultimately the choice is spontaneous: that is freedom of the will.

It is interesting to note that some post-Kantian philosophers have come to the contrary conclusion that we are 'free' only when we act *against* reason. This very postmodern posture is in a way a predictable outcome of Kant's rationalist-moralist stance. If one realizes that rigid adherence to principles like that proposed by Kant is just another form of slavery, the only space left for freewill seems to be moral anarchy.

But this "anything goes" position is just the hedonist side of the same coin; it is not a logical answer to Kant. It merely reverts to the idea that freedom is "doing whatever you wish". Kant's objection to that remains valid[86] – even if his

[86] Kant here is of course reaffirming an ancient wisdom, found in the major religious traditions. When 20th Century Western man rejected Judeo-Christian religion in favor of the 'pleasure principle', Kant's wise insight came to seem like old-fashioned, rigid 'moralism'. But now, perhaps thanks in part to the spread of Buddhist ideas in the West, many people are beginning to realize again that the unbridled pursuit of pleasure is ugly, weak, and destructive of self and others. The characterization of hedonism as slavery is increasingly perceived as accurate, once one reflects on the many ways commercial and political interests use this cunning means to exploit and control the populace. The "hippy" revolution of the late 1960's was not the liberation it claimed to be, but a thorough enslavement to drugs, sexual promiscuity (ending in depravity), and rock and roll music (i.e. omnipresent loud noise).

proposed alternative, “doing what reason orders”, is also objectionable.

The dilemma can only be overcome through deeper understanding of the relation between agent and volition, and influences like desires or rational-moral insights.

It is important to distinguish one’s self (or soul or spirit) from one’s body and mind. The latter include all one’s involuntary thoughts and emotions, i.e. all one’s felt affections and appetites. It is a cognitive error to identify with any such *passive* body and mind event, i.e. to think: “this is me or an expression of me”. The self may be dissociated from such events; they are essentially ‘outside’ it. (The self is “empty” of such relatively material and mental events, to use a Buddhist phrase.)

However, this does not mean that we may dissociate ourselves from our voluntary physical or mental *actions*. The latter must be viewed as extensions and expressions of the self that wills them; the self is responsible for them, however much influenced by passive body-mind factors. We cannot, in an attempt to act viciously without taking on blame, argue: “since this body-mind is not wholly me or mine, all its actions are not me or mine”. This too – i.e. the failure to identify with active body and mind events – is an error of judgment.

The role of reason here is thus clear: it serves primarily to honestly distinguish the active from the passive, i.e. the areas of responsibility from those of non-responsibility in the life

of the self. Such lucidity does not guarantee morality, though it is a precondition of it (and therefore in itself a moral act). Reason here acts as a counterweight to the influence of emotion. The self must still thereafter intuit the 'moral' choice and exercise freewill in that direction.

An act of will may be considered as most 'free' and 'responsible' when its Agent is maximally aware of all the positive and negative influences impinging on him, *and* of his having freedom of action and responsibility for his actions all the same.

By definition, influences are conditions of which one is more or less aware, and which thereby play a role in the volition concerned. Here, we note that the degree of such awareness affects the degree of freewill. A fully awake person has more freedom and responsibility than someone who functions half-asleep.

Note well the radical difference between freedom through awareness and freedom from awareness. People who affirm the existence and freedom of the will do so with the good intention to take control of their lives. Whereas, people who deny or doubt it generally do so in order to excuse themselves for past shameful or evil acts, or in order to facilitate such acts in the present and future. They reject freewill so as to liberate themselves from their conscience, by putting it to sleep. They cunningly use such philosophical denial as a bad influence on their will, making possible unbridled pursuit of unethical values.

9. Alleged Influences

An *alleged* influence on volition is not necessarily an influence in fact. The mere saying that something was an influence on one's action does not imply it to have indeed been so; i.e. it does not make the alleged influence ex post facto become an influence. This may seem obvious – but the issue is worth raising, because people confuse initial influence with later influence.

> For instance, a debtor may tell a creditor "I couldn't pay you off today because of my son's wedding", when in fact the wedding did not actually influence the decision not to pay, or take so much time that payment was impossible, but was used as a false excuse, a *pretext*. If neither the wedding itself *nor the thought of* the wedding in fact affected the non-payment in any way, the latter event cannot truthfully be said to have been caused *or influenced* by the former. However, this does not imply that the creditor cannot thereafter be influenced by the excuse given, if he has believed it or even if he has disbelieved it.

For X to 'influence' some volition Y, it is necessary that the thought of X *precede* the action Y, as well as make it easier or harder to some degree. If the thought of X only occurred after Y (e.g. as when X is falsely declared ex post facto as the reason for Y) – the reality of X *not* having influenced Y is

not changed. However, X may well thereafter, after such false declaration has been made and mentally registered, begin to influence *other, subsequent* actions of the initial agent (the agent of Y) or of some other agent(s).

Saying something is so, doesn't make it so – even in the realm of the spirit. There is 'objective' truth, even with regard to 'subjective' relations. One may, for lack of attention or introspective skills, or due to weak memory, not be sure as to what one willed, or what influenced one's will. In such cases, one's witness concerning one's inner processes, even if sincere, may be erroneous. Additionally, in some cases, even knowing the truth, one may deliberately lie, wishing to manipulate someone somehow with one's lies.

An external observer is of course very disadvantaged in assessing the will of someone else and the influences impinging upon it. In such contexts, we often rely on what could be construed as *post hoc ergo propter hoc* thinking, but more precisely (usually tacitly, of course) consists in eliminating all thought-of alternative explanations of perceived behavior but one, or opting for the most likely looking explanation in our present perspective.

(This is of course a whole field of logic by itself, which I cannot hope to cover in a few comments.)

> Incidentally, when we speak of someone having a certain '**spirit**', we originally mean that the person concerned functions with a certain *attitudinal pattern*, i.e. we refer to aspects of *his own* volition. For examples, a person may

have ‘a good spirit’ (e.g. be hard working, enthusiastic) or ‘a bad spirit’ (e.g. be constantly complaining, resisting).

But some people have *reified* this sense of the word ‘spirit’, implying that some external non-material *entity* (something like a ghost) *invades and inhabits* people, forcing them to behave in this way or that. The actions of the person concerned are in that case no longer his own, but someone else’s. The person’s soul has lost its freewill, and been subjected to a spiritual takeover.

This mode of explanation is found in the Christian religion and among African shamanists, for examples. ‘The holy spirit’, ‘the devil made me do it’ – are cases in point. Another common belief is that wine or liquor instills a ‘spirit of drunkenness’ into the drinker.

The trouble with such explanations, logically, is that instead of explaining volition by the influence of non-determining conditions, they ipso facto annul volition and void responsibility.

10. Analogical Inferences

Analogies as bases for inference from one cause to another: this methodology is apparently currently used in medical science, and should be logically evaluated. Two arguments are proposed: one (a) refers to ***similarities in the effects of two causes***; the other (b) refers to ***resemblances between the two causes***.

Both the arguments were relayed by TV journalists[87], and concerned the possible transmission of 'mad cow' disease (MCD, here) on to humans in the form of Kreuzfeld-Jacob disease (KJD, here).

(a) In the first case, Scottish researchers suggested[88] the following method:

> Prions from cow with MCD (P), and prions from man with KJD (R) –
>
> when injected into mice, *produce similar symptoms* (Q) in the latter.
>
> Whence, it is inferred that MCD in cows may well become KJD in man!

This argument may be construed as a 2nd Figure causal syllogism, as follows:

> R causes Q (major premise)
>
> P causes Q (minor premise)
>
> P could cause R (putative conclusion).

Such disease transmission would presumably occur when cow meat with MCD prions (P) is eaten by a man, at which

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[87] I assume I heard them correctly, and they had not overly simplified the scientific information.

[88] I heard the suggestion on French TV on 21.12.1999.

point these prions would, either as they are, or after going through slight changes, be KJD prions (R).

That is to say, the conclusion may be considered as being: 'P gets to be or becomes R'; but for our purposes, it suffices to conclude, more vaguely and generally: 'P causes (or may cause) R'.

The formal validity of such an argument depends on the determinations of causation involved in the given premises and putative conclusion[89]. In the strongest mood, **mn/mn/mn**, and in many weaker cases (more than one might expect), we have a valid argument. In some other cases (some of them, quite unexpectedly), no such conclusion is strictly possible (e.g. **m/m** or **n/n**), i.e. the argument is invalid.

Thus, the proposed causative argument is not always valid, not a universal truth; but under the right conditions, it may indeed be valid.

Moreover, we need not always consider the 'P causes R' conclusion as absolute; it suffices sometimes to regard it as merely probable – i.e. as 'P probably (to some degree or other) causes R'.

It should be kept in mind that different causes may have *some* effects in common, without having *all* effects in common. In more extreme cases, the parallel causes of some common effect are not merely different, but even incompatible, i.e.

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[89] For the full list of valid and invalid arguments, see *The Logic of Causation*, chapter 6.3.

unable to coexist in the same circumstances. Thus, we cannot simply in principle equate all causes of common effects. We may, however, reason from one such cause to another, if we exercise some caution, since the inference is sometimes valid.

(b) The second argument I heard was made by a Zurich scientist[90], who stated, with reference to the prions of MCD, or more precisely of a variant found in rats, and those of KJD, that "the more similar these prions are the more likely is transmission of the disease from animal to man".

This argument could have been intended as equivalent to the preceding, i.e. regarding the similarity between the two kinds of prion as a similarity of their effects. But my impression was that he meant that the prions *constitutionally* resemble each other, i.e. have similar physical structures or chemical compositions, or common components. In that case, using a different set of symbols to avoid confusion, the argument runs as follows:

> Certain prions (Y) cause KJD in humans (Z).
>
> Certain other prions (X), known to cause MCD in cows, *constitutionally resemble* the Y prions.
>
> Therefore, X could also cause Z.

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90 On Swiss TV, on 4.1.2000.

Or, in more general, purely symbolic terms, we have:

> Y causes Z (major premise)
>
> X resembles Y (minor premise)
>
> Therefore, X probably causes Z (putative conclusion).

Note well the differences between this argument and the one earlier considered. The present argument is a 1st Figure syllogism, whose middle term is one of the causatives (Y). Here, the major premise and putative conclusion are causative propositions, but the minor premise is not per se causative, but about the constitutional resemblance between causatives (X and Y). So this argument is only partly causal in content.

Note moreover that the Zurich scientist argued that *the more X resembles Y, the more probable it is that X causes Z*. Granting the syllogism, this further principle would seem reasonable, since *in the limit, when X and Y are identical, the conclusion would be obvious and necessary*. Indeed, we could use this insight about degrees of resemblance as a source of validity for the proposed mixed-form syllogism.

Another way we might approach this same argument is to suppose that the apparently different causes have some underlying *common factor or character* (say S) to different

extents, so that the 'real' cause is one and the same in either case. If this common factor is present to sufficient degree (as in Y, at least), it causes the effect in question (Z); whereas, if its presence is insufficiently strong (as might happen in X), it might not have the same result (i.e. Z). There may be a threshold of some sort for the causative factor to be operative.

Thus, we may consider the proposed argument to proceed more precisely as follows:

> Y causes Z; or more precisely, *it is factor S within Y* that causes Z
>
> X resembles Y; or more precisely, *X has factor S (to a comparable degree)*
>
> Therefore, X probably causes Z (putative conclusion).

The probability of the conclusion is then seen to hinge on the quantity of S in X, if this is comparable in potency to the quantity of S in Y. The underlying deduction becomes, in this perspective, *a fortiori* rather than syllogistic. If S in X is sufficient, as S in Y is, the inference is valid. If S in X is insufficient, unlike S in Y, the inference is invalid. When we are not sure which is true, the conclusion is proportionately uncertain.

The common factor or character concerned may be some concrete phenomenon, or it may be something more abstract, that we conceptually assume to justify our making the proposed inference. Such conceptualization of causes is not an arbitrary process, however. It is, or should be, regulated adductively. As Ockham's Razor teaches us, it is not always wise to multiply concepts, *ad nauseam,* without need. The way to tell when it is wise and when it is not, is by trial and error. A common abstract essence may be assumed, and such assumption tested: if it is found true and useful, it is kept on; otherwise, it is abandoned.

Thus, to summarize our findings, here: the Scottish researchers appealed to a standard causative syllogism, whereas the Swiss scientist was using a more complicated mixed-form argument (which taught me, at least, something I had not thought of). Both arguments are sometimes valid, sometimes not; therefore, in cases where we do not have enough data to draw a definite conclusion, we might still on that basis draw a probable conclusion.

It should be added that a probable cause conclusion is of course not intended as final. Rather, it serves as an encouragement and guideline for further research.

9. ABOUT NEGATION

1. Negation in Adduction

Concepts and theories are hypothetical constructs. They cannot (for the most part) be proven (definitely, once and for all), but only repeatedly confirmed by experience. This is the positive side of adduction, presenting evidence in support of rational constructs. This positive aspect is of course indispensable, for without some concrete evidence an abstraction is no more than a figment of the imagination, a wild speculation. The more evidence we adduce for it, the more reliable our concept or theory.

But, as Francis Bacon realized, the account of adduction thus far proposed does not do it justice. Just as important as the positive side of providing evidence, is the negative aspect of it, the rejection of hypotheses that make predictions conflicting with experience. As he pointed out, even if a hypothesis has numerous confirmations, it suffices for it to have *one* such wrong prediction for it to be rejected.

Stepping back, this means that the process of adduction is concerned with selection of the most probable hypothesis among two or more (already or yet to be conceived) explanations of fact. Each of them may have numerous

'positive instances' (i.e. empirical evidence that supports it); and so long as they are all still competitive, we may prefer those with the most such instances. But, the way we decisively advance in our conceptual/theoretical knowledge is by the successive *elimination* of propositions that turn out to have 'negative instances' (i.e. empirical evidence against them).

Now all the above is well known and need not be elucidated further. This theory of inductive logic has proven extremely successful in modern times, constituting the foundation of the scientific method.

But upon reflection, the matter is not as simple and straightforward as it seems at first!

Consider, for example, the issue of whether or not there is water on Mars. It would seem that the proposition "There is water on Mars" is far easier to prove inductively than the contradictory proposition "There is no water on Mars". Both propositions are hypotheses.

The positive thesis would be somewhat confirmed, if it was discovered using certain instruments from a distance that there are serious indices that water is present; the thesis would be more solidly confirmed, if a sample of Mars was brought back to Earth and found upon analysis to contain water. In either case, the presence of water on Mars would remain to some (however tiny) degree unsure, because some objection to our instrumental assumptions might later be raised or the sample brought back may later be found to have

been contaminated on the way over. Nevertheless, something pretty close to certainty is conceivable in this matter.

The negative thesis, by contrast, is much more difficult to prove by experience. We can readily assume it to the extent that the positive thesis has not so far been greatly confirmed. That is, so long as we have not found evidence for the positive thesis (i.e. water on Mars), we should rather opt for the negative thesis. But the latter is only reliable to the degree that we tried and failed to confirm the former. If we earnestly searched for water every which way we could think of, and did not find any, we can with proportionate confidence assume there is no water.

Thus, in our example, the negative thesis is actually *more difficult* to establish than the positive one. It *depends on a generalization*, a movement of thought from "Wherever and however we looked for water on Mars, ***none was found***" to "***There is no*** water on Mars". However, note well, it remains conceivable that a drop of water be found one day somewhere else on Mars, centuries after we concluded there was none.

Granting this analysis, it is clear that Bacon's razor that "What is important is the negative instance" is a bit simplistic. It assumes that a negative is as accessible as (if not, indeed, more accessible than) a positive, which is not always the case.

In practice, a negative may be inductively more remote than a positive. Granting this conclusion, the question arises – is the

negative instance *ever* more empirically accessible than (or even as accessible as) the positive one? That is, *when* does Bacon's formulation of induction actually come into play?

If we look at major historical examples of rejection of theories, our doubt may subsist. For example, Newtonian mechanics was in place for centuries, till it was put in doubt by the discovery of the constancy of the velocity of light (which gave rise to Relativity theory) and later again by the discovery of various subatomic phenomena (which gave rise to Quantum mechanics). In this example, the 'negative instances' were essentially 'positive instances' – the only thing 'negative' about them was just their negation of the Newtonian worldview!

Such reflections have led me to suspect that the 'negation' referred to by Bacon is only meant *relatively* to some selected abstraction. His razor ought not be taken as an advocacy of absolute negation. If we look at the matter more clearly, we realize that the data used to thus negate an idea is essentially positive. A deeper consideration of the nature of negation is therefore patently called for.

2. Positive and Negative Phenomena

People have always considered that there is a difference between a positive and a negative term. Indeed, that is why logicians have named them differently. But logicians have also found it difficult to express that difference substantially.

Yet, there are significant phenomenological differences between positive and negative phenomena**.**

a. The concrete material and mental world is evidently composed only of positive particular phenomena, some of which we perceive (whether through the bodily senses or in our minds). These exist at least as appearances, though some turn out to seem real and others illusory. This is an obvious phenomenological, epistemological and ontological truth.

To say of phenomena that they are 'particular' is to express awareness that they are always limited in space and time. They have presence, but they are finite and transient, i.e. manifestly characterized by diversity and change.

> We do not ordinarily experience anything concrete that stretches uniformly into infinity and eternity (though such totality of existence might well exist, and indeed mystics claim to attain consciousness of it in deep meditation, characterizing it as "the eternal present"). We do commonly consider some things as so widespread. 'Existence' is regarded as the substratum of all existents; 'the universe' refers to the sum total of all existents; and we think of 'space-time' as defining the extension of all existents. But only 'existence' may be classed as an experience (a quality found in all existents); 'the universe' and 'space-time' must be admitted as abstractions.

However, the limits of particulars are perceivable without need of negation of what lies beyond them, simply due to the

variable concentration of consciousness, i.e. the direction of focus of attention. That is, though 'pointing' to some positive phenomenon (e.g. so as to name it) requires some negation (we mean "this, but not that"), one can notice the limits of that phenomenon independently of negation.

b. Negative phenomena (and likewise abstracts, whether positive or negative), on the other hand, do depend for their existence on a Subject/Agent – a cognizing 'person' (or synonymously: a self or soul or spirit) with consciousness and volition looking out for some remembered or imagined positive phenomenon and failing to perceive it (or in the case of abstracts, comparing and contrasting particulars).

