NOTES ON LOGIC

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Analogy as a Logical Form

Scientists are used to blame analogies as a non-scientific way of reasoning, though analogy lies in the very foundation of science, which has been clear ever since Hegel's *Science of Logic*. V. I. Lenin even wrote that all the achievements of natural sciences should be attributed to analogy. However, Hegel distinguished two kinds of analogy, depending on whether the essential or superficial properties of things are compared; in the following, only analytical analogies were considered as "truly scientific", while "superficial" analogies were contemptuously dismissed. Since most analogies in the arts appear to be "superficial" in that categorization, art was thought of as a second-rate occupation incapable of providing true knowledge of the world and only fit to entertain. In Unism, the balance between science and art gets restored, since the two kinds of analogy are treated as complementary aspects of the integral view of the world, and neither of them can exist without its opposite. A closer examination of Hegel's treatment of the issue shows that the two levels of analogy he described should better be called "associative" and "inductive", and they may equally be either sound or superficial, depending on the current cultural context, rather than their logical function.

Truth vs. Opinion

Logic in general refers to the inner organization of people's activity, the way we act. However, subjectively, we often discover our logicality through explicit statements concerning the different aspects of our attitudes to the world and other people. Such judgements do not necessarily stress the logical side of activity; however, every single judgement necessarily contains a logical component as well. In this respect, any human activity at all can also be made into a logical form.

The hierarchical nature of human activity assumes a hierarchy of attitudes, with the corresponding levels of judgement. On the most basic, syncretic level, judgement takes the form of *opinion*, a very common type of immediate reflection closely intertwined with people's everyday life, their personal experience. On the next stage, reflection grows in a separate activity, detached from its cultural basis, the activity we reflect upon. One could consider that self-contained development of reflection as a cultural representation of the ideal side of consciousness; in this sense, this level could be referred to as *spirituality*. Of course, spirituality develops its inner hierarchy as well. The distinct (qualitatively different) levels of this hierarchy are not arbitrary, they reflect real cultural structures.

When opinions grow into people's spirituality, they retain their syncretic character, the inseparability from the common practical decision. Such decisions do not need any further justification; they become socially fixed as *beliefs*. However, on the level of spirituality, there is no more immediate practical background, and therefore assorted beliefs tend to support each other forming all kinds of conglomerates, complexes, constellations… Under certain social conditions, such organized beliefs can form the core of a religious system.

A more developed kind of spirituality is already aware of the difference between people's judgment and the actual ways of the world; this critical self-assessment could be characterized as *analytical reflection*, and its principal levels (stages of development) are known as *aesthetic*, *logical* and *ethic* judgment in the specific sense, currently institutionalized in art, science and philosophy as cultural

phenomena.

Aesthetic judgment usually takes the form of a (personal, subjective) *view*. Of course, the subjective character of a view does not mean that it belongs to a particular individual; there are different layers of the subject, including various groups, classes, nations or even the humanity as a whole, so that a collective entity may objectively play the role of an agent of activity and hence develop all kinds of collective judgements.

Views are not as rigid as beliefs; they can be intentionally combined or altered, thus allowing people to mentally try the available choices before it comes to a practical decision. However, this apparent arbitrariness is always limited and culturally bound, intrinsically depending on the historical circumstances and the fundamental trends of economic and social development. As people are not yet fully aware of what is yet to come, the arts may occasionally express quite unexpected ideas, thus becoming their first explicit formulation.

On the next level, in science, the very rules of developing views become interrelated and standardized; as soon as a view is culturally accepted as compliant with such formal criteria, it acquires the status of *truth*. Science is a huge machine for producing truths: it takes the products of all the other levels of reflection and puts them in the same methodological frame. In this sense, science is twice analytical: first, it makes us observe ourselves from a distance, and second, it opposes the ways of expression to the results of observation. As the accent is shifted from the content to its form, there is a risk of producing spurious truths devoid of any practical significance. It may seem that mere adherence to the scientific method is enough to come to a kind of knowledge; one cannot distinguish truth from delusion within science, one needs to always try formal results against the practical needs. In particular, the very scientific method cannot develop into a science and be true on its own. The norms of analytical reasoning are culturally depended, they depend on the current level of material production and the corresponding power of reflection. There are no “absolute” or “eternal” truths (just like there is no eternal beauty, or universal moral). Scientists pretend to go beyond mere opinions, and they are right as long as it concerns the difference between an individual opinion and a practically established procedure that can be taught and learned. However, in the hierarchy of the subject, this difference becomes relative: a scientific truth is normally a kind of *collective opinion*, but some individuals (or smaller groups) may be ahead of time (the current level of cultural development) and represent new modes of scientific judgement that are to eventually extend the already established paradigms. Scientific rigor is based on social acceptance (institutionalization) of certain modes of activity, which makes science much more conservative than art or philosophy. That is why scientific revolutions are usually more painful and often tragic.

Moving still higher in the hierarchy of reflection, people become aware of the origin of their views and truths and thus develop the ability to consciously control them, which takes the form of *conviction*, a kind of judgement considering the practical importance of anything, its historical scope, from its origin to the inevitable expiration. Convictions regulate the choice of other forms of reflection, as well as the transformation of abstract ideas into real activity. It is here that the very idea of a unique, all-comprising and integral world enters the minds; we try to abandon the primitive anthropocentric position in be honest with ourselves, admitting that the humanity is only a part of the infinite Universe, possibly not the best, but objectively necessary for the whole. This attitude could be called *ethical* in a wide sense, since it is concerned with the development of conscious behavior, incorporating all kinds of available regulators: moral norms, ideals, beauty and truth, ideological stand *etc*.

In the hierarchy of judgement, one cannot isolate one level from another. There is no sense in preferring one kind of reflection and despising the rest; they always go together and are readily convertible to each other. Breaking this integrity means spiritual degradation, inability of conscious attitude to the world and, as a consequence, impossibility of inner development. In this broken hierarchy, one form of judgement is undistinguishable from another, they all degrade to the most primitive state, with scientific truths becoming mere beliefs, or opinions. Normally, every individual act of judgment will stress a specific attitude, retaining the others in the background, ordered by their relevance to the topic in a hierarchical structure.

People's communication makes the partners compare their individual hierarchies of judgement and merge them into a synthetic whole that could serve as a common platform for joint activity. This does not always happen in an automatic manner; quite often, such personal pictures of the world require a special activity to reveal their intrinsic commonality determined by the partners' belonging to the same culture. A poorly cultivated person would fail to perceive the hierarchy of the other's attitudes, trying to plant one's own vision of the world in the other's head. This leads to tensions and conflicts that can be easily avoided provided everybody accepts mental diversity as an objective precondition for communication and learns to observe the apparent differences as superficial and formal, while the very fact of communication indicates that any individual positions are culturally comparable and present the complementary aspects of the whole.

Machine Logic vs. Human Logic

When people are compared to computers, one means either the excellence of the human mind over the primitive "mechanical" thinking, or, conversely, the poor efficiency of humans as compared to computers in many "intellectual" tasks. And one can hardly find a sober reflection of the very distinction of the two mental styles. Does the computer really differ from humans in their way of thinking? If it does, what is the difference? Is this difference a permanent feature or it will develop into something else in a while?

Machines are usually praised for their consistency, the ability to follow the pre-set rules of the game. In humans, such rigidity is almost impossible, we depend on our moods; we cannot concentrate on a single task, being engaged in many interfering activities. But the latter habit makes us more resistant to the pressure of circumstances, and human won't just "hang" in the heavy flood of service requests, as computers often do.

From the formal viewpoint, humans are very chaotic and uncertain. They do not even conform to a stochastic picture. The human history is replete with the attempts to establish some universal order, and the dramatic stories of its inevitable violation. Computers are more likely to be the law-abiding citizens of the perfect state; most humans would take such a state the worst ever dictatorship.

The principal difference between the two styles is in its primary direction. Computers are inner-bound, their "motivation" comes from inside and hence it can only follow the already existing models of behavior. Humans are essentially outer-bound; they have to follow the variations of the objective reality, obeying rather the laws of nature than any formal prescriptions. These two attitudes complement each other, and an outer-bound behavior is often necessary to initiate an inner-bound activity, while an inner-bound functioning can sometimes pose questions to an outer-bound mind.

The distinction in the logical orientation does not directly depend on the formal complexity of the problem. Very complicated tasks can be efficiently solved by machines, provided there is no need in additional considerations of anything beyond the current scope. On the contrary, the necessity to adapt to the "contradictory" demands from the outside may hang a computer in a relatively simple case.

We already know that the elements of the inner-bound logic can saturate the human activity in the conditions of relative historical stability. One could predict the appearance of the outer-bound logic in computers on a higher level of development, with the computer systems transforming into a kind of "computer society". For this new society, humans will serve as an inner-bound system producing standardized reactions to complete the objective motivation of conscious computers.