Thus, negative particular phenomena (and more generally, abstracts) have a special, more 'relative' kind of existence. They are not as independent of the Subject as positive particular phenomena. That does not mean they are, in a Kantian sense, 'a priori' or 'transcendental', or purely 'subjective' – but it does mean that they are ontological potentials that are only realized in the context of (rational) cognition.

Another kind of experience is required for such realization – the self-experience of the Subject, his intuitive knowledge of his cognitions and volitions. This kind of experience, being immediate, may be positive or negative without logical difficulty. The Subject reasons inductively as follows:

I am searching for X;

I do not find X;

Therefore, X "*is not"* there.

The negative conclusion may be 'true' or 'false', just like a positive perception or conclusion. It is true to the degree that the premises are true – i.e. that the alleged search for X was diligent (intelligent, imaginative, well-organized, attentive and thorough), and that the alleged failure to find X is not dishonest (a lie designed to fool oneself or others).

Whence it is fair to assert that, unlike some positive terms, negative terms are never based *only* on perception; they *necessarily* involve a thought-process – the previous mental projection or at least intention of the positive term they negate.

This epistemological truth does reflect an ontological truth – the truth that the 'absences' of phenomena lack phenomenal aspects. A 'no' is not a sort of 'yes'.

Note well the logical difference between '**not perceiving X**' and '**perceiving not X**'. We do not have direct experience of the latter, but can only indirectly claim it by way of *inductive inference* (or extrapolation) from the former. In the case of a positive, such process of reasoning is not needed – one often can and does 'perceive X' directly.

Suppose we draw a square of opposition for the propositions (labeling them by analogy to standard positions) – "I perceive X" (A), "I do not perceive not X" (I), "I perceive not X" (E), "I do not perceive X" (O). Here, the A form is knowable by experience, whereas the I form is knowable perhaps only by deductive implication from it. On the negative side, however, the E form is not knowable by experience, but only by inductive generalization from the O form (which is based on experience).

3. Positive Experience Precedes Negation

Negation is a pillar of both deductive and inductive logic, and requires careful analysis. We have to realize that negative terms are fundamentally distinct from positive ones, if we are to begin fathoming the nature of logic. The following observation seems to me crucial for such an analysis:

> ***We can experience something positive without having first experienced (or thought about) its negation, but we cannot experience something negative without first thinking about (and therefore previously having somewhat experienced) the corresponding positive.***

a. Cognition at its simplest is perception. Our perceptions are always *of positive particulars*. The contents of our most basic cognitions are phenomenal sights, sounds, smells, tastes, and touch and other bodily sensations that seemingly arise through our sense organs interactions with

matter – or mental equivalents of these phenomena that seemingly arise through memory of sensory experiences, or in imaginary recombinations of such supposed memories.

A positive particular can be experienced directly and passively. We can just sit back, as it were, and receptively observe whatever happens to come in our field of vision or hearing, etc. This is what we do in meditation. We do not have to actively think of (remember or visualize or conceptualize) something else in order to have such a positive experience. Of course, such observation may well in practice be complicated by thoughts (preverbal or verbal) – but it is possible in some cases to have a pure experience. This must logically be admitted, if concepts are to be based on percepts.

b. In the case of *negative particulars*, the situation is radically different. A negative particular has *no* specific phenomenal content, but is *entirely* defined by the 'absence' of the phenomenal contents that constitute some positive particular. If I look into my material or mental surroundings, I will always see present phenomena. The absence of some phenomenon is only noticeable if we first think of that positive phenomenon, and wonder whether it is present.

It is accurate to say that our finding it absent reflects an empirical truth or fact – but it is a fact that we simply would not notice the negative without having first thought of the positive. Negative knowledge is thus necessarily (by logical necessity) more indirect and active. It remains (at its best)

perfectly grounded in experience – but such negative experience requires a rational process (whether verbal or otherwise).

To experience a negative, I must first imagine (remember or invent) a certain positive experience; then I must look out and see (or hear or whatever) whether or not this image matches my current experience; and only then (if it indeed happens not to) can I conclude to have "experienced" a negative.

Thinking about X may be considered as positioning oneself into a vantage point from which one can (in a manner of speaking) experience not-X. If one does not first place one's attention on X, one cannot possibly experience the negation of X. One may well experience all sorts of weird and wonderful things, but not specifically not-X.

From this reflection, we may say that whereas affirmatives can be experienced, negatives are inherently rational acts (involving imagination, experience and intention). A negative necessarily involves thought: the thought of the corresponding positive (the imaginative element), the testing of its presence or absence (the experiential element) and the rational conclusion of "negation" (the intentional element).

c. The negation process may involve words, though it does not have to.

Suppose I have some momentary experience of sights, sounds, etc. and label this positive particular "X". The *content of consciousness* on which I base the term X is a

specific set of positive phenomenal experiences, i.e. physical and/or mental percepts. Whenever I can speak of this X, I mentally *intend* an object of a certain color and shape that moves around in certain ways, emitting certain sounds, etc.

Quite different is the negation of such a simple term, "not X". The latter is not definable by any specific percepts – it *refers to no perceptible qualities*. It cannot be identified with the positive phenomena that happen to be present in the absence of those constituting X. Thus, strictly speaking, not-X is only definable by 'negation' of X.

Note well, it would not be accurate to say (except ex post facto) that not-X refers to all experiences other than X (such as Y, Z, A, B, etc.), because when I look for X here and now and fail to find it, I am only referring to present experience within my current range and not to all possible such experiences. We would not label a situation devoid of X as "not X" *without thinking of X*; instead, we would label that situation in a positive manner (as "Y", or "Z", or whatever).

Thus, we can name (or wordlessly think of) something concrete "X", *after* experiencing phenomena that constitute it; but in the case of "not-X", we necessarily conjure the name (or a wordless thought) of it *before* we experience it.

"Not-X" is thus already a concept rather than a percept, even in cases where "X" refers to a mere percept (and all the more so when "X" itself involves some abstraction – as it usually does). The concept "not X" is hypothetically constructed first

and then confirmed by the attempted and failed re-experience of X.

In short, negation – even at the most perceptual level – involves an adductive process. It is never a mere experience. A negative term never intends the simple perception of some negative thing, but consists of a hypothesis with some perceptual confirmation. Negation is always conceptual as well as perceptual in status.

A theory cannot be refuted before it is formulated – similarly, X cannot be found absent unless we first think of X.

4. Negation is an Intention

Now, there is no specific phenomenal experience behind the word "not". Negation has no special color and shape, or sound or smell or taste or feel, whether real or illusory! What then is it? I suggest the following:

Negation as such refers to a 'mental act' – or more precisely put, it is an act of volition (or more precisely still, of velleity) by a Subject of consciousness. Specifically, *negation is an intention*. Note that our will to negate is itself *a positive act*, even though our intention by it is to negate something else.

Negation does express an experience – the 'failure' to find something one has searched for. Some cognitive result is willfully pursued (perception of some positive phenomenon), but remains wanting (this experience is qualitatively a

suffering of sorts, but still a positive intention, note) – whence we mentally (or more precisely, by intention) mark the thing as 'absent', i.e. we construct an idea of 'negation' of the thing sought.

Thus, negation is *not a phenomenon* (a physical or mental percept), *but something intuited* (an event of will within the cognizing Subject). 'Intuition' here, note well, means the self-knowledge of the Subject of consciousness and Agent of volition. This is experience of a *non-phenomenal* sort. Such self-experience is immediate: we have no distance to bridge in space or time.

When a Subject denies the presence of a material or mental phenomenon, having sought for it in experience and not found it – the 'denial' consists of a special act of intention. This intention is what we call 'negation' or 'rejection of a hypothesis'. It occurs in the Subject, though it is about the Object.

This intention is not however an arbitrary act. If it were, it would be purely subjective. This act (at its best) remains sufficiently dependent on perception to be judged 'objective'. The Subject must still look and see whether X is present; if that positive experience does not follow his empirical test, he concludes the absence of X.

Indeed, an initial negation may on closer scrutiny be found erroneous, i.e. we sometimes think something is 'not there' and then after further research find it on the contrary 'there'. Thus, this theory of negation should not be construed as a

claim that our negating something makes it so. Negation is regulated by the principles of adduction – it is based on appearance that is credible so long as confirmed, but may later be belied.

We can ex post facto speak of an objective absence, but we cannot fully define 'absence' other than as 'non-presence', and the 'non-' herein is not a phenomenon but an intention. The 'absence' is indeed experienced, but it is *imperceptible* without the Subject posing the prior question 'is X present?'

Absence, then, is not produced by the Subject, but is made perceptible by his vain search for presence. For, to repeat, not-X is not experienced as a specific content of consciousness – but as a continuing failure to experience the particular positive phenomena that define X for us.

Although we are directly only aware of apparent existents, we can inductively infer non-apparent existents from the experience that appearances come and go and may change. On this basis, we consider the categories 'existence' and 'appearance' as unequal, and the former as broader than the latter. Similarly, we inductively infer 'objective absence' from 'having sought but not found', even though we have no direct access to former but only indirect access by extrapolation from the latter. Such inference is valid, with a degree of probability proportional to our exercise of due diligence.

For these reasons, I consider the act of negation as an important key to understanding the nature and status of logic.

Negation is so fundamental to reason, so crucial an epistemic fact, that it cannot be reduced to something else.

We can describe it *roughly* as an intention to 'cross-off' (under the influence of some reason or other) the proposed item from our mental list of existents. But this is bound to seem like a circular definition, or a repetition of same using synonyms. It is evident that *we cannot talk about negation without engaging in it*. Thus, we had better admit the act of negation as a primary concept for logical science.

> Note in passing: the present theory of negation provides biology with an interesting distinction regarding rational animals.
>
> Sentient beings without this faculty of negation can only respond to the present, whereas once this faculty appears in an organism (as it did in the human species) it can mentally go beyond the here and now. A merely sensory animal just reacts to current events, whereas a man can fear dangers and prepare for them.
>
> Once the faculty of negation appears, the mind can start *abstracting, conceiving alternatives and hypothesizing*. Memory and imagination are required to project a proposed positive idea, but the intent to negate is also required to reject inadequate projections. Without such critical ability, our fantasies would quickly lead us into destructive situations.

5. Formal Consequences

Returning to logic – our insight here into the nature of negation can be construed to have *formal* consequences. The negative term is now seen to be a radically different kind of term, even though in common discourse it is made to behave like any other term.

We cannot point to something as 'negative' except insofar as it is the negation of something positive. This remark is essentially logical, not experiential. The term 'not' has no substance per se – it is a purely relative term. The positive must be experienced or thought of before the negative can at all be conceived, let alone be specifically sought for empirically. This is as true for intuitive as for material or mental objects; and as true for abstracts as for concretes.

One inference to draw from this realization of the distinction of negation is: "non-existence" is not some kind of "existence". Non-existent things cannot be classed under existence; they are not existent things. The term "non-existence" involves no content of consciousness whatsoever – it occurs in discourse only as the verbal repository of any and all denials of "existence". Existentialist philosophers have written volumes allegedly about "non-being", but as Parmenides reportedly stated:

> *"You cannot know not-being, nor even say it."*

This could be formally expressed and solidified by saying that ***obversion*** (at least that of a negative – i.e. inferring "This

is nonX" from "This is not X") is essentially an artificial process. If so, the negative predicate (nonX) is not always inferable from the negative copula (is not). In other words, the form "There is no X" does not imply "There is non-X"; or conversely, "X does not exist" does not imply "nonX exists".

We can grant heuristically that such eductive processes work in most cases (i.e. lead to no illogical result), but they may be declared invalid in certain extreme situations (as with the term "non-existence")! In such cases, "nonX" is 'just a word'; it has no conscionable meaning – we have no specific thing in mind as we utter it.

Logicians who have not yet grasped the important difference of negation are hard put to explain such formal distinctions. I know, because it is perhaps only in the last three years or so that this insight about negation has begun to dawn on me; and even now, I am still in the process of digesting it.

> Note that a philosophical critic of this view of negation cannot consider himself an objective onlooker, who can hypothesize 'a situation where absence exists but has not or not yet been identified'. For that critic is himself a Subject like any other, who must explain the whence and wherefore of his knowledge like anyone else – including the negatives he appeals to. No special privileges are granted.
>
> That is, if you wish to deny all the above, ask yourself and tell me how you consider you go about denying without having something to deny! Claiming to have

> knowledge of a negative without first thinking of the corresponding positive is comparable to laying personal claim to an absolute framework in space-time – it is an impossible exercise for us ordinary folk.

It should also be emphasized that the above narrative describes only the simplest kind of negation: negation of a perceptual item. But most of the time, in practice, we deal with far more complex situations. Even the mere act of 'pointing' at some concrete thing involves not only a positive act ("follow my finger to this"), but also the act of negation ("I do not however mean my finger to point at that").

Again, a lot of our conceptual arsenal is based on imaginary recombinations of empirical data. E.g. I have seen "pink" things and I have seen "elephants", and I wonder whether "pink elephants" perhaps exist. Such hypothetical entities are then tested empirically, and might be rejected (or confirmed). However, note, abstraction does not depend only on negation, but on quantitative judgments (comparing, and experiencing what is more or less than the other).

Abstraction starts with experiences. These are variously grouped through comparisons and contrasts. Negation here plays a crucial role, since to group two things together, we must find them not only similar to each other but also different from other things. This work involves much trial and error.

But at this level, not only denial but also affirmation is a rational act. For, 'similarity' means seemingly having some

quality in common in some measure, although there are bound to be other qualities not in common or differences of measure of the common quality. The essence of affirmation here is thus ‘measurement’.

But Nature doesn’t measure anything. Every item in it just is, whatever it happens to be (at any given time and place). It is only a Subject with consciousness that measures: this against that, or this and that versus some norm.

This weighing work of the cognizing Subject is not, however, arbitrary (or ought not to be, if the Subject has the right attitudes). As in the above case of mere negation, the conclusion of it does proceed from certain existing findings. Yet, it is also true that this work only occurs in the framework of cognition.

6. Negation and the Laws Of Thought

Logic cannot be properly understood without first understanding negation. This should be obvious from the fact that two of the laws of thought concern the relation between positive and negative terms. Similarly, the basic principle of adduction, that hypotheses we put forward should be empirically tested and rejected if they make wrong predictions – this principle depends on an elucidation of negation.

a. The so-called laws of thought are, in a sense, laws of the universe or ontological laws – in that the universe is what

it is (identity), is not something other than what it is (non-contradiction) and is something specific (excluded middle).

They have phenomenological aspects: appearances appear (identity); some are in apparent contradiction to others (a contradiction situation); in some cases, it is not clear just what has appeared (an excluded middle situation).

They may also be presented as epistemological laws or laws of logic, in that they guide us in the pursuit of knowledge. However, they are aptly named laws of thought, because they really arise as propositions only in the context of cognitive acts.

To understand this, one has to consider the peculiar status of negation, as well as other (partly derivative) major processes used in human reasoning, including abstraction, conceiving alternative possibilities and making hypotheses.

b. The impact of this insight on the laws of thought should be obvious. The law of identity enjoins us primarily to take note of the *positive* particulars being perceived. But the laws of non-contradiction and of the excluded middle, note well, both involve *negation*. Indeed, that's what they are all about – their role is precisely *to regulate our use of negation* – to keep us in harmony with the more positive law of identity!

Their instructions concerning the subjective act of negation, at the most perceptual level, are as follows. The law of non-contradiction ***forbids negating in the perceptible presence of***

the thing negated. The law of the excluded middle ***forbids accepting as final an uncertainty as to whether a thing thought of is currently present or absent***.

We are unable to cognize a negative (not-X) except by negation of the positive (X) we have in mind; it is therefore absurd to imagine a situation in which both X and not-X are true (law of non-contradiction). Similarly, if we carefully trace how our thoughts of X and not-X arise in our minds, it is absurd to think that there might be some third alternative between or beyond them (law of the excluded middle.)

Thus, these two laws are not arbitrary conventions or happenstances that might be different in other universes, as some logicians contend (because they have unfortunately remained stuck at the level of mere symbols, "X" and "non-X", failing to go deeper into the cognitive issues involved). Nor are they wholly subjective or wholly objective.

These laws of thought concern the interface of Subject and Object, of consciousness and existence – for any Subject graced with rational powers, i.e. cognitive faculties that go beyond the perceptual thanks in part to the possibility of negation.

They are for this reason applicable universally, whatever the content of the material and mental universe faced. They establish for us *the relations* between affirmation and denial, for any and every content of consciousness.

c. On this basis, we can better comprehend the ontological status of the laws of thought. They have no actual existence, since the concrete world has *no use for or need* of them, but exists self-sufficiently in positive particulars.

But the laws are a potential of the world, which is actualized when certain inhabitants of the world, who have the gifts of consciousness and freewill, resort to negation, abstraction and other cognitive-volitional activities, in order to summarize and understand the world.

In a world devoid of humans (or similar Subject/Agents), there are no negations and no 'universals'. Things just are (i.e. appear) – positively and particularly. Negation only appears in the world in relation to beings like us who can search for something positive and not find it. Likewise for 'universals' – they proceed from acts of comparison and contrast.

Consciousness and volition are together what gives rise to concepts and alternative possibilities, to hypotheses requiring testing. It is only in their context that logical issues arise, such as existence or not, reality or illusion, as well as consistency and exhaustiveness.

It is important to keep in mind that the laws of thought are themselves complex abstractions implying negations – viz. the negative terms they discuss, as well as the negation of logical utility and value in contradictory or 'middle' thinking. Indeed all the 'laws' in our sciences are such complex abstractions involving negations.

d. The insight that negation is essentially a volitional act allied to cognition explains why the laws of thought are prescriptive as well as descriptive epistemological principles.

The laws of thought are prescriptive inasmuch as human thought is fallible and humans have volition, and can behave erratically or maliciously. If humans were infallible, there would be no need for us to study and voluntarily use such laws. There is an ethic to cognition, as to all actions of freewill, and the laws of thought are its top principles.

The laws of thought are descriptive, insofar as we commonly explicitly or implicitly use them in our thinking. But this does not mean we all always use them, or always do so correctly. They are not 'laws' in the sense of reports of universal behavior. Some people are unaware of them, increasing probabilities of erroneous thinking. Some people would prefer to do without them, and eventually suffer the existential consequences. Some people would like to abide by these prescriptions, but do not always succeed.

These prescriptions, as explicit principles to consciously seek to abide by, have a history. They were to our knowledge first formulated by a man called Aristotle in Ancient Greece. He considered them to best describe the cognitive behavior patterns that lead to successful cognition. He did not invent them, but realized their absolute importance to human thought.

Their justification is self-evident to anyone who goes through the inductive and deductive logical demonstrations certain

logicians have developed in this regard. Ultimately it is based on a holistic consideration of knowledge development.

Our insights here about the relativity of negation and abstraction, and the realization of their role in the laws of thought serve to further clarify the necessity and universality of the latter.

7. Pure Experience

A logically prior issue that should perhaps be stressed in this context is the existence of pure experience, as distinct from experience somewhat tainted by acts of thought.

Some philosophers claim that all alleged 'experience' falls under the latter class, and deny the possibility of the former. But such skepticism is clearly inconsistent: if we recognize some *part* of some experience as pure of thought, this is sufficient to justify a claim to *some* pure experience. Thus, the proposition "There are some pure experiences" may be taken as an axiom of logic, phenomenology, epistemology and ontology. This proposition is self-evident, for to deny it is self-contradictory.

Note that this proposition is more specific than the more obvious "There are experiences". Denial of the latter is a denial of the evidence before one's eyes (and ears and nose and tongue and hands, etc. – and before one's "mind's eye", too): it directly contravenes the law of identity. Philosophers who engage in such denial have no leg to stand on, anyway -

since they are then hard put to at all explain what meaning the concepts they use in their denial might possibly have. We have to all admit *some* experience – some appearance in common (however open to debate) – to have anything to discuss (or even to be acknowledged to be discussing).

Let us return now to the distinction between pure and tainted experiences. This concerns the involvement of thought processes of any kind – i.e. of ratiocinations, acts of reason. To claim that there are pure experiences is not to deny that some (or many or most) experiences are indeed tainted by conceptual activity (abstraction, classification, reasoning, etc.)

We can readily admit that all of us very often have a hard time distinguishing pure experience from experience mixed with rational acts. The mechanisms of human reason are overbearing and come into play without asking for our permission, as is evident to anyone who tries to meditate on pure experience. It takes a lot of training to clearly distinguish the two in practice.

But surely, any biologist would admit that lower animals, at least, have the capacity to experience without the interference of thought, since they have no faculty of thought. The same has to be true to some extent for humans – not only in reflex actions, but also in the very fact that reasoning of any sort is only feasible in relation to pre-existing non-rational material. To process is to process something.

I have already argued that what scientists call ‘experiment’ cannot be regarded as the foundation of science, but must be understood as a mix of intellectual (and in some cases, even physical acts) and passive observation (if only observation of the results of experiment displayed by the detection and measuring instruments used). Thus, observation is cognitively more fundamental than experiment.

Here, my purpose is to emphasize that perceptual ‘negation’ is also necessarily a mix of pure experience and acts of the intellect. It is never pure, unlike the perception of positive particulars (which sometimes is pure, necessarily) – because it logically cannot be, since to deny anything one must first have something in mind to deny (or affirm).

Thus, negation can be regarded as one of the most primary acts of reason – it comes before abstraction, since the latter depends to some extent on making distinctions, which means on negation.

8. Consistency is Natural

It is important to here reiterate the principle that *consistency is natural*; whereas inconsistency is exceptional.

Some modern logicians have come up with the notion of “proving consistency” – but this notion is misconceived. Consistency is the natural state of affairs in knowledge; it requires no (deductive) proof and we are incapable of providing such proof, since it would be ‘placing the cart

before the horse'. The only possible 'proof' of consistency is that no inconsistency has been encountered. Consistency is an inductive given, which is very rarely overturned. All our knowledge may be and must be assumed consistent, unless and until there is reason to believe otherwise.

In short: harmony generally reigns unnoticed, while conflicts erupt occasionally to our surprise. One might well wonder now if this principle is itself consistent with the principle herein defended that negatives are never per se objects of cognition, but only exist by denial of the corresponding positives. Our principle that consistency is taken for granted seems to imply that we on occasion have logical insights of *in*consistency, something negative!

To resolve this issue, we must again emphasize the distinction between pure experience and the *interpretations* of experience that we, wordlessly (by mere intention) or explicitly, habitually infuse into our experiences. Generally, almost as soon as we experience something, we immediately start interpreting it, dynamically relating it to the rest of our knowledge thus far. Every experience almost unavoidably generates in us strings of associations, explanations, etc.

The contradictions we sometimes come across in our knowledge do not concern our pure experiences (which are necessarily harmonious, since they in fact exist side by side – we might add, quite 'happily'). *Our contradictions are necessarily contradictions between an interpretation and a pure experience, or between two interpretations*.

Contradictions do not, strictly speaking, reveal difficulties in the raw data of knowledge, but merely in the hypotheses that we conceived concerning such data.

Contradictions are thus to be blamed on reason, not on experience. This does not mean that reason is necessarily faulty, but only that it is fallible. Contradictions ought not be viewed as tragic proofs of our ignorance and stupidity – but as helpful indicators that we have misinterpreted something somewhere, and that this needs reinterpretation. These indicators are precisely one of the main tools used by the faculty of reason to control the quality of beliefs. The resolution of a contradiction is just new interpretation.

How we know that two theories, or a theory and some raw data, are 'in contradiction' with each other is a moot question. We dismiss this query rather facilely by referring to "logical insight". Such insight is partly 'experiential', since it is based on scrutiny of the evidence and doctrines at hand. But it is clearly not entirely empirical and involves abstract factors. 'Contradiction' is, after all, an abstraction. I believe the answer to this question is largely given in the psychological analysis of negation.

There is an introspective sense that *conflicting intentions* are involved. Thus, the 'logical insight' that there is inconsistency is not essentially insight into a negative (a non-consistency), but into a positive (the intuitive experience of conflict of intentions). Although the word inconsistency involves a negative prefix, it brings to mind something

empirically positive – a felt tension between two theses or a thesis and some data.

For this reason, to say that 'consistency is assumable, until if ever inconsistency be found' is consistent with our claim that 'negations are not purely empirical'. (Notice incidentally that we did not here "prove" consistency, but merely *recovered* it by clarifying the theses involved.)

The above analysis also further clarifies how the law of non-contradiction is expressed in practice. It does not sort out experiences as such, but concerns more abstract items of knowledge. To understand it fully, we must be aware of the underlying intentions. A similar analysis may be proposed to explain the law of the excluded middle.

In the latter case, we would insist that (by the law of identity) 'things are something, what they are, whatever that happen to be'. Things cannot be said to be *neither* this *nor* the negation of this, because such characterizations are negative (and, respectively, doubly negative) – and therefore cannot constitute or be claimed as positive experience. Such situations refer to uncertainties *in the knower*, which he is called upon to eventually fill-in. They cannot be proclaimed final knowledge (as some modern sophists have tried to do), but must be considered temporary postures in the pursuit of knowledge.

9. Status of the Logic of Causation

It should be pointed out that the theory of negation here defended has an impact on our theory of causation. If causation relates to the conjunctions *and non*-conjunctions of presences *and absences* of two or more items – then our knowledge of causes (i.e. causatives) is subsidiary to judgments of negation. It follows that ***the logic of causation is not "purely empirical",*** but necessarily involves acts of reason (namely the acts of negation needed to declare something absent or two or more things not conjoined).

Incidentally, we can also argue that causative judgments are not purely empirical with reference to the fact that it always concerns *kinds* of things rather than individual phenomena. Truly individual phenomena are by definition unrepeated and so cannot strictly be said to be present more than once, let alone said to be absent. Causation has to do with *abstractions* – it is conceptual, it concerns classes of things. In this regard, too, causation depends on rational acts.

These features of causation do not make it something non-existent, unreal or invalid, however. The skeptic who tries to make such a claim is also engaged in negation and abstraction – and is therefore implicitly suggesting his own claim to be non-existent, unreal or invalid! One cannot use rational means to deny reason. It is obviously absurd to attempt such intellectual convolutions, yet many have tried and keep trying.

The polemics of Nagarjuna and David Hume are examples of such sophism. As I have shown in previous writings, they try to deny causation without even defining it properly (and likewise for other rational constructs). This is a case of the fallacy I have identified more generally in the present reflections – namely, *the attempt to deny something before one even has something to deny*. What are they disputing if indeed there is nothing to discuss?

> As we have seen, awareness of the distinctiveness of negative terms can have consequences on logical practice. Generally speaking, a negative term (i.e. one contradicting a positive term) is more naturally a predicate rather than a subject of (categorical) propositions. Similarly, the negation of a proposition is more naturally a consequent than an antecedent.
>
> Using a negative term as a propositional subject is sometimes a bit artificial, especially if the proposition is general. When we so use a negative term, we tacitly understand that a set of alternative contrary positive terms underlie it. That is to say, given "All non-A are B", we should (and often do) look for disjuncts (say C, D, E, etc.) capable of replacing non-A.
>
> In the case of a causative proposition, the positive side of the relation may be more effective than the negative side, even when the latter is the stronger. That is, when the causative seems on the surface to be a negation, we

should (and often do) look deeper for some positive term(s) as the causative.

This recommendation can only, however, be considered heuristic. Formal rules remain generally valid.

10. Zero, One and More

Another consequence of the theory of negation has to do with the foundations of **mathematics**. What is the number 'zero' (0)? It refers to the 'absence' of units of some class in some domain. And of course, we can here reiterate that there is no possibility of concretely identifying such absence, without having first sought out the presence of the units concerned. Therefore, here too we can say that there is a sort of relativity to a Subject/Agent (who has to seek out and not find a certain kind of unit).

But of course, not only zero is 'relative' in this sense. We could say that the only purely empirical number is the unit, one (1). It is the only number of things that can be perceived directly, without processing information. As we said earlier, there are only positive particulars. We may here add: each of them is 'only a unit', never 'one of many'.

Such units may be mentally (verbally or even just intentionally) grouped together, by means of some defining rule (which may just be a circle drawn in the dust around physical units, or a more abstract common and exclusive characteristic). We thus form natural numbers larger than one

(such as 2, 3, etc.) *by abstraction*. It follows that any number larger than one (as in the case of zero) can be actualized *only if there is someone there to do the counting*.

Thus, zero and the natural numbers larger than one are less directly empirical than the unit; they are conceptual constructs. It still remains true that '2+2 = 4' or false that '2+2 = 5' – but we do not get to know such truth or falsehood just by 'looking' out at the world: a rational process (partly inductive, partly deductive) is required of us. If no one with the needed cognitive powers was alive, only units would actually exist – other numbers would not appear.

And if this dependence on someone counting is true of whole numbers, it is all the more true of fractions, decimals and even more abstract numerical constructs (e.g. imaginary numbers). As for 'infinity', it is obviously the most abstract of numerical constructs – considering, too, the negativity it involves by definition.

But we can go one step further in this analysis, and reexamine our above notion of a purely empirical unit! Implicit in this notion is that what appears before us (in the various sensory media, and their mental equivalents) is a multiplicity of distinct units. This already implies plurality – the existence of many bits and pieces in a given moment of appearance (different shapes, colors, sounds, etc.), and/or the existence of many moments of appearance (across 'time', as suggested by 'memory').

But multiplicity/plurality does not appear before us through mere observation. It is we (those who are conscious of appearances) who 'sort out' the totality of appearance into distinct bits and pieces (e.g. physical or mental, or sights and sounds, or blue and white), or into present phenomena and memories of phenomena. We do this by means of intentions and mental projections (acts of will, sometimes involving imagination), in an effort to summarize and 'make sense of' the world we face.

Thus, to speak of 'positive particulars' as pure percepts (or in some cases, as objects of intuition) is not quite accurate as phenomenology. The starting data of all knowledge is a *single* undifferentiated mass of all our experience. This is split up and ordered in successive stages.

> Consider my field of experience at a given moment – say, for simplicity, I look up and see a solitary bird floating in the blue sky, i.e. two visual objects (ignoring auditory and other phenomenal features), call them x and y.
>
> Initially (I postulate), they are one experience. Almost immediately, however, they are distinguished from each other (I postulate this true even for a static moment[91], but it is all the more easy to do as time passes and the bird

[91] Of course, the observer of the static moment *takes time* to make a distinction between items within it. But there is no inconsistency in our statement, since we are not claiming our world as a whole to be static but merely mentally considering a static moment within it.

flies through different parts of the sky, and other birds and clouds come into the picture).

This basic distinction is based on the fact that the bird has a shape and color that visually 'stand out' from the surrounding blue of the sky, i.e. by virtue of contrast. This may called '**imagined separation**', and involves a mental projection (or at least, an intention) of imaginary boundaries between the things considered.

It need not (I again postulate) involve negations. That is, I make a distinction because x is x and y is y, not because x is not-y and y is not-x. The latter negations can only logically occur *as an afterthought*, once the former contrasts give me separate units I can negate.

The acknowledgment of 'many' things within the totality of experience (a sort of epistemological initial 'big bang') is already a stage of ratiocination. Negation is yet another of those stages, occurring perhaps just a little after that. Numbers are yet a later stage, dependent on negation (since to explicitly distinguish things from each other we need negation).

By the way, the arising of multiplicity does not only concern external objects; we must also take into consideration the Cartesian *cogito ergo sum*. This refers to the development of successive pluralities relating to the psyche, notably:

- Cognized and cognizing, and also cognition; thus, Subject – consciousness – Object.

- Self and other; or further, soul/spirit, mind, body and the rest of the world (the latter also spiritual, mental and material/physical).[92]

Everything beyond the totality of experience depends on *judgment*, the cognitive activity we characterize as rational. Such judgment exists in varying amounts in humans. It also seems to exist to a lesser degree in higher animals (since they search for food or look out for predators, for instances), and even perhaps a little in the lowest forms of sentient life (though the latter seem to function almost entirely by reflex).[93]

11. Psychology of Negation

With regard to **psychology**, the following may be added. Knowing when and how to negate is an art – on which

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[92] The distinction between internal and external objects varies with context, of course. 'Internal' may refer to spiritual intuitions (own cognitions, own volitions, own appraisals, and self), mental phenomena (memories, mental projections, emotions), or bodily phenomena (sensations and visceral sentiments). 'External' then means, respectively, phenomena in one's own mind-body and beyond, or only those in one's body and beyond it, or again only the world outside one's body.

[93] A good argument in favor of this thesis, that mental separation and negation are distinct stages of distinction, is the possibility it gives us (i.e. biology) of supposing that lower animals are aware of multiplicity but unable to negate (because the latter requires a more pronounced level of imagination).

depends the pertinence and accuracy of our judgments. The faculty of negation can be abused or underused.

Psychologists will agree that excessive negation, as excess in any intellectual endeavor, can be considered a mental sickness. People with excessive negativity have a negation faculty that has gone haywire, causing them and others much suffering. But lack of critical sense – excessive credulity and enthusiasm – can also mislead and cause harm.

Sober judgment relies on poise and restraint either way – i.e. it is appropriately balanced.

12. Negation in Meditation

I have found in the course of **meditation** that effective awareness that all pure perception relates to positive particular phenomena, and that negation is always partly an act of reason, has a powerful concentrating effect due to eliminating at its root much underlying thought (which uselessly diverts our attention from 'the here and now' of positive particulars). If negations are not pure experiences, they can and ought to be treated as (expendable) thoughts by the meditator.

If negations involve thought, the same is all the more true of abstractions (which are all derivatives of negation), including explanations, calculations and other rational judgments. However, in the latter cases, meditators are usually well aware that thinking is involved and try their best to avoid it.

Whereas, in the case of negations, one is more easily fooled into believing that they are mere experiences and tend to tolerate them and get absorbed in them.

> In this context, parenthetically, I am tempted to ask the question: if the Buddhist enlightenment experience is – as some seem to suggest – a contemplation of "emptiness", is it a pure experience (as they claim) or an inference from experience? For the concept of emptiness (absence of content) here refers to denial of ultimate essences (which are described as "self-nature" or "self-existence") behind the particular appearances of experience; but if such denial involves negation, and negation here strictly means 'essence has not been found' rather than 'non-essence has been found', the latter conclusion is only an extrapolation from the former.

One way to avoid negation, and indeed other forms of judgment, in meditation is simply to abstain from asking questions and seeking answers (confirmations, refutations, or details of any sort). This promotes a more passive and receptive frame of mind, which generates inner calm and silence.[94]

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[94] Note that this might only concern *zazen* and similar methods of meditation. In certain other meditations, the mind is deliberately kept active and searching; for instance (according to D.T. Suzuki), masters of meditation on a *koan* recommend cultivation of a "spirit of inquiry".

It may be objected that such an attitude is not conducive to philosophical – and more broadly, knowledge – development! But in fact, although one cannot progress far in meditation if one considers it as merely a means to philosophical or other ends, the practice of meditation does improve one's philosophical insight and understanding, and knowledge generally. (And indeed, the converse is also true – philosophy can help improve one's meditation.)

10. JEWISH LOGIC: A BRIEF HISTORY AND EVALUATION

This essay was first written in 1990 in Canada, then completely revised in 1995 in Switzerland.

1. Introduction

All comparative and historical studies are likely to deepen and enrich our understanding of logic in general. Reading the article on 'The History and Kinds of Logic', in the *New Encyclopaedia Britannica*[95], one is struck by the total absence of any mention of Hebrew, Israelite, Talmudic, Rabbinic, Judaic or Jewish contribution to logic before modern times, except for a mention of 13th century logician Isaac Albalag. Since Jewish (religious) literature, notably the Torah and subsequent books of the Bible, was highly developed many centuries before the advent of Greek philosophical literature, one may well wonder to what extent the former deserves to be ignored by historians of logic.

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[95] *The New Encyclopaedia Britannica: Macropaedia*, 1989 ed. (23:234-290.)

Indeed, the said *NEB* article itself admits that the Western view of the history of logic may be biased by limited access to sources in other cultures. I quote[96]:

> Judging from the outline of the development of logic given so far, it would appear that logic has been an exclusive product of Western culture. Some historians of the subject, however, have found this view parochial and sought to identify traces of logic in Indian and Chinese thought. But research in these two fields is beset with tremendous difficulties: most of the texts remain unpublished or untranslated; some of the monographs are unreliable; and scholars well trained both in logic and philology are extremely rare. Thus, a fair evaluation is, as yet, impossible.

The same difficulties and barriers beset historians, who wish to trace logic history more globally, with regard to Judaic logic. The Talmud, in particular, is a dense and complicated document, written in Hebrew and Aramaic, not accessible to all comers.

To begin answering our question, we must first distinguish between the art or actual practice of logic, and the science of or theorizing about logic. This distinction applies equally well to individuals and whole cultures. So our question is really two-fold: as of when is there evidence of logical thought in Jewish culture, and when did Jews begin reflecting

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96 P. 240.

on their own thought processes? Another, equally important, issue is: how extensive and how good were their logic practice and theory?

It is clear that such questions could and should be asked in relation to any culture, not just Jewish culture; but we will make this a case study of sorts (as the topic happens to have aroused the author's personal interest!). Furthermore, we need to study the mutual influences, if any, between cultures: who taught what aspects of logic to whom? In this regard, we may refer, on the one hand, to obvious, manifest influences, one way or the other, and on the other hand, to subterranean, assumable influences. The media often misplace credit and attribute innovations to imitators. Here, a reflection is called for, concerning the methodology appropriate to historical studies, which involve peculiar difficulties.

We cannot, of course, in a brief essay, hope to solve all these problems.

2. Traditional Claims and Historical Record

It is interesting to start with an *apperçu* of the claims made by Jewish traditionalists.

Talmudic and Rabbinic legal discussions are replete with complex reasoning processes, which seem logical, at least at

first sight. With regard to historical record, these discussions began around the 2nd or 1st century BCE — that is, when the Mishnah (the crux of the Talmud) was developed — stretching to the 5th century CE. However, according to Talmudic and Midrashic literature (the latter dates from about the same period), claiming oral tradition, Talmudic debates were mere reflections and continuations of legal discussions dating from Mosaic, and in some instances from Patriarchal and even Antediluvian, times.

Furthermore, Talmudic and Midrashic literature reports that Talmudic legal decisions were based on a number of explicit interpretative, or *hermeneutic*, principles, claimed to have been taught by God to Moses, and then faithfully transmitted by word of mouth to Talmudic generations. These principles, or *Midot*, were intended to facilitate and govern understanding of the written law given in the Torah (the first Five Books of the Jewish Bible, revealed at Sinai some 3,300 years ago).

If these principles were rules of logic, and if they were indeed as ancient as alleged, then the Jewish people had a functioning logic theory long before the Greeks (whose known written work in the field started around the 4th century BCE). This does not seem unreasonable, if we reflect that the Israelites had a written language and developed literary culture several hundred years before the Hellenes[97].

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[97] As is well established on the basis of archeological evidence, the Greek alphabet was a relatively late offshoot (*c*. 6th

Now, this is the traditional thesis, very briefly put. Let us leave it at that for now, and trace the history of Jewish logic in a bit more detail. (The reader is referred to standard reference works for more ample details, such as the *Jewish Encyclopedia*[98] and the *Encyclopaedia Judaica*[99].)

There is certainly evidence of logic practice in the Torah and subsequent Books of the Bible. A Midrashic work (*Bereshith Rabbah*, 92:7) explicitly notes this, listing ten *a-fortiori* arguments scattered in it (for example, Genesis, 44:8). In fact, as the present author has shown elsewhere, there are many more *a-fortiori* in the Bible. Furthermore, as well as such deductive practices, we find inductive practices (namely, adduction[100]) in it, which are even somewhat explicited (in Deut. 13:2-4 and 18:21-22).

However, apart from the just mentioned passages, there is no mention, use or listing in the Bible of the hermeneutic principles which make their written appearance in Talmudic times. The exception is *a-fortiori* argument, which is *used* by protagonists in the Biblical narrative (including God, Moses, patriarchs, kings and prophets), though not *explicited* or *explicated* in any way. Adduction, though used and to some

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century BCE) of the Phoenician, which was almost identical to the Hebrew. The alphabet from which the Phoenician and Hebrew evolved is estimated as dating from the 17th century BCE.

98 New York: Funk and Wagnalls, 1968.

99 Jerusalem: Keter, 1972.

100 To 'adduce' information, means to put forward data which continues to buttress some hypothesis, or (in the negative case) henceforth eliminates it from consideration.

extent explicited (but not explicated) in the Bible, and in fact widely used in the Talmud, is not counted by the Rabbis as a hermeneutic principle.

As far as the written record shows, the hermeneutic principles used in the Talmud and after were authored by sages of the time, notably **Hillel** (to whom a list of 7 is attributed) and his rival **Shammai** (both *Tanaim*, participants in the Mishnah), **R. Ishmael** (to whom a list of 13 is attributed, in *Sifra*, chapter 1) and his rival **R. Akiba** (both *Amoraim*, participants in the Gemara). It may readily be admitted that, as is mentioned in the Talmud itself, these men learned some of the interpretative rules they taught from their own immediate teachers, or that they induced them by observation of their own or their close colleagues' thought processes — but it is hard to prove that these principles were already known in Biblical times and were taught by Moses.

It is worth noting that, though the lists of hermeneutic principles proposed by these various Rabbis have points of agreement, they also in some instances exhibit significant differences. These methodological disagreements predictably affected the reading of the Biblical text by the various Rabbis concerned, and their respective schools, and caused divergences in their legal opinions (*ab-initio*, though they were eventually harmonized, by means like majority vote). If these various principles had indeed, as claimed, a common, Mosaic origin, it is difficult to explain convincingly why they were contradictory; if the contradictions were due to erosions

of memory, it is difficult to assign Mosaic authority to the principles.

Furthermore, detailed analysis shows that the language in which the hermeneutic principles was expressed went through a process of change and even evolution. This is evident in the case of the one process which is found in the Bible, and later in lists such as those of Hillel, R. Ishmael and the slightly later R. Eliezer ben Yose ha-Gelili (whose list had 32 principles), namely *a-fortiori* argument. In the Bible, the language used in such argument is colloquial and unspecific; whereas in the Talmud and after it is much more technical, involving specialized terminology (like the expression *qal vachomer*) not used in other contexts, which is clearly the product of a theoretical reflection.

Additionally, if we compare the lists of R. Ishmael (who only mentions *a-fortiori*, but does not describe or analyze it) and R. Eliezer (who distinguishes between two variants of it, namely *michomer leqal* and *miqal lechomer*, i.e. from major to minor and from minor to major), we may well conclude that there were in fact theoretical developments over time. We may similarly observe a development from Hillel (1st century BCE) to R. Ishmael (2nd century CE) in other principles. For instance, the *klal uphrat, prat ukhlal* principle of Hillel is regarded by most authorities, traditional and secular, as having been split up by R. Ishmael into several more specific rules (namely, Nos. 4-7, and possibly 8-11).

We can thus say without fear of error that there was an evident evolutionary trend, and reject the notion of a monolithic Rabbinic logic of Sinaitic origin, unchanged by time. Such origin is only explicitly and dogmatically claimed much later, anyway, having been apparently first proposed by Saadia Gaon (d. 942 CE), and then echoed with more and more insistence (because of the gradual perception of its capital importance in the justification of Rabbinic law). The Mishnah of *Pirke Avot*[101], which purports to name the trustees of the oral transmission of Jewish law from Moses to its own day, does not specifically mention the hermeneutic principles.

Moreover, the evolutionary trend visibly continued in subsequent centuries, with more and more refinements and restrictions proposed by successive generations of Rabbis, as new queries and insights arose. The latter always pretended to be mere vehicles of ancient traditions on the subject; but there is no textual evidence to support such claims. We must rather see them as 'arguments by anachronism' — it was common practice in the Middle Ages (also before, and since, in Judaism and elsewhere) *to try to justify a belief by attributing it to a past authority*. This device was buttressed by intimidation: accusations and threats which silenced potential critics for centuries.

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[101] Bulka, Reuven P. *As A Tree By The Waters.* Jerusalem: Feldheim, 1980. (pp. 19ff.)

The practical skills in hermeneutics did not change much; indeed, one may well admit that the earlier masters in the art were superior to their later disciples. (I do not mean to imply that later authorities, like Rashi or Maimonides, were deficient in skills, but only that their forerunners were, after all, their teachers). What evolved was theory; and it did so in two directions. One good: improved definitions, clearer understanding of the mechanics involved; one bad: a reduction of freedom of thought, an attempt to control use of the processes, so as to prevent modifications in the law.

So much, here, for the history of Jewish logic in itself. Let us now consider things in a broader historical context and with regard for the objective value of processes.

3. Comparisons and Assessments

To precisely determine the place of Judaic logic in world logic history, we must *evaluate* it; that is, objectively assess it, determine how much of it, if any, may be considered as really logic. In a broad manner of speaking, any thought process is an act of 'logic'. What makes us, however, class it as good logic, or logic in the sense of a scientific thought process, is our ability to demonstrate its universal validity.

It is, without doubt, **Aristotle** (a 4th century BCE Greek) who must be credited with the discovery of the scientific method of validation of arguments. Prior to him, no one we know of had come up with the idea; though his predecessors, Socrates and Plato, had begun to become aware of the issue. The method of Aristotle was simple, though brilliant. It was, firstly, *formalization*: the substitution of symbols in place of specific terms, the consideration of form irrespective of content. Secondly, the testing of processes (so denuded of particular issues) with reference to the '*laws of thought*', namely identity (A is A), non-contradiction (A cannot be nonA) and exclusion of the middle (either A or not A).

What is amazing, historically, is that Aristotle's method was never grasped or adopted by the teachers and law-makers of Judaism, even though they had had considerable contacts with the Greeks. Historian Chaim Raphael[102], of Oxford University, describes their early relations as follows:

> The Jews… had been aware of the Greeks as part of their world long before the arrival of the Macedonians under Alexander the Great. Greek traders had been familiar in the coastal towns of Palestine as early as the seventh century BC. There were Greek mercenaries in the Egyptian and Babylonian armies, including the army of Nebuchadnezzar. From the time of its greatness in the fifth century BC, Greece had

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[102] *The Road from Babylon: The Story of Sephardi and Oriental Jews.* London: Weidenfeld and Nicolson, 1985. (p. 31.)

> poured a profusion of explorers, adventurers and scholars into the Near East, and the Jews had responded.

But I am not sure this is an entirely accurate picture. The fact is that although Israel/Judea was conquered by Alexander, a direct pupil of Aristotle and a man interested in cultural exchanges with the peoples he conquered; and although he was, exceptionally, well-liked by Jewish traditionalists; and although the Jews remained under Greek political dominion and/or cultural influence for centuries thereafter (until the Roman takeover, and the Romans had a Hellenistic culture, anyway) — Aristotle's conceptual breakthrough in logic had apparently no direct effect on Judaism. However, perhaps we should not be so surprised. After all, Alexander's empire stretched East all the way to India, yet Indian philosophy seemingly never adopted formal methods of discourse, either.

Generally speaking, we may expect the interactions of peoples to involve some give and take of information and methods. But we cannot predict, without detailed study of the matter, precisely who influenced whom, and in what domain and to what extent. It is as erroneous to presume that the politically dominant party shall have the greatest influence, as to presume that the intellectually or spiritually superior party shall have it. The historian must avoid pure speculations, based on a very narrow context of data and driven by hidden agendas.

In the present case, we can on the basis of close study affirm the following:

1. ***With regard to the Jewish Bible***, a document which according to Jewish tradition and most secular historians antedates Greek logical discoveries by about 1,000 years (but, according to so-called Higher Critics, by only a couple of hundred years):

a) There are evidently both deductive and inductive reasoning processes in its stories and legal statements. Differences in this respect between the various Books of the Jewish Bible do not seem significant (i.e. are probably just happenstance), judging by linguistic and statistical indices.

b) While use of categorical and hypothetical syllogism may be found in the Torah and other Books (it would seem odd if it were not, since thought by means of classes and theses is fundamental to human thought), it is not there talked about in an abstract manner. That achievement is undoubtedly Greek (Aristotle, Philo the Megarian, for examples).

c) As already stated, there is a distinctive deductive process in several of the Jewish Books, namely *a-fortiori* argument; again, this is repeatedly used, but never talked about. This form of argument may have been used by the Greeks (it remains to be shown), but they never noticed it or elucidated it theoretically (as far as we know). The fulfillment, to a large extent, of these tasks may safely be

attributed to the Rabbis of the Talmudic period and after. *A-fortiori* arguments do occur in the Christian Bible (notably, in Paul), but their abstract discussion in Western philosophy appears much later, in the Middle Ages.

d) As already stated, too, we find in the Book of Deuteronomy a nearly formal expression of the two laws of adduction, concerning the confirmation or elimination of hypotheses. These laws are there stated in relation to the empirical testing of prophecies and prophets; but, nevertheless, they are so clearly formulated that they may be viewed as a universal lesson in inductive cognition. Furthermore, since these statements concern evaluation of what religion conceives as the highest level of consciousness (namely, prophecy), they are perforce applicable to lesser levels. Western formulation of the two laws of adduction is a much later phenomenon, in the era of Francis Bacon and Isaac Newton.

e) Other kinds of reasoning, deductive and inductive, are doubtless manifest in the Jewish Bible, though in much less differentiated form. If arguments appear, they are enthymemic rather than full; and they are used, but not discussed as such.

2. ***With regard to the Talmud*** (whose legal debates began to all evidence a couple of centuries after the Greek conquest of the Holy Land) and after:

a) We find there much more complicated reasoning processes (inductive and deductive) and much more

developed linguistic tools used, as well as considerable theoretical reflection on many of these practices. Rabbinical thought processes included, not only arguments by analogy and causal inferences, but also (though less consciously) opposition, eduction, syllogism, production, dilemma, generalization and particularization, adduction and many more forms. However, contrary to orthodox claims, the Talmudic and later Rabbis were not infallible and all-knowing; they (individually and collectively[103]) made practical and theoretical mistakes.

b) On the positive side, we may mention especially two processes, which were more developed in Rabbinic logic than elsewhere, namely *a-fortiori* argument and *reconciliation of conflicting theses*. With regard to these (the first and thirteenth *Midot* of R. Ishmael), there is no doubt that the Rabbis were in advance of their time for centuries, both in the quantity of their practice and in the quality of their theoretical awareness. However, though these processes are demonstrably valid, it does not follow that their use by Rabbis was invariably faultless, nor that their understanding of them was complete.

It must be stressed that Aristotelian logic did not take into account *degrees* of possession of qualities (as does *a-fortiori* argument), nor the '*balancing of opposites*' aspect of logic (as does harmonization of conflicting theses). The

[103] An individual's error is collective if uncorrected by the peer group.

species of a genus might have a hierarchical relation to it, but this was not brought out in the syllogism (which merely confirmed the common ground between the terms); and when two arguments arrived at opposite conclusions, there was no conscious attempt to reconcile them (the reasoning process stopped or became unconscious as of the discovery of conflict, with the thought that 'one thesis or the other or both must be wrong'). Greeks evidently functioned in a more 'either-or' (or 'all or nothing') mode than the Jews, who rather sought to find the nuances between predicates and the commonalties of disparate views. In Rabbinical debates, this attitude served to maintain the credibility and authority of all participants.

c) On the negative side, Rabbinic thinking included many wholly or partly questionable if not demonstrably invalid forms. 'Logic' was to the Rabbis very often merely a way to buttress predetermined 'conclusions', rather than a means to discover unknown facts. This is evident in many of the interpretative techniques they adopted. There were always, in those, an appearance of verity; but closer analysis shows them to have been fallacious.

   One fallacy consisted in *drawing a possible conclusion and declaring it necessary*; that is, *an inductive alternative was attributed the status of a deductive certainty*. Another sleight of hand consisted in *starting with a general premise and (even though it not give rise to a conflict) particularizing it along the way, so as to obtain a*

conclusion contradictory to what it would otherwise have been. The arguments passed, being often too intricate for non-logicians to sort-out.[104]

d) Thus, though their approach was not always lacking in objectivity, it was essentially unscientific. Their ultimate arguments, stated or tacit, were that they had Divine sanction and traditional continuity, and that whoever disagreed with them was merely expressing rebellion against the powers that be and deserved punishment accordingly. Because the Rabbis did not have a concept of impartial validation of thought processes by formal means, they could not see how they might possibly err.

e) As already remarked, it is very surprising that the formal method and specific discoveries of Aristotle were not understood or adopted by the Rabbis; nevertheless, that is historical fact and the main explanation for their practical and theoretical problems. In early centuries, this avoidance of the scientific method was perhaps naive, a side-effect of Jewish rejection of the mores and morals of non-Jews; in later centuries, it became dogmatic, an intractable ideological position.

I think the existence of such distinctive currents in Judaic logic, for good or bad, proves the point, that it has been an independent and distinct enterprise. R. Shmuel Saffrai, of

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[104] I here merely highlight two examples. See especially the analyses in chapter 10-12 of my work *Judaic Logic*.

Hebrew University in Jerusalem, author of the *Encyclopaedia Judaica* article 'Hermeneutics', reaches a similar conclusion:

> It is debatable whether (as suggested by the 12th century Karaite author Judah Hadassi) any Greek influence can be detected, though terminologically some of the rules have Greek parallels.

Much later, of course, mutual influences between Jews and non-Jews developed considerably. Christian (and Moslem) scholars in the Middle Ages and after were influenced by Rabbinic methodology, whether through study of written texts or in oral disputations[105]. And Jewish scholars, like Maimonides[106], did eventually study Aristotelian logic[107].

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[105] Similar disputations are reported by the Talmud to have occurred in Greek and Roman times.

[106] Maimonides (Spain, Morocco and Egypt, 1135-1204) was very impressed by Aristotle's presentation of logic and at the age of sixteen wrote a book on logic in Arabic, the *Makalah fi Sana'at al Mantik*. (See *Enc. Jud.*, 11:459-460.) His later and better-known *Guide for the Perplexed*, which defines many logical and philosophical terms, was highly influential on Christian (and Moslem) thinkers, including Thomas Aquinas and Leibniz, as well as on Jewish thinkers like Spinoza. (See Heschel, Abraham Joshua. *Maimonides: A Biography.* 1935. Trans. Joachim Neugroschel. New York: Farrar, Straus, Giroux, 1982. p. 209.) More important, without such logical studies, it is doubtful whether Maimonides would have become the powerful systematizer of Jewish law he became, notably with his *Mishne Torah*, influencing all subsequent treatment of the subject.

[107] In some cases indirect influence seems evident, though direct study is doubtful. This is I suspect true of R. Moshe Haim Luzatto, known as the Ramchal (18th cent.), in his *Derech Tevunot*

Some Jewish commentators attempted to justify this new openness by interpreting (quite logically!) 'the commandment to maintain correct scales, weights and measures (Deut. 25:13-15) as referring to the rules of logic', in addition to its literal sense[108]. The role played by Jewish translators in logic history should also be mentioned; they helped to revive interest in Aristotelian logic, bridging the contemporary Moslem and Christian cultures[109].

Nevertheless, to repeat, Greek formalism never found its way into Judaism. Logical skills can, indeed, as Jewish tradition claims, be adequately taught and passed on *by way of examples*, which may moreover be classified under rough descriptive/prescriptive principles. This continues to occur in Jewish circles, and therefore can be assumed to have occurred in the past; furthermore, it occurs in non-Jewish circles. The communication of any knowledge content always involves passing on a 'way of thinking'; this is sometimes more effective than teaching logic by explicit principles. Nevertheless, non-formal methods are deficient, in that they do not permit a proper evaluation of the material transmitted; only the use of variable-symbols makes certainty possible. [110]

(*The Ways of Reason.* Trans. D. Sackton and Ch. Tscholkowski. Jerusalem: Feldheim, 1989).

[108] Heschel, p. 168.

[109] Raphael, p. 102; and *Enc. Jud*.

[110] Written in Geneva, 1995, to correct an article called *Jewish Logic* written in 1990 and published in *World of Chabad* of Vancouver, B.C.

11. ISLAMIC LOGIC

This essay was written end 1998 or early 1999, as preparatory notes for a series of lectures on philosophy delivered to a group of some twenty students at the Université Populaire de Genève. It has been slightly edited since then.

1. The Structure of Islamic Law

This section is intended serve Moslems, as well as believers in any other religion (Jews, Christians, Hindus, Buddhists, or whatever) to view their own beliefs in perspective (it is often easier to admit reasoning when one is not personally attached to a doctrine). My intent is certainly not to express disrespect for Moslem beliefs, though I of course wish them too to be more open-minded.

Islamic law has three sources: the Koran, the hadith and the law doctors.

1) THE KORAN: Alleged revelation from God to angel Gabriel to the prophet Mohammed, to the people, contemporary and subsequent.

Equivalent to the Torah (or Tanakh); it is the founding scriptures, the ultimate reference document for Islamic law.

Epistemological problems:

For Mohammed: granting his sincerity, how can he be sure the vision and voice of Gabriel was not a hallucination. How can he be sure his "Gabriel" is a messenger from God, and not a visitor from some other planet, say.

For his disciples and followers: how to be sure of Mohammed's sincerity (i.e. that it was not all a trick of his to gain power and influence) and accuracy (i.e. that he did not simply hallucinate).

Note also that, according to Arnaldez[111], the Koran has so far not been subjected to historical and textual criticism by impartial researchers.

The recipients of an alleged revelation have to learn to distinguish between:

a) The appearance of sights and sounds to the alleged prophet — X.

b) The verbalization of the phenomenon — "X occurred"

c) The identification of God as the source of the phenomenon — "X was from God".

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[111] Roger Arnaldez, *L'Islam* (Paris: Desclée/Novalis, 1988), p.196.

d) The taking into consideration of the recipient of the message — "Mohammed considered that God gave him the message X".

The alleged event (a) and the various propositions about it (b, c, d) cannot logically be treated as equivalent, as naïve readers of revelations tend to do. (d) does not necessarily imply (c), (b) or (a). The transition from each to the next involves a conceptualizing or rational act of a human mind, and is subject to possibilities of error of observation or verbalization or causal logic. This is true of any revelation, not just the Islamic.

2) THE HADITH: Alleged eyewitness accounts of the sayings and doings of the prophet, supposedly written down by his contemporary followers, for their successors. Some hadith were apparently transmitted orally. Some have been judged authentic (*sahih*), others less so (*hasan*), still others forged (*saqim*).

Serves as second level of reference for Islamic law. Thus, technically equivalent to the Oral tradition of Judaism (written in the Mishnah and Gemara), though *less spread out in time* and therefore more likely to be a reliable report.

Epistemological problems:

For the eyewitnesses: granting their sincerity, how can they be sure their observations of Mohammed's actions were properly remembered and relevant.

An item X may be a broad law; Mohammed's action represents one possible concrete application of that law (he has to apply it *some*how); but there may be other acceptable concretizations; the simple fact that Mohammed chose a given one, though legitimizing, does not in itself exclude other conceivable concretizations. To make Mohammed's actions equivalent to law is to imply he received more instructions than he transmitted, and to make a wrong generalization from his actions.

With regard to verbal pronouncements by Mohammed reported by others: they may have been improperly remembered; and even if they were written immediately (though not verbatim), they may have been improperly understood and reported.

Similar problems, and more, occur with regard to Jewish tradition. A rabbi may perform a mitzvah in a certain way, because he has to do it some way, not because it is the only way; yet his disciples take it and transmit it as *the* way; and so it remains if uncontradicted. If a rabbi says something, his disciples likewise will assume it of traditional origin and descent; but it may in fact be his own interpretation, or he may have misunderstood what *his* teachers said or did, or he may have badly remembered and filled in blanks, and so forth.

For the subsequent generations: they may doubt the sincerity of the eyewitnesses, or their accuracy of hearing or observation, or their having been eyewitnesses at all, or the

authenticity of the text received. It is important to resist the tendency religion induces in us all to be credulous to events or claims that are far away in time and therefore almost unverifiable!

We can here, as above, express the transitional problems in formal terms: that "Alleged eyewitnesses claim they saw or heard Mohammed doing or saying Y" does not prove that "M did/said Y", nor that "What Mohammed did/said was divinely approved or intended". It is naïve to regard these propositions as equivalent, each one involves further assumptions than the next.

3) THE LEGAL EXPERTS: those who try to develop a precise jurisprudence, with reference to Koran and hadith, resolving contradictions, making clarifications and inferences, filling in blanks, extending laws to new situations.

Epistemological problems:

Here, reasoning is at stake, just as in the Talmud and subsequent rabbinic writings (formal issues, in addition to alleged traditions as to content). Initially, personal opinion (*ray*) of Islamic masters was legitimate; eventually, traditionalists reacted with more stringent demands. Their hermeneutics, which have some resemblances to the Judaic, may similarly be subjected to critical review.

2. Islamic Hermeneutics

This section is significant, in that it constitutes a comparative study, of interest not only to Moslems but equally to Jewish Talmudists.[112]

If there is a conflict between two verses of the Koran, or a verse of the Koran seems in conflict with an authentic tenet of the hadith, Muslim doctors of law propose the following **harmonizations**.

1st rule: exception.

If one text is more restricted in scope than a *conflicting* other, the narrower is considered an exception to the larger.

> The major premise: "X is to do Y";
>
> the minor: "X is not to do Y, when Z";
>
> the putative conclusion: "X is to do Y, only when not Z".

[112] See Arnaldez, pp. 33-45, 56-57,191-197.

The conclusion renders the major premise conditional. This solution seems credible, granted both texts have comparable level of authority and reliability. Note that this rule is comparable to Rule 10 or perhaps 13 of R. Ishmael in Talmudic hermeneutics; it is a dialectical reconciliation.

2nd rule: merger.

If one text prescribes (or forbids) a part of some class and the other *similarly* prescribes (or forbids) another part of the same class, there is no contradiction: together the two texts form a larger proposition.

> The major premise: "X is to do Y, when Z1";
>
> the minor: "X is to do Y, when Z2";
>
> the putative conclusion "X is to do Y, when Z1 or Z2 (or 'when Z', if Z1 and Z2 constitute all of Z)".

This is a valid merger or amplification.

3rd rule: exclusion.

If one text prescribes (or forbids) to what seems a general subject (X) what seems a specific predicate (Y1), and another text obversely forbids (or prescribes) to what seems a specific

subject (X1) what seems a general predicate (Y), then we must conclude that either the specific subject is *not included* in the general subject or the specific predicate is *not included* in the general predicate (the decision between these two alternatives depending on finding another text which comforts the one or the other).

> The major premise: “All X are to do some Y1”;
>
> the minor: “No X1 is to do any Y”;
>
> the putative conclusion: “No X1 is X” and/or “No Y1 is Y”.

For, it is tacitly argued, if we add to the major and minor that “All X1 are X” (subjectal) and “All Y1 are Y” (predicatal), we must conclude that “All X1 are to do some Y” (pitting the minor against the three other premises) and “At least some X are *not* to do any Y1” (pitting the major against the three other premises), by regular syllogisms and substitutions.

Note that in fact, it suffices for the subjectal premise to be “At least some X1 are X” to obtain the result “No X1 is X”. Also, given the needed generality of the predicatal premise, the second result should be “At least some Y1 are not Y”. But we can accept the generalities everywhere, granting that we are dealing in *kinds*, i.e. whole classes (to be precise, such acceptance involves a generalization). Also note, the

disjunction in the conclusion may be taken as inclusive, and/or.

This is a credible resolution of conflict, granted both texts have the same level of authority and reliability. Comparing to Talmudic hermeneutics, this rule concerns a situation treated under Rule 10 of R. Ishmael; but whereas the latter resolves the conflict by a daring particularization of the major premise, the Islamic version more carefully challenges the subjectal or predicatal premise.

4th rule: abrogation.

If one text prescribes (or forbids) the entirety of what another text conversely forbids (or prescribes), one or the other text must be abrogated, i.e. considered null and void. If one is more recent, it is to be preferred. Otherwise, add certain commentators, if one is seemingly more demanding, it is to be preferred. But there are often disagreements, when such conflict resolutions are not readily available. (Another logically conceivable resolution, note, would be to particularize both premises to some extent—but I do not know if Islamic interpreters use this option.)

There is a Koranic text (2:106) saying that abrogation of a law occurs only when a better or similar one is promulgated (for some this implies that God, the author of the Koran, is the only abrogator or promulgator). This is understood at one level to refer to God's abrogation through the Koran of some

pre-Koranic laws. At a second reading, it may imply that there should be no unresolved contradictions within the Koran, which is doubtful considering the need for two of the previous three rules. Naturally, if one text has greater authority and reliability (e.g. Koran vs. hadith), it is to be preferred. But the law doctors wonder whether the lower text (hadith) may abrogate the higher (Koran) in certain cases.

On a formal level,

> the major premise: "X is to do Y";
>
> the minor: "X is not to do Y";
>
> so, one or the other must indeed be abandoned in the conclusion.

The preference of the more recent (say, within the Koran, which is *not* chronologically ordered) is sound practice, though it is unclear why God would change His mind so quickly, before the earlier law has had time to be put into practice (if that is the case).

Concerning the subsidiary rule about the relative severities or leniencies of the two texts, the implication is that the two predicates are not really identical (Y).

Regarding conflicts between texts of unequal authority and reliability, I fail to see how the lower (hadith) can displace the higher (Koran), but I have not seen relevant examples.

We may add that it could be appropriate to use such a rule when there is a conflict between a text (Koran or hadith) and an established empirical fact; the latter winning, according to our modern view.

For comparison, abrogation is not officially included in Talmudic hermeneutics, though in practice it occurs (e.g. at least, when one rabbi's position is preferred to another—but sometimes perhaps also in Torah contexts, as e.g. in the apparent conflict between Gen. 1:29 and 9:3[113]).

There are some similarities between the above four rules and Talmudic harmonization rules. But the latter often consider more complex situations and propose more far-fetched logical responses. One significant underlying difference is the rabbinic concern with *redundancies*.

There are, additionally (mentioned in my said source), two types of reasoning by **analogy**.

This involves generalization. An issue, here, is why the original text did not mention the sought-for generality in the first place. In cases where the new cases were unknown at the

[113] I am not sure this is a good example, as neither passage explicitly excludes the other: permitting vegetable food and permitting meat are not strictly in conflict, only *davqa* readings make them seem so.

time (e.g. electricity, say), this is understandable. But in other cases, the use of such reasoning may seem daring.

5th rule: extension by direct analogy.

A law given in the text concerning some particular case(s), may be extended to all other cases of the same sort. The difficulty with this method, as the law doctors admit, is the vagueness of the underlying criterion of resemblance. Formally,

> "X1 is to do Y" and "X1 is an X",
>
> therefore "At least some X are to do Y";
>
> therefore "All X are to do Y".

This is syllogism followed by generalization, which is in principle acceptable, so long as no reason is found for particularization. This method calls to mind that of *gezerah shavah* in Talmudic hermeneutics.

6th rule: extension by indirect analogy.

When a law found in the text concerns some particular case(s), *the reason* for the law is sought, before extending to all other cases which seem subject to the same underlying reason. Formally,

(a) the initial law is "X is to do Y" (textually given);

(b) furthermore, we presume that "X is to do Y, *because* X is Z" (not textually given);

(c) granting this, we are supposing that "All Z are to do Y" (not textually given).

The third proposition is seen as an explanation of the "because" clause in the second[114]. For, with the propositions "X is Z" and "All Z are to do Y", we can by syllogism infer the given premise "X is to do Y". It is clear that propositions (b) and (c) are not inferred from (a); rather, we have sought out propositions *from which* (a) might be inferred. (b) and (c) are thus hypotheses which fit this requirement; but it does not follow that they are the only possible such hypotheses. So long as no alternative explanation of (a) is found, then (b) and (c) have some credibility. We have, then, at best an inductive argument, not a deductive one, note well.

This method resembles somewhat that of *binyan av* in Talmudic hermeneutics. It is called ***qiyas***, and was developed

[114] Another interpretation of the clause "because" in (b) would not have the same effect. If, for instance, it meant that Z is a *sine qua non* for Y, then (c) would read "Only Z are Y", which implies "Some Z are Y and No nonZ is Y", which is not enough to infer (a) syllogistically.

by the imam Al-Shafii (d. 820). Another jurist, Ibn Hazm, also known as Abu Mohammed Ali (Spain, 994-1064), criticized this approach, arguing that God's intent in the Koran was precisely what he said and no more (except where the text is put in doubt by another text).

7th rule: application.

Additionally, some Moslem commentators acknowledge syllogistic reasoning composed of a Koranic major premise and an observed minor premise. E.g. "Fermented drinks are forbidden" and "wine is a fermented drink", therefore "wine is forbidden". The issue here is whether the middle term is correctly interpreted.

Other rules.

My source further mentions the methods of ***istihsan*** (a law is proposed because it seems 'good') and ***istislah*** (a law is proposed because it seems 'useful to the Community'), which institute laws not mentioned in the text, that is, through insight of their value. As some Moslem commentators have pointed out, such methods may be subjective and arbitrary, and lead far from the given text. Indeed, value-judgments are almost bound to be conditioned by personal and social/cultural context; they may easily be prejudices.

There is also the principle of **consensus** (*ijma*), which resembles the Talmudic principle of *rov* (majority). The Islamic principle is based on a hadith where Mohammed says "My Community will never agree together on an error". The issue then arose, on a practical level—who to include in the 'Community'? Democratically, it would be the whole population; this being at the time impracticable, the law doctors were referred to; but in view of communication difficulties in the vast Islamic empire, only those of major Islamic centers were considered. Some commentators suggested, instead, that the 'Community' included only the immediate companions of the Prophet.

The very fact that there are disagreements among authorities regarding the reference intended by the language of this hadith—as well as the practical difficulties of application of different interpretations—make such a rule of consensus open to doubt, and therefore ultimately to some extent arbitrary.

The above is probably not a complete list of hermeneutic rules used in developing Islamic law.

Note also that the formal representations of the rules proposed above are my own logical clarifications. The Islamic jurists who appealed to these techniques were not necessarily as clearly aware of their structures; and those who were theoretically aware, did not necessarily always manage to adhere to them in practice. Probably, some interpreters

occasionally wrongly (through mistakes or dishonesty) claimed their judgments based on these ideal forms.

Anyway, the rules mentioned above seem overall respectable, from a logician's point of view. Needless to say, this positive evaluation of some logical methods is not intended as a comment on the content of Islamic law, or as an expression of any sort of personal endorsement of Islam.

Incidentally, some Islamic methods resemble Talmudic ones, but the former are on the whole more natural. It is significant that the latter are often more artificial. This may be due to their being of earlier date historically; it shows anyhow that they are not universal to all religious groups, and therefore not normal to human reasoning. Nevertheless, apparently, Talmudic logic includes valid forms, like the a-fortiori argument, which are (to my knowledge so far) absent in Islamic methodology, at least at a self-conscious level.

3. Interpreters

Note, finally, the distinction between Divine law (*shar*), found written in the Koran and not giving rise to disagreements among law doctors; and Applied law (*sharia*), developed by law doctors, in response to textual conflicts or through other motives.

This distinction is similar to that between unproblematic Torah law, and Talmudic and Rabbinic interpretation of law (*halakhah*).

There are four main **schools** of interpreters of the law[115]:

- the liberal **Hanefists** (Abu Hanifa, d. 767), found in Turkey, Central Asia, Pakistan and India;
- the **Malekists** (from Malik b. Anas, d. 795), dominant in North Africa;
- the **Shafeists** (Shafii, d. 820), especially in Egypt and Indonesia;
- and the rigid **Hanbalists** (Ahmad ibn Hanbal, d. 855), in Saudi Arabia.

A fifth school, not officially recognized, is that of the **Zahirists** (including ibn Hazm, already mentioned), which sought literal readings and rejected laws based on human reasoning. We might roughly compare these to the Sadducees (*Tsadokim*) or the Karaites (*Qaraim*) in Judaism.

Mention should also be made of the **Reformists** (principally Jamal al-Din al-Afghani, 1838-1897; Mohammad Abduh, 1849-1905; Rashid Rida, d. 1935). They tried to "reopen the

[115] Note, in passing, the following attributions mentioned by Arnaldez (pp. 42, 57): Personal opinion or *ray* was used by Abu Hanifa. *Istislah* was used by the disciples of Malik b. Anas. *Analogy* was used by Shafii.

gates of the *ijithad*," that is, the effort of personal interpretation, in lieu of the servile imitation (*taqlid*) of past law doctors by present 'orthodox' ones, and to adapt Islamic law to the modern world influenced by Western civilization. This may be comparable to Conservative or Reform Judaism.

> Note that the above list makes no mention of Persian interpreters, so that I am not sure whether it applies only to Sunni Islam, or also to the Shi'ite branch.

The innovating velleities that begun 19th Century have come to little, due to the rise of **modern fundamentalism**, generated by the likes of the Muslim Brotherhood (founded 1928 in Egypt, by Hasan al-Banna, of the Hanbalist school).

An allegedly 'orthodox' backlash started occurring in the early 20th Century, which in the last two or three decades, under the given label of 'Islamism', has sadly become more and more radical and extreme, indulging in blind hatred and violence towards anyone external to it.

> According to a newspaper article I read (*Tribune de Genève*, 26-7-05), the main theoreticians of this *Salafiya Djihadia* movement were: Sayed Qotb (Egypt, 1906-66), inspired by Hanbalism, and Abu Al-Mawdudi (Pakistan, 1903-79), of Hanefist inspiration. Their doctrines gave rise to the notorious Al-Qaeda network, among others. The article does not mention the ideological sources of the Shi'ite

Ayatollah Khomeini's 1978 Iranian revolution, however.

Moslem intellectuals who wish to reverse this disastrous trend must begin by critically reviewing every single argument put forward by the proponents of modern fundamentalism, (a) checking it for consistency with traditional logical procedures; and (b), in cases where no hermeneutic rule has visibly been breached, considering the possibility tradition offers of alternative juridical interpretations. Many faults are likely to be found in Islamist doctrine on purely Islamic grounds in this way, even before needing to question traditional Islam and more deeply the Koran.

Another important measure is, of course, education – inoculating common people against the fallacious arguments concocted by individuals with dubious motivations. It is all too easy for religious fanaticism to take hold in populations overly prone to emotional incitement and social intimidation, and intellectually ill-equipped to insist on rational checks and balances.

12. LOGICAL ASPECTS OF FOUCAULT'S *ARCHEOLOGY*

This is a critical analysis of Dr. Michel Foucault's methodology, as well as doctrine, in his celebrated **The Order of Things: An Archeology of the Human Sciences** *(387 pages, plus a forward and preface)*[116]*. That book is a translation of* ***Les Mots et les Choses****, originally published, in France, in 1966. The author (1926-1984) was a graduate of the Sorbonne and the Université de Paris, who lectured in a number of universities in various countries.*

This essay and the next were written in 1990 in Denman Island, B.C., Canada.

1. Slippery

Ordinarily, when reviewing a book on philosophy, one would present the author's doctrines, then make a critical analysis of them and draw conclusions. However, it is also wise to keep track of methodological issues, both at the descriptive level and at the level of fitting the thesis into a broader context.

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[116] 1966. New York: Vintage, 1973.

In this particular case, it turns out that Foucault's doctrinal arguments are not his main theme. At first, they seem to be, as he discusses various developments in the 'episteme', the epistemological framework, of Western thinking from the Renaissance to Modern times. But as he proceeds, he makes clear, that these doctrines are not his main message; for he is willing, at the end, to deny them, saying 'these are not affirmations; they are at most questions to which it is not possible to reply' (386).

The main thrust of Foucault's book is on a more subliminal level, at the level of his rhetoric, his peculiar way of thinking, the artifices he utilizes in his discourse, his 'logic', if the word may be used. The doctrinal material, whether on epistemology, on philology, biology or economics, or even on ontology and metaphysics — these serve both to provide an occasion for application of his methods, and also, by virtue of the subject-matter of his doctrines, to give depth to the issues and confuse them.

For these reasons, this here review is forced to begin with an analytical exposition of Foucault's methods, as well as their applications, and then to evaluate them. I may thus say, at the outset, that *The Order of Things* is a very skillful and elaborate Sophistic work. I do not use the word in any pejorative sense, but in the strict sense employed by logical historians, in the sense of an age-old school of Philosophy.

Among Foucault's literary devices are the following. They read like a list of The Fallacies, so adept and relentless he is

at using a multiple of techniques, which reinforce each other's optical illusions. He disposes of the full array of sophistic instruments; his is a concert of sophistry.

The reader is fatigued, bedazzled, bewildered, and intimidated, into submission. You can never pin the author down, because almost as soon as he says something, he also denies it; he is there, and then he is not there, so that you cannot argue with him, because he has not asserted anything, yet. It is like in the manuals on the martial arts, always to elude the opponent, strike and quickly depart, become invisible and untouchable. The only answer to that technique is to find the slippery character, in the midst of all those feints and velleities. Where he shows himself, you are there.

Foucault's text is filled with ambiguities and equivocations; concepts and words are left undefined or denied their customary meanings, and freely used in a variety of ways. Distinctions are imposed on similar things, or denied to dissimilar things, merely by saying so and repeating it over and over, making it seem like accepted fact. Certain distinctions are transformed into deep, unbridgeable divisions between things, which only the most naive would dare to question. He exaggerates, understates.

Florid sentences, reiterating the same thing in different words, again and again, are designed to make it seem that the thesis in question is being repeatedly confirmed, and that it has many profound facets. These flourishes also make it seem as if Foucault is going through a deductive, interpretative

process, so that the sentences he intersperses here and there without proof seem like inferences.

Just as affirmation and denial are, in Foucault, arbitrary (he need only assert something for it to be as he says), so are implication and unimplication and other logical relations (he need only say that P implies Q or that P does not imply Q, and we have to believe him). Thus, *non-sequiturs* become implications, and obvious inferences are forbidden. Words are played on; every doubtful area in meaning or truth is used as the playground, an opportune 'space' for sowing confusion.

He does not make nuances, he inverts the sense of words; in becomes out, out in. Things 'turn in on themselves' or 'over and against themselves'. Circular arguments are concealed in a dramatic cloud of intriguing phrases, which however serve to put over a scattered few crucial 'terms' (which tacitly imply certain propositions), to insert them as accepted fact into the reader's consciousness. Paradoxical statements and self-contradictions are made unabashedly, as if their very antinomy is proof of their profundity and relevance.

Ultimately, for Foucault, propositions need not be assertoric; they may be posited, and then negated, both true and false, or considered established and then as possibly not possible ('it is so… *but* it is or may be *not* so'). It is sufficient that they convey certain catch words or phrases, which give an impression of broad knowledge and deep wisdom. His sophism works, precisely because it seems 'consistent' with

itself; it is so pervasive, that he has actually said nothing, so that one may not argue with him.

The theories of others that he presents, in the course of his digressions, are never his point. They are not illustrations of a thesis of his own, but mere vehicles for the transmission of this fuzzy methodology, which is his real message, as he himself admits. The historical events and ideas that he describes for us, serve only to draw and keep our attention, because they are in themselves interesting. But for him, they are only occasions, allowing him to intersperse his own peculiar outlook and terminologies as alleged explicata. They serve to give his interpolations a veneer of reflected legitimacy.

2. Catch Him

By ‘archeology’, Foucault generally refers to a study of the methodological assumptions at least tacit in the thinking of different cultures and ages. On the surface, it seems reasonable enough to suppose that people, in each place and period of history will display some particular emphases in their ways of thought, which can be identified as an epistemological framework, underlying their whole cultural context. But such patterns are of course only discernible *ex-post-facto*; they are not predictable.

For a start, Foucault does not clearly distinguish between the epistemological practices common to all the people of a defined group, and their own theories concerning these practices, and our own estimates of what these practices and theories might be; there is always a vagueness and ambivalence in that issue, which is rhetorically useful (as already indicated).

But, as it turns out, the method he explicitly proposes allows for such lapses. He is not appealing to ordinary scientific methods, to common logic, but to the so-called Critical/Transcendental method, which was inaugurated by Immanuel Kant (Prussia, 1724-1804). Foucault frankly admits use of this form of argument, though he also claims to be using it with other contents, other terms. According to this method, the 'critical philosopher' can somehow 'transcend' the mind's structural limitations, and make unassailable judgments from above, 'as it were'.

Here, let me say that such argument is an 'imposture' from the point of view of pure logic. It is an attempt to introduce a *deus ex machina* into epistemological discussions. The philosopher becomes a privileged human being, capable in some untold way to become a 'superman', to use a Nietzschean phrase dear to Foucault. This is not logic — it is non-logic, even anti-logic. It has never been validated by the norms of logic, as a form of reasoning.

You cannot at once claim that a Subject is locked into his specificity and finitude, and at the same time capable of acts

of consciousness which rise above and overcome these given limits. The two theses are strictly contradictory; there is *formally* no room for doubts and speculations about a paradoxical credibility in between them (Law of the Excluded Middle). We do not have here a dialectic of 'thesis implies antithesis, therefore the latter is their synthesis', which is the definition of valid 'self-evidence' arguments in logic. The proposed argument is in no way proved necessary by dialectic; on the contrary, dialectic proves it impossible.

If the Subject says 'I see (from above, allegedly) that my consciousness is limited in distortive ways', as do Foucault and Kant, he is automatically de-legitimizing his very own statement (an assertoric cannot imply its own negation, nor, even, *imply* its own negation to be possible). This means, in formal logic, that the proposition in question is false; a conceptual claim which is logically *self-incapacitating* is simply incapacitated, it is alethically impossible and not worthy of any further consideration. Yet, these people continue to try to evade this absolute law for the resolution of paradox.

Foucault claims that the Kantian 'method' marked a radically new stage in epistemological history. I agree that arguments of this sort have since Kant received considerable 'prestige and importance'; but I do not agree that they are indubitable, quite the contrary, they are entirely spurious. Their credibility is due to the paradox which negates them, rather than to the existence of a paradox which posits them; they are not self-

evident, or even possible, they are self-rejecting, logically impossible.

This is not a 'radically different' 'configuration of science' as he suggests (nor are the findings and theories of Ricardo, Cuvier and Bopp, formal examples of such an 'other' science); it is illogical and it is therefore not knowledge (366). Foucault's alleged transcendence of language is not a sort of mystical state of silent meditation on the noumenal, but an alienation from even ordinary reality. Perhaps he is describing his own peculiar relation to words and things, but it is not a relation I personally recognize in me, and so it cannot be universal.

This peculiar method is contrasted to the Classical/Scientific method, which Foucault rejects as naive, half-witted and tiny-minded. He claims the change 'irreversible'; but, I say, *surely, criticism, too, can be criticized, it is not itself alone above criticism, the exclusive domain of those who are for it*. I agree, however, that the Kantian method was a radical break from the Classical — in my view, an unfortunate break. The 'second degree' of language, the language of science, is simply a clarification of ordinary language, a selection and re-affirmation of its most intelligent potentials; it is not something essentially different than ordinary language, and (*a-fortiori*) nor can the critical method be so construed.

In any case, it would be untrue, historically, to say, as Foucault does, that either the Classical method or the Kantian is exclusively representative of the *episteme* of its cultural

era. Surely, that is hyperbole. Is he referring to university professors, to the scientific community, to intellectuals or to the whole population, of all ages and intelligence, socio-economic milieu, educational level, ethnicity? The indefinition in the subject of his propositions allows him to turn particular ones into universal ones.

But what is clear throughout is that Foucault does not properly understand the scientific *episteme* (any more than Kant did, incidentally). His knowledge of logic is limited to actual-categorical propositions and processes, which are used to construct simple classification 'tables' — drawings which display the similarities and differences of things. This is only one of the tools of scientific logic, and not its *whole* method (thinkers may use a technique long before they become aware that they were using it).

Foucault does not know modal logic, conditional logic of various de re modal bases, causality, or the inductive and deductive capacities of logical conditioning. Class-logic clearly brings out the perpendicularity between the space of objects (subsumed by classes) and that of ideas (classes or classes of classes). When evaluating the content of a thesis, we are duty bound to consider the methods used in formulating it. He borrows terms like 'validation' from logic (which are meaningful to us, only because of their value within logic), and reverses their meanings. He says that certain '…laws of fluctuation and change… cannot be fitted

over natural laws', as if formal logic cannot handle transitive relations.

Our movements of thought always display certain patterns, whether philosophers and historians are yet aware of them or not; changes in logical science may effect changes in the frequency and concentration of our use of these thought processes, but not invent them — their discovery implies that they were there already, because it is only possible by an act of self-consciousness. Foucault's use of phrases like 'partial totalities' (he means 'contexts thought to be total, then found partial', to be exact) or 'thoughts that we cannot think' (when he should say 'things we cannot think of' — which is less dramatic, but more accurate), prevents him from developing a healthy outlook.

Because he lacks this logical training, he imagines that Science consists only of simple tables, and he is always very surprised to discover, in history, events or ideas which do not fit this narrow model. For this reason, he sees the logic of science as flawed, and tries to find some alternative 'logic' which will somehow (he never asks or says just how) resolve the difficulties of epistemology. But it is a red herring, this Classical science of his imagination; it is not a correct image of real science, at any point in time or place.

His arguments do not therefore concern the human mind as it in fact functions; they are irrelevant. His so-called 'archeology' is neither omniscient nor infallible. It is of course conceivable that different people *effectively, if not*

self-consciously, use different epistemological frameworks; but I very much doubt that Foucault has correctly identified the uniformities characteristic of the historical cultures under consideration. He tries to give the impression that his historical thinking is novel and profound, concerning an additional dimension of time; but none of the evidence he adduces for such an in-depth, into-man line of aseity inductively implies such a conclusion.

While Descartes was predominantly a rationalist, Hume was more of an empiricist, and other people were other things. In every period, there is perhaps a bell-shaped curve, with a multitude of tendencies, though some are more probable for a given time and place. There are shifts in emphasis, perhaps some quick movements or quantum leaps from curve to curve, but there are no 'revolutions' in a strict sense of profound discontinuities. Foucault keeps insisting on them, but he fails to convince (me, at least).

A distinction cannot be transformed at will into a radical difference. Logic, scientific epistemology, have always, since Aristotle at least, sought for timeless generalities about the human means of knowledge. Such a universal science acknowledges freely that different people, at different times in their lives, as well as in different societies and epochs, may use an arsenal of logical techniques which are incomplete or even fallacious.

The logical philosopher has two tasks: to observe the human thought potential and to validate it. That valid potentials are

not in all cases actualized, or that invalid potentials are all too often actualized, in no way affects the universality of the logician's findings, for they exist in a modal framework. It is modality which allows the reconciliation between the finitude and specificity of the thinker, and his ability to formulate apodictic statements which are both empirical and rational.

Since logic is able to validate itself very well, thank you, there is no need for a 'transcendental' non-logic; the 'critique' is a redundancy, it has no problem to solve (let alone whether it is capable of offering a credible solution). The Kantian method, and Foucault's applications, are not exempt from the inductive and deductive conditions set by logic; and it does not matter how we characterize the meaningfulness of words.

It must be admitted, however (and this is the faint shining of credibility that the transcendental method has behind it), that there *is* in fact a 'movement of thought', which consists in 'going above or under' or 'taking a step back or aside' from the situation at hand. And this ability of the Subject to withdraw from a context and conceive of a wider context, is of course perfectly possible and legitimate as a logical act. What Kant achieved, is to remind philosophers to take this distance repeatedly, so as to ensure an overall consistency at all levels. The trouble is, Kant wrongly defined the formal aspect of this movement of thought, as a sort of paradox. It is this interpretation of the event by Kant, which is at issue.

Hegel and Marx were of course among those who adopted this interpretation, misunderstanding the psychology of synthesis. One of the more interesting statements in Foucault's book (which shows that good insight can sometimes come out of a bad method, though I do not agree with it all), is the following; I see it as an attempt at poetic description of the consciousness relation between Subject and Object, which is of course so unique as a universal that it is indefinable:

> It is no longer their identity that beings manifest in representation, but the external relation they establish with the human being. The latter, with his own being, with his power to present himself with representations, arises in a space hollowed out by living beings, objects of exchange, and words, when, abandoning representation, which had been their natural site hitherto, they withdraw into the depths of things and roll up upon themselves in accordance with the laws of life, production and language (313).

At a couple of points, to his credit, Foucault waxes romantic (whether sincerely or as a pose, I cannot tell) about the Same, thus suggesting that the ultimate goal of this sophistic self-contradiction dialectic is a Unity. At this point, he returns right back to Nicholas de Cusa's more theistic idea of the ultimate One. Indeed, this sort of Return, of which Foucault is conscious enough, and which makes him human, is also found in his theory of philology. At first, words were

understood as being deeply related to the universals in objects at some level; then they were conventionalized; but at the end, they return to a richer content and relation.

3. Healing

It should be noted that not all historians agree with Foucault's historiology or historiography. The *History of Philosophical Systems*[117], for instance, characterizes his Classical period as Early Modern, implying that Kant did not affect developments that radically (how could he? common-sense persists). Another 'deep chasm' Foucault proposes is that between the Classical period, and the Renaissance and Late Medieval.

According to him, this period was characterized by a frivolous concern with irrelevant relations of 'resemblance', *regarding labels of things as real symptoms of them, and all hearsay or text concerning them as in a sense true and significant*. This epistemology, confusing the sign *for* something (an *accidens*), which is a word, and the sign *of* something, which is a real aspect or effect of the object (an *incidens*) — this is claimed by Foucault to be the overriding

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[117] *A History of Philosophical Systems*. Ed. Vergilius Ferm. 1950. Paterson, N.J.: Littlefield, Adams; 1961.

episteme of the Pre-Classical period in Europe. Note well Foucault's own confusions in the logic of 'semiology'.

That proposition might seem conceivable, but further reflection puts it in doubt. Had people lived *only* by that philosophy, would they have been able to function at all? Surely, ordinary people of all classes were doing some valid observation and reasoning, in their everyday lives. In that case, the Renaissance would only be less rigorous in logic than the Classical period, and not wholly different in some big, earth-shattering way. Formal logic is not affected by such changes; it indeed requires that we make a clear effort to distinguish between imaginary, intimate phenomena, *noetic* projections, and seemingly external, independent and physical ones.

It is true that, as Wittgenstein objected, the relation of indication (pointing to something, and saying I mean 'this') underlying all verbalization is itself a vague act; but context-changes gradually sort and purify such primitive ideas of their possible ambiguities and equivocations, until there can be no mistaking what one is pointing to. Nothing in this act previews the strength of signifying relation involved, whether it is the vocalization or diagram of an insight into real universals, or a merely conventional equation. Modal logic allows for a range of word-thing relations at our disposal.

Even today, we continue to have bumbling 'Don Quixotes' who confuse their fantasies with reality; nothing has changed much. What of Sartre's distress at his role-play of models of

behavior he himself constructed? What of the power of today's media (novels, movies, TV, video) to produce role models? There is essentially nothing methodologically criticizable with drawing water from the traditional wells of wisdom. Is Foucault himself not engaging in 'commentary' and 'exegesis' (though with regard to other, less ancient sources), even as he writes that very book of his?

The Classical concept of semiology, as 'representation' of one *idea* by another *idea* (according to the *Port-Royal* definition Foucault mentions; and equally in the work of Bacon, Locke, Hume, Berkeley, and Descartes) was of course also flawed, though in a different way than the Renaissance way. The formal definition of signification is, the relation between an image or conventional symbol and an apparent *object*, whatever that relation (or its object) might happen to be essentially. Foucault fails to clearly analyze the term 'representation'; now he takes it as neutral, now as pictorial, now as pure label, oscillating as convenient (to his theories) between these various senses.

In any case, again, Foucault's presentation of facts is contradicted by those by other historians. The examples he focuses on in support of his case are not necessarily, just because he thinks so, *the most illustrious, most typical or most numerous*. Hamlyn[118], for instance, mentions as among the most significant of that period, Nicholas de Cusa (1401-

[118] Hamlyn, D.W. *A History of Western Philosophy.* 1987. London: Penguin, 1988.

64, rather early perhaps), Giordano Bruno (1548-1600, an important figure, a precursor of Phenomenology, who discussed the aspect of 'intentionality' in consciousness), Galileo (1564-1642, a founding-father of modern science, mind you), and Francis Bacon (1561-1626, a great logician and philosopher, who clarified the inductive process of focusing on the elimination of hypotheses contrary to experience, rather than on the confirmation of hypotheses).

Furthermore, Foucault's method is flawed, because he refers to a very limited time and place, Europe in the last few centuries. He does not consider other periods of history or other strata of the societies in question or other peoples and cultures. His empirical sample is thus very limited, and he makes hasty particularizations and generalizations, and that is why his research is so distorting. A sophistic method applied to arbitrarily selective data.

Many epistemic and epistemological threads appearing even today are well known to have roots in deep antiquity. Had Foucault considered them, he could not claim what he describes to be novel and fundamental. Even the philologies, biologies, and theories of political economy he (very ably) describes (and prescribes) for us, have some evident roots. In a sense, we can say that Astrology and Alchemy are early forms of Astronomy and Chemistry; that the changes in methodology and subject-matter and doctrine, intended by these name changes, expressed a difference of degree, however large, rather than a total upheaval.

Just because ‘natural historians’ were concerned with more concrete, superficial, and spatial aspects of living beings, whereas later a more anatomical, functional and abstract science of the phenomena we call ‘life’ was reached by ‘biologists’, does not mean that a basic change of consciousness occurred. The visible at the surface and the visible below the surface are both concrete, and all science is to some degree abstract, anyway. Aristotle’s work in this field should have sufficed to make Foucault see that the name change was not *so* significant.

The discovery of grammatical inflection as a tool for the comparative study of languages, in no way logically implies that similarities and differences in words and meanings are no longer relevant to that study. Foucault suggests to us that this event somehow changed everything, so that ‘general grammar’ was replaced by ‘philology’. Just as he implies that ‘general grammar’ earlier displaced the Hebraic model of semiology (which admittedly Nicholas de Cusa subscribed to, indirectly at least).

Rather, I would say, the Enlightenment equivocations in the word ‘representation’, its ambiguity as ‘idea’ *versus* ‘object’, caused a lot of havoc in philosophy, with Kant as a failed attempt to redress the duality. The grammatical inflections — declension of nouns and pronouns, conjugation of verbs,

comparatives and superlatives[119] — are merely, from the point of view of advanced logic, condensed propositions, abbreviated signals of statable relational forms. Foucault does not seem to be aware that the modalities of terms and copula are always proportional, whatever their type or category.

Similarly, nothing in logical science excludes that classifications be made on the basis of more complex and abstract relations than simple comparison and contrast of any degree. Nor does logical science make a great formal distinction between more concrete and more abstract contents. Class-logic allows of subsumptions on the basis any type of de re or logical relation, actual or modal, subsumptive or transitive, categorical or conditional in any respect. It is clear that Foucault does not know these things; he only mentions the extensional mode (even the logical mode seems beyond him).

For these reasons, the modern interest in functions of organ-systems (a return, note in passing, to purposive relations) and evolution of species (just a collection of changes) simply refers to causal or teleological logic. These processes in no way necessitate a 'new logic', as Foucault claims so vehemently; they are a formal outgrowth of traditional elementary logic. Likewise, the concepts of labor and

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[119] *The Living Webster Encyclopedic Dictionary of the English Language*. Chicago: English Language Institute of America, 1977. (p. xix.)

production do not displace traditional concepts of economics, since nothing in their logics is that different.

I repeat what I argued in my book *Future Logic*: none of the developments in philology (using the term in a neutral, open sense) in the past few centuries of Western thought in fact, formally speaking, at all undermined the premises and conclusions of Judaic philology. That is clear to me, and Foucault's arguments to the contrary have not succeeded in convincing me otherwise; they are mere sophistries. I do not imply that they are calculated; I simply state a fact from the point of view of pure logic.

My feeling toward Foucault, who is evidently a brilliant writer, is sadness that such a potentially fine mind could have become so mixed up, frankly-speaking. Every writer of theories is saying something about himself, 'where he is at', in the way of a subtext. As European society became secularized (in some cases, atheistic), it sought other unifying principles like 'Nature', and then 'History', to replace the loss of 'Providence'. Foucault is an end product of this march into a sort of alienation from reality, or madness, and his implied cries of despair in the last pages, when the masks of cunning intelligence are unveiled, and the lame imitations of Friedrich Nietzsche's jolly iconoclasm peter out, are touching.

Still, such a book as the one we have here reviewed is inexcusable. It is not philosophy, the serious study of reality and knowledge; it is 'philosophism', an impish love of

mischief. If any revolution is needed in philosophy, it is surely one away from such tendencies (if such a miracle is possible). The educational system ought to cease giving credence to such diversions; they waste humanity's time. The philosopher must be more self-critical and have a stronger commitment to finding a reasonable and empirically based philosophy.

13. COMMENTS ON 3 CHAPTERS OF FOUCAULT

Comments (written in 1990) on the first three chapters of Michel Foucault's The Order of Things. An Archeology of the Human Sciences. *(1966. New York: Vintage, 1973.)*

1. *Las Meninas*

Apparently, a rather longwinded demonstration, with reference to a painting by Velazquez, that real things, events and relationships are infinitely complex, and capable of interminable verbal description. Whereas, once proper names are introduced, the inherent pregnancy and polyvalence of the original is effectively abandoned.

But, of course, it need not be so. The names do not in themselves arrest further description; they are exact parameters, but all the ambiguities beyond them are still operative, and still open to discourse. Nor, as Foucault admits, does the 'infinity of the task' allow us to infer that 'words are imperfect.'

2. *The Prose of the World*

An interesting analysis of the way the world was thought, until the end of the 16th century, in Western culture, at least according to Foucault. This refers supposedly to the Medieval Christian and Renaissance cultures. He considers that this period shows a distinct epistemological framework, in comparison to the more ancient Graeco-Roman cultures.

This new 'logic' (let us say) centered on an (to our eyes) extravagant concept of 'resemblance' (which later became more refined and stringent, in the 'Classical Age' of the 17th century and on). I am not sure of the correctness of this perception: neither that there was a historical discontinuity, nor that 'resemblance' was so universally understood by the pre-Classicals in quite the way Foucault posits. His interpretation of events is, to be frank, a bit simplistic.

Foucault: Four main kinds of 'resemblance' were claimed. Things may be adjacent in place or time, 'convenient' (proximate); they may be mirror-images of each other, 'emulate' (or imitate) one another; they may be more abstractly and remotely similar, 'analogous'; or they may be 'sympathetic,' one tending to become more like the other—though such change toward identity and singularity is held back by an opposing force of 'antipathy.'

I say: It is especially the last principle which is at stake. The ideas of Sympathy and Antipathy were perhaps a physical theory (natural science). The 'infinite reflection of the Object, even into words, or other shapes and sounds,' idea is tenable, and has some truth. It may be that a large number of writers used this methodology to excess, I am not contesting that. So another interpretation of events, than that offered by Foucault is perfectly feasible.

Even today, the idea of affinity plays some role in our thinking. Does not the butterfly look like the flower? Do not husband and wife often come to strikingly resemble each other over time? The idea of evolution of species by natural selection and adaptation surely contains echoes of this: a process tending to certain uniformities. Modern Chemistry appeals to ideas of attraction and repulsion, to explain chemical compositions.

Foucault: These resemblances were knowable by reference to more or less hidden 'signs,' which were themselves resemblances of sorts. Thus, for instance, the medical value of walnuts was suggested by the similarity in shape these fruits have to the human skull and brain. Since the semiological relation was essentially one of similitude, the epistemology of that period was much less restrictive than our own.

This writer: I am not sure that the method of looking for signs (themselves resemblances) can 'archeologically'-speaking be regarded as the overriding methodology of the period. People

were still perceiving, they still had senses, they still conceived abstractions as we do; they still referred to logic, and were already cognizant with the Ancient works on the subject, including the *Organon*. It would not be accurate to characterize the 16th-century-or-earlier epistemology as exclusively focused on concepts of Sympathetics origin.

Foucault: Anything to do with an object of study, however incidentally or accidentally, was equally significant. Magic and divination were accepted as on the same level as erudition, and ancient texts and commentaries thereon were as relevant as direct observation and independent reasoning. Words about something were part of that thing, and therefore their repetition constituted knowledge, as 'objective' as any other.

Self: The facts presented here are quite conceivable, though I tend to be skeptical that they were historically as widespread as Foucault suggests. In any case, he quite rightly points to the Judaic roots of this indiscriminate methodology. But it would be unfair to squarely blame these developments on Biblical beliefs. Extrapolations were made by certain (let us say) Christian thinkers; but these extensions were not conversant with the traditional parameters of applicability, or chose to ignore them. Thus, Jewish logic can in no wise be blamed for these developments, to the extent that they occurred.

It is true that, according to traditional Jewish philology, the world was created through (a primeval version of) Hebrew,

which language therefore reflected, in its sounds and shapes, the essences of the things it referred to. However, according to that same tradition, this strong relation between sign and signified has been considerably diluted and distorted since the Babel incident, so that inferences are only possible within very strict limits, known to only a few Sages.

Mediaeval Christian attempts to hang on to a methodology that was no longer so applicable (to the untrained user), and especially not to post-Babel languages (even though they retain reflections of the glory of the Holy Tongue), were therefore unjustified within the framework of the doctrines they claimed to echo. Judaism certainly never intended to foster superstition or 'blind faith' in ancient philosophers, quite the contrary. The World was created by God as an act of mercy, of love; it is essentially a benevolent, beautiful place, with a great potential for dignity and decency.

Further on, Foucault suggests that, as of the Renaissance, the written word acquired predominance over the spoken. That is doubtless true, what with the advent of printing and the spread of literacy. He is attempting to show that the written word made a quantum leap, at about the same time as the Sympathetic methodology reached its peak. Okay, but there was not such a sharp distinction as he is trying to imply. In that case, so what? There were shifts in emphasis, there always are; the overall cognitive process is in essence the same, with in it the seeds of many alternative expressions.

In any case, Foucault's statement that 'the Law was entrusted to the Tablets, not to men's memories' is inaccurate, from the Jewish point of view. For Jews, the oral transmission was always as weighty as the written one, if not more so (in the sense that those who lack the oral, cannot fully understand the scriptural). The relatively modern concentration on written texts must be viewed rather as resulting from a gradual breakdown in the social cohesion necessary for oral traditions; study became a more individual activity, and therefore one more dependent on the written word.

Lastly, Foucault points out that the assumption that words and things are related by virtue of 'resembling' each other began in the 17th century to be displaced. The relation gradually became more tenuous and arbitrary; though this tendency, he claims, has been somewhat prevented from excesses thanks to modern 'literature.' In my view, this 'symbolization of symbols' was a positive development in itself, though one which could be misinterpreted, and indeed has been by some.

Although modern language cannot claim an intrinsic power of representation of reality, it still depends for its meaningfulness on perceived, conceived or assumed distinct similarities between the objects it refers to. The sound and shape of the word is arbitrary and what we choose to attach it to is our prerogative; but the word remains meaningless if we are not agreed-upon using it to refer to some objective individual entity, or group of entities with distinctive

common factors. Comparison and contrast remains the foundation of conceptual knowledge.

Thus, Professor Foucault is tending to over-generalize; he speaks in flourishes, *sans l'extrême rigueur de pensée qu'il se doit d'après ses propres arguments.* The relation between words and things, or knowledge and reality, was not understood by the pre-Classicals as simply as Foucault implies. It is not accurate to suggest that 'resemblance' (in the indiscriminate sense above described) characterized their *episteme* so thoroughly; there were other points of reference too. For instance, causality is not mentioned by Foucault in this context; yet, Aristotelian influence did exist at the time.

3. *Representing*

By this term, Foucault formally intends the 'semiological' relation between a sign and its object. He claims that this relation had something to do with 'resemblance', prior to the 17th century and on; at which time a stricter version of similitude was adopted, the method of discriminate identification. This method, of cautious analysis of identities and differences, as suggested by the likes of Descartes and Hume (though with different emphases), was a new *episteme*.

Thus, in Foucault's intent, 'representing' is a neutral general term for the sign-object relation, however any period may believe that this relation is specifically established. It simply means 'taking the place of' or 'standing in for', without implying a re-presentation, in the sense of a similitude, between sign and object.

In any case, Foucault has confused the 'sign' in the sense of the walnut's shape being a sign *of* its medical qualities, with the 'sign' in the sense that a word is a sign *for* its object. The of/for difference in preposition is important; it makes two words out of the one, the noun 'sign'. Pre-Classical thinkers may have subscribed to the walnut-interpretation method, but it does not follow that this in any way modified the sign-object relation.

They were just accepting another kind of object, or phenomenon, which we no longer rely on so seriously; the 'archeologically'-implied relation of signification was unaffected. Foucault himself formally admits the perils of 'establishing discontinuities' particularly in the history of thought. Yet, the content of his thesis is replete with such 'arbitrary division'.

Thus, he characterizes pre-Classical thought as justified by the sum total of its parts, whereas the Classical 'exhaustive census' gave rise to 'absolutely certain knowledge.' Both of these characterizations are exaggerations. The two periods are not distinguishable with reference to these characteristics,

because both of them involved both contextuality and enumeration to some extent.

Astrology and alchemy imply a looser, more poetic methodology; astronomy and chemistry, a more precise and mathematical logic. With regard to the 'representing' relation, which others have called more broadly 'signification,' it existed prior to science as well as in science. The difference between the two periods is this: the former was not as conscious of identities and differences as the latter; and the latter relied on 'resemblance' as much as the former, though in a more cautious and thoughtful manner.

Foucault presents Don Quixote as the first modern character of literature, as well as the last hanger-on to the methodology of consulting texts for an externally suggested world-view and behavior-pattern. He is depicted as formatting his thought and action, in slavish accord with the ideas and examples of ancients, and rejecting as unreal, as magic, any personal insights or perceptions which disagree with his loyalties. He is bound by resemblance to mythical characters and events; he reads nature through books, discarding independent epistemology or conscience.

Thus, Don Quixote suffers from a sort of insanity, an alienation into imagination and analogy. His fiction becomes a reality, when his early adventures are in turn published in book form while he is yet alive. We learn from this that language 'now possesses new powers.' In my view, all this is, again, exaggeration. Everyone relies to some extent on

received knowledge, from previous generations or others in one's generation; everyone's behavior is to some extent influenced by other people, whether in writing, by speech, or by example.

It would therefore be unfair to characterize Don Quixote, or the *episteme* and period he represents, as peculiarly dependent and bumbling. He seems like a piously fanatic fool to our eyes; but who knows the inner development he was going through. Think for instance of the mediaeval churchman (Frollo, the cathedral's archdeacon) in Victor Hugo's *Notre Dame de Paris*. He is painted much more sympathetically, as a madly impassioned searcher; and he emerges as a credible construct (though ultimately tragic, destructive). Foucault has focused on just one possible characterization.

Furthermore, modern man is no less involved, in his own way. We all have our authorities, our points of reference, our trials and errors, our imaginations, our boundaries. That fact in itself does not disqualify someone; the only issue is how wisely we absorb others' contributions and handle our finitudes, how consciously and selectively. People vary in intelligence or virtues; some make more mistakes than others. Every period has its achievements, and its limits. But nothing has changed, the epistemological background is the same; we are all to some extent Don Quixotes.

I mean, just look at the power exercised by today's media—novels, movies and T.V. Their whole *raison d'être* is

producing role models, and it is no accident that actors are referred to as 'idols.' To suggest, as Foucault does, that we have become free of such dependencies is gross inaccuracy. Consider Jean-Paul Sartre's distress at the difficulty of spontaneity; a modern man, locked in a self-made prison of role-play. Sartre simply replaced traditional models with one of his own fancy; but the art of natural behavior still eluded him.

There is nothing intrinsically wrong in referring to tradition. The 'wisdom of the ancients' is neither proven nor disqualified by its antiquity. Many of the speculations of ancient philosophers are still of interest to us today; not merely as historical opinions, but because they continue to enrich and stimulate our thought. 'Authority' is often well earned. Scholarship did not suddenly die; and the proof is afforded by Foucault's own research into past thought. As Anatole France suggested:

> Any expression of an abstract idea can only be an allegory. By an odd fate, the very metaphysicians who think to escape the world of appearance are constrained to live perpetually in allegory. A sorry sort of poets, they attack the colors of the ancient fables, and are themselves but collectors of fables. Their output is mythology, an anemic mythology without body or blood. (Bentwich, 345.)

I am not trying to play down differences, but merely to put things in perspective. Let us continue. Foucault says, with

reference to the Classical period as of the 17th century: 'there can be no sign until there exists a *known* possibility of substitution between two *known* elements.' The subject-object relation is brought into the equation between sign and signified. Thus, he in effect perceives a shift from *de re* modality to the logical, *de dicta* mode.

Signs were no longer 'representative,' in the sense of microcosmic reflections of objects, but more frankly conventional. The 'resemblance' factor was relatively diminished in the relation of signification. A sign (read: word), henceforth, contained within itself a statement of its function as a sign, as well as a statement as to what it specifically referred to; but otherwise its relation to the object was man-made.

Fair enough, but I disagree with Foucault's analysis. The natural causality referred to, when for instance we take a cry as a 'sign' of a baby—this is still with us, even today; it was not abandoned in the Classical period, and nor was the belief that 'if no one were to perceive' things, they would be 'just as much *there*.' Similarly, it would be inaccurate to say that logical modality was absent from pre-Classical thinking processes (witness Maimonides' critique of the Arab Mu'tazilites school, for instance).

It is true that philosophers like Descartes, Leibniz, Bacon, Berkeley, Locke, Hume, discussed the 'connections of ideas.' This was an outcome of their analysis of sensory-perception as a physiological process terminating in the production of

mental images, called ideas. They did not see the paradox generated by this hypothesis, that if what we perceive are ideas, then how do we know of an object capable of producing them? It was an erroneous approach, which was only later corrected by a more Phenomenalist ordering of events.

But in any case, a distinction must be made between the methods professed by the philosophers of a certain period—their own understanding of what was going on in their milieu—and the methods actually used by human beings of the time, themselves included. The former belong to the history of explicit philosophy; the latter, more broadly to cultural history. These two processes are not always, if ever, at the same stage of development. Human methodology changes little, shifting in emphasis, but not in its essential components.

For these reasons, it seems to me that Foucault's suggestion that the semiological relation itself underwent a radical structural change is rather hyperbolic. The potential for words to serve as 'transparent and neutral' symbols coexisted with the more florid view of language as 'one of the figurations of the world'—certainly the former is found in Aristotle, at least. And as for applying 'one and the same name... indifferently to things that are not of the same nature'—it is an error we all still occasionally make.

Now, Foucault offers the following epistemic constructs, as characteristic of the new order. Instead of an emphasis on

'resemblance' (to ridiculous extremes), a more pondered observation of differences. Instead of far-fetched and vague analogies, 'complete enumeration' of cases and the elements in each case, with a more discriminating eye. Separation of historical and scientific research, so that the opinions of past authors are regarded with a more critical eye, if at all considered; they are no longer authorities, though they may remain contributors.

Science orders information either in the way of a *mathesis*, with reference to precise measurement of numbers or degrees; or at least in the way of a *taxonomia*, a more analytical ordering of data with reference to qualitative identities and differences. Additionally, the *genesis* of things and ideas must be considered; this is the chronological and epistemological aspect of science. The whole has to be empirical, yet imagination is also required to reconstitute an order.

The Rationalist/Empiricist divisions between Classical philosophers, then, reflect different emphases within that framework; but in any case, according to Foucault, both differ radically from the preceding period of 'divination' methodologies, which made more comparisons than distinctions and failed to carefully observe the object itself before flying off into romantic associations.

However, Hume's comment on the pretensions of the new philosophers is *apropos*:

> Let the philosopher pride himself on his precision as much as he will... I nevertheless defy him to make a single step in his progress without the aid of resemblance.

Similarity (moderated by dissimilarity) was always, and continues to be, the basis of all conceptual knowledge. It is possible that the preceding period involved more imagination of resemblance than was justified, but it is impossible for the basic relations to change.

Formally, a word X is related to some pointed-to thing or group of things, by the statement 'X is a sign for this/these thing(s)'—this is how the relation of signification is defined, without any presuppositions as to the particular configurations of the thing(s) referred to, or the basis for their being grouped together. It is true, as Wittgenstein objected, that indication (pointing to something, saying 'I mean this') is itself a vague act; but context-changes gradually purify such ideas of possible ambiguities or equivocations.

The label may or may not itself contain other relations (like similarity of sound or shape) to its object; and putting a label on a group of objects does not guarantee that they possess a distinct commonalty other than the arbitrary label itself.

According to Foucault, the relation of signification became a component of the sign, instead of a copula linking sign and object. He claimed that 'no specific activity of consciousness can ever constitute a signification,' and inferred that signs changed from ternary organization to a binary one. But this

seems a forced, hair-splitting argument to me. It matters little whether we regard the copula as in or out of the sign-term, or its genesis as arbitrary or imposed by some resemblance between sign and signified. There is always a final implicit thought 'X is to be the sign for the indicated thing(s)'.

I am not at all convinced that the *Logique du Port-Royal* was introducing a novel sign-object relation. It states: 'The sign encloses two ideas, one the thing representing, the other the thing represented.' I do not see this definition as formally excluding the Renaissance interest in what makes possible 'to see in the first the mark of the second.' The Renaissance's specific answer to that question may have been fantasy-prone, but the question in any case remains operative.

Funnily enough, in my view, the Classical philosophers unwittingly created a new problem, by confusing things and ideas. The above *Port-Royal* definition is a case in point. The sign 'encloses' the *idea* of 'the thing represented,' they said; but in fact the sign is supposed to refer to 'the thing' itself, not to the idea of the thing. Whether a mental entity called an 'idea' stands between the label and its object is an open question. A broad, neutral definition cannot at the outset exclude a direct subject-object relation.

Ideas may exist, as memories of previous perceptual and conceptual acts, without implying that these acts require intermediaries. Ideas may be sometimes formed on the basis of imagined realignments of the mental images of some

concrete and/or abstract components of things; but it does not follow that they are always so formed.

I am not, of course, denying the great value of epistemological and philological contributions of the Enlightenment period, but merely to some extent disagreeing with Foucault's interpretations of these developments.

14. BOLZANO'S SEMANTICS CONCEPTS

This essay was developed in 2003 and 2005 from notes written in March 1998, after attending a lecture about Bernhard Bolzano (Bohemia, 1741-1848), a logician I'd never heard of at the time, given by Professors Barnes and Mulligan of Geneva University[120]*. I was disappointed by their seeming inability to unravel for their students the confusions in Bolzano's approach. Needless to say, I am here only concerned with specific proposed logic concepts of his, and do not intend any criticism of his mathematics or other writings.*

1. "Propositions-in-Themselves"

I would like to propose here a brief critique of Bolzano's concepts for semantics[121].

In common discourse, the term "proposition" is used in relation to an act of consciousness, which may or not be expressed in words – it is never used with reference to the object of such act, be that object real or imaginary.

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[120] Based on a reading of: A. Wedberg's *A History of Philosophy* (Oxford: Clarendon, 1984). Vol. 3, pp. 57-61.

[121] Which I believe Bolzano presented in 1837, in his *An Attempt at a New Presentation of Logic.*

The underlying object of a proposition, it should be stressed, is essentially *relational*. Categorical propositions concern relations between subjects and predicates (whether the latter concern attributes, actions, or any other category); hypothetical propositions concern those between prior propositions (categorical or otherwise); and so forth.

Bolzano takes off from the expressions "a proposition apprehended" or "a proposition uttered", to suggest a concept of "proposition" without any such specification (*tout-court*), or "proposition-in-itself", or again "objective proposition". However, to begin with, that leap is illicit: from the given concepts, we would only normally elicit a genus "proposition", and not a concept other than or beyond the given two, as he attempts to do here.

The concept he refers to, I submit, is none other than that of *the object* of the thought or spoken proposition, i.e. what it tells us. The situation he is considering is, quite simply, that of ***an object that has not yet been apprehended or thought, and which perhaps never will be.*** We can quite imagine such a situation, as there are objects we are conscious of today which we ignored yesterday, or that we are aware of but other people are not – and, in view of our cognitive and existential limitations, by extrapolation, we can well assume that there are objects none of us will ever get to apprehend.

We could, in the limit, refer to such objects as "**potential but unactualized propositions**". This is assuming that all objects are in principle *knowable*, which proposition is open to much

doubt or at any rate hard to demonstrate – but let us, for the sake of argument (as it is not the essence of the issue here), accept it as conceivable. Such doubt should dissuade us to apply the term "proposition" to objects of this sort (i.e. unknown objects); but in any event, we can in no wise omit to specify that such propositions are to be distinguished from *actual* propositions by being *merely* potential.

It follows that the term "propositions-in-themselves" is a misnomer. The correct term would be simply "propositions", provided we had *previously* clearly defined this term as including both actual propositions (thought or spoken) and potential-but-not-actual propositions. Propositions *so defined* are true if they are realistic (i.e., in common parlance, if they have a correspondent in reality – but, in a more scientific approach, roughly put, if in the given context of information they are best classified as thus), and they are false if their content is (or is found to be) merely imaginary.

Note also: one cannot discuss what Bolzano calls a "proposition-in-itself" without expressing it in thought or speech (witness his own definition of them as "assertions"). For this reason, too, the term he proposes is misleading: we might only, at best, accept the label "potential but not actual propositions".

Briefly put, then, *actual* propositions would be called true or false if they are real or imagin***ed***, respectively; whereas potential-but-not-actual propositions would be called true or false if they are real or imagin***able***, respectively. Thus, the

definition of truth is the same in both cases, but that of falsehood is slightly different: for actuals, it is actual imagination; whereas for merely-potentials, it is the mere potential of imagination.

Concerning the latter, it should be added that the existence of an object not yet encountered is *hypothetical*. It is an inductive extrapolation from our past cognitions, from the fact that in the course of our lives we have come to know new objects previously unknown, or that we know things others ignore or others claim to know things we ignore.

There is therefore no call for a varied terminology regarding truth and falsehood, as suggested by Bolzano[122]. No need to get into a deeper discussion regarding the concepts of truth and falsehood, here.[123]

With regard to the thesis by Bolzano (and others) that propositions are subdivided into terms (i.e. that ideas are parts of propositions), I will not here comment.[124]

In passing, let me mention my agreement that not all propositions are of the form "S is P". This form is reserved for the expression of a specific kind of relation, viz. the *classificatory* (broadly-speaking). A colloquial proposition like "it rains" attempts to express in such habitual form an event. More precise would be something like "Water is

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122 Or is it Wedberg? p. 59.

123 I refer you to my work, *Future Logic*, e.g. chapter 21.

124 See *Future logic*, e.g. p. 248, showing the impossibility in certain cases of such processes.

dripping or pouring down from the clouds in the sky". But the "it" involved may not be the sky, but simply the screen in front of our face in which the event of raining water occurs.

2. "Ideas-in-Themselves"

Turning now to Bolzano's treatment of "ideas" - the issues are very similar.

It is clear in the above that I am using the term "object" (which, in my view is best retained, without expanding the term "proposition" as suggested by Bolzano) as widely as possible.

Now, a proposition (in the normal sense, or a thought/spoken proposition in Bolzano) is *assertoric*, essentially in that it claims that the event or relation it expresses *really exists*. If, "in fact" (i.e. in the widest possible context of phenomenal knowledge) it does exist, the proposition is said to be true; otherwise, the event or relation it asserts is regarded to have been a mere product of the imagination, an illusion, and the proposition is said to be false.

Similarly for a term (or phrase), thought or spoken. It may refer to something "in fact" existing, or it may be a mere construct of the imagination. In the former case, it indeed has an object; in the latter case, it gives the illusion of having an

object, but doesn't. Thus, "ideas" (if we must use this tortured word) are like propositions exactly, in that they implicitly assert an existence, though they may in fact merely refer to a construct.

As we saw, a relational object, be it real (demonstrable) or imaginable, which has *not* been thought or uttered (in theory – though that is precisely what we are doing the moment we but mention it for the present discussion), cannot be called a "proposition" (and much less a "proposition-in-itself", implying it to be even more of a proposition than a merely actual proposition!). It is *sensu stricto* erroneous to call it that; at best (though preferably not), we might refer to it as a "potential but unactualized proposition".

Likewise, the object, real or imaginable, of an "idea" cannot properly be called an idea until a perceptual or conceptual cognition of the object actualizes as such. Here again, if we wanted to be very generous, we might refer to "potential but unactualized ideas", but certainly not to "ideas-in-themselves".

The proof that this proposal of Bolzano's is confusing and unacceptable is that it leads to a distinction (made by him) between an "idea-in-itself" and its "object"! Once the *verbal* difference is generated, a corresponding *material* difference is presumed, even though in fact the object of both these terms is one and the same.

The examples brought to bear by Bolzano are not convincing, but emerge from yet more confusions in his mind. He does

not realize that an empty class is a mental (imaginary) construct without demonstrable (real) referents. He does not understand that a general idea is not an "idea-in-itself" with many objects – but more simply a concept in relation to which all the objects referred to count as "one", due to their abstract commonalities.

Bolzano's expression "ideas-in-themselves" is as artificial and confusing a term as "propositions-in-themselves". It refers at best to "ideas" defined as including both actual ideas (i.e. which have been thought or spoken, rightly or wrongly) and potential but not actual ideas (which *could be* thought or spoken, rightly or wrongly, *but have not been*).

But to think of objects or constructs which have not been apprehended or uttered as "ideas", let alone "ideas-in-themselves", is not advisable. The danger being that of reification – once a term is introduced, it is taken to refer to something additional. This is exactly what happened with Bolzano: the idea-in-itself is thenceforth distinct from the object.

It should be added that the expression "having an object", which Bolzano uses, is ambiguous. All more or less meaningful terms, phrases or propositions have an object of sorts – but these objects are not epistemologically or ontologically always on the same plane.

Sometimes the object referred to is no more than a name or verbal construct; sometimes, it is a vague or clear mental image, a set of imagined sights and sounds. Sometimes, the

word refers us to a hypothetical entity within a complex scientific theory, a conceptual construct at different stages of validation; sometimes, the object is a perceptible or very well established material body. Thus, the "object" referred to could in fact be anything from a reality to an illusion, including all the intermediate statuses of appearance in between.

As our above clarification implies, "ideas" as Bolzano presents them are in fact *one and the same as* "objects" (in the wide sense including "real objects" and "imaginary constructs", of course), whether they come to mind or remain unknown. But Bolzano's hunt for examples to support his discriminative thesis diverts the discussion, raising issues regarding the statuses of empty classes and general classes.[125]

Empty classes, in my view, roughly put, are mental constructs based on conceptual manipulations (which may be based in whole or in part on perceptual rearrangements). They are indeed "ideas", but their objects are not "real objects" only at best "imaginary constructs". They are empty of objective content, though they emerge from some fantasy (and in this latter sense – alone – have a content of sorts).

In the case of concrete individuals or limited groups, the idea "refers to" or "means" certain objects. In the case of general classes, we suppose the idea-object relationship to be the same, though the object (a universal or an open-ended group)

[125] I refer you to the examples given by Wedberg in this context.

is more difficult to pinpoint and understand. They are supposed "abstractions"– projected common factors, based on our apparent capacity to measure the underlying units against each other.

But in any case, the distinction has no bearing on the issue of Bolzano's split between idea (in the large sense adopted for him) and object, because his discussion started with a broad concept of object such as to include *any type of* object. He was only concerned thus far with whether the object was thought/uttered *or not*.

He cannot now change the sense of his term, so that singular and plural objects acquire distinct properties in this respect! Indeed, rather he should have at this stage gone into the varieties in his use of the term object, distinguishing between those that are imaginary from those that are demonstrable, and so forth. All this goes to show that he got caught up in misleading categorizations.

Lastly note, Bolzano's consideration of compound terms (say, "XY" – e.g. "blue flower") as not propositions, and therefore neither true nor false, is also misleading. Terms, single or compound, are not *per se* true or false, but if they *imply* a proposition (such as "Xs exist" or "some things are Y" or "there are Xs that are Y") they suggest or presuppose some truth or falsehood. Note well: the proposition concerned may be true (as in the case of "some flowers are blue"), *or it may well be false* (as in the case of "some flowers are talkative").

3. The Issue of Time

Once we have understood what it is that Bolzano has in mind when he refers to "propositions-in-themselves", it is relatively easy to resolve his questions concerning their being in time or beyond time.

That *actual* propositions exist in time is not open to doubt, they come to be when they are thought (and occasionally, spoken) and cease to be when they are no longer thought (let alone spoken). This refers to the mode of existence we call actuality, specifically.

We may say that *in the mode of existence we call potentiality*, they existed *before* they were ever thought/spoken (else they would never have been), and also will exist *after* they are last thought/spoken, at least *so long as* it is still potential for anyone to think/speak them.

But in any case, this potential mode of existence is ***not*** an actual mode of existence. Similarly for propositions that are potential but have never been actualized. If our definition of timelessness is such that it refers to the existence of things in

the weaker mode of being that we call potentiality, then this is indeed "outside time".[126]

In other words, the issue raised by Bolzano is not specific to this area of discussion, but concerns *all* cases of "potentiality". The important thing is not to permit ourselves equivocations and confuse the terms "exists actually" and "exists potentially".[127]

The following may be added, regarding the temporality or timelessness of his "propositions in themselves".

Consider a proposition that is *not* actual (only potential) – i.e. which no one has wordlessly thought or explicitly formulated:

- Does it exist? Only, at best, potentially (by our premise).
- Did it begin to exist? Not yet, though it might one day become actual.
- Did it always exist? Only as a potential of the universe, since (by definition) it has not yet actualized.
- Is it "outside time" No, insofar as its existence is possible only *within* this universe.

Here again, then, Bolzano is misappropriating a concept. The issue of time raised here (as already pointed out) is applicable

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[126] But the concept can be criticized further - it is not the issue here, so I won't.

[127] For further discussion of this point, again see *Future Logic*, e.g. pp. 413-415.

not only to "propositions in themselves" (supposing that we at all grant the concept), but to all unactualized potentialities.

In my *Future Logic*[128], I show that we cannot regard such potentialities as 'casting an actual shadow' into the 'nature' of the thing, i.e. into some static essence; instead, we must regard potentiality as another, lighter form or degree of being. This, I may add, is not timelessness, since some potentialities are irretrievably *lost* anyway, i.e. there exists a phenomenon of 'loss of powers'[129].

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[128] See chapter 45.3 on Impermutability.

[129] The reverse phenomenon of 'acquisition of powers' could also be pointed to as an argument in favor of the idea that existence has degrees. Some potentialities are *more remote* than others, requiring more work to be brought into near actuality (readiness or immediate power) or into full actuality (actualization). This concept is usually applied to volitional contexts, but sometimes also more broadly.

Works by Avi Sion, to date

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All these works may be consulted on the Internet, at
www.TheLogician.net

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130 First published by author in Vancouver, B.C., 1990.
131 First published by author in Geneva, 1995.
132 First published by author in Geneva, 2003.
133 First published by author in Geneva, 1999. The first edition comprised only Phase I (Macroanalysis), whereas this edition also includes Phase II (Microanalysis).
134 First published by author in Geneva, earlier 2005.
135 First published by author in Geneva, earlier 2008.

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