Logical Degeneration

In classical logic, we evaluate the truth of any statement by assigning it a logical value *true* or *false*. From the viewpoint of human activity, this is a special case of binary discrimination, which is one of the most common operations in human (and animal) perception. Thus, for an animal, when something

happens in the world, it is of vital importance to decide whether the event can be potentially dangerous, or potentially awarding, to take an appropriate action. Humans have more opportunities for decision, but, in real life, we do not evaluate anything just for the sake of evaluation; binary discrimination is always a preliminary stage for deciding what to do next.

In a more general case, we need to filter the situation through an *n*-slot scheme, selecting one of the predefined labels for a certain characteristic of an event, thus bringing it under the corresponding *category*. The operation of categorization lies in very core of human culture, and in the foundation of human thought. In particular, we often use categorization in the form of *measurement*.

In the stationary case, when the characteristic time of decision is much less than the typical duration of an event, *n*-slot categorization can be reduced to a sequence of acts of binary discrimination. This reduction does not necessarily reflect to logical organization of events, but it can model the real attempts to cope with a difficult problem step by step, subdividing it into tractable parts.

Unfortunately, the world does care much for our categorization schemes and moves on its own, so that many events cannot objectively be brought under a single category. For instance, several positions in the scheme are equally valid to characterize an event. In this case our categorization happens to be *degenerate*, and one could replace several slots (which are called *adjacent* in respect to this particular kind of degeneration) with a single slot, a higher level category. In more complex cases, all the positions in the scheme can describe the same event, and we have to introduce yet another scale to evaluate the degree of correspondence. The event is then represented as a distribution over the original categorization space, which thus becomes hierarchically organized.

The folded scheme can be unfolded back, provided the single entity occupying multiple positions is split into its separate aspects, or roles, depending on the positions occupied. That is, instead of folding our categorization scheme, we try to remove degeneration by reorganizing the objective situation itself considering it in more detail. Thus folding of categorical hierarchies corresponds to unfolding the hierarchy of activity, and the other way round.

Let us illustrate it with a simple example. The statement “His wife is better than his boss” is a typical case of binary discrimination. Given two possibilities (“better” and “no better”), we need to apply one of them to a scheme containing two logical positions (“wife” and “boss”). We can successfully apply this scheme to many individuals, and admit its universality. However, the scheme becomes degenerate, when one’s wife is also one’s boss. As a result, the statement cannot be said to be either true or false. One solution is to admit yet another logical value (higher level category) “neither true nor false” and fold our evaluation to a single slot. Conversely, the possibility of discrimination can be saved if we reformulated the original statement as “She is better as his wife, than as his boss”, effectively removing degeneration.

Of course, all the above is valid within the range of the scheme’s applicability. For instance, we cannot apply it to the individuals who have either no wife (which is quite possible) or no boss (which sounds a little bit fantastic). Also, there are many ways of degeneration, each requiring its own resolution. Thus, what is “better” in one respect can be “no better” in another. And the very idea of categorization becomes out of place when the positions or aspects of the situation change too fast to fix any momentary values; a different logic is needed in this case.

Subjective Logic

As any product, logical truth has two complementary aspects. Primarily, it refers to a class of objects with their natural properties, which are reflected in the subject and communicated to the others (that is, inside a higher-level, collective subject) in the form of objective statements that are deemed to be (objectively) true or false. On the other hand, any subject is not only passively reflecting the world, but also trying to reorganize it in some intentional action. That is, beside the image of the world, a conscious being will necessarily show some active attitude, which is related to the subjective side of any truth. Though subjective truth can also be communicated to the others in the form of apparently

verifiable statements, logical judgement is here directed by different criteria, expressing subjective attitudes rather than objective properties of things. A statement will be called true or false depending on whether it properly reflects the personal position or significantly distorts it.

While objective statements are said to be "true" or "false" on themselves, subjective truth always implies a particular subject (individual or collective , real or virtual). However, this difference is not as drastic as it may seem, and as it is often presented by some politically engaged scientists proclaiming the absolute independence of science of any social bias or economic interest. People don't live in the vacuum, and any personality is a product of the current cultural environment. This means that the inner organization of the subject is essentially objective, and the subjective attitudes do not come from nothing, they are virtually explainable on the basis of the objective cultural hierarchy. In this respect, subjective truth is much wider than mere personal opinion; it is an expression of a cultural regularity, which may act sometimes as an objective law. Conversely, the world is always reflected in the subject inasmuch it is involved in people's activity, and hence any object is not only material in the universal sense of the word, but also a matter of personal interest. The very selection of the object is a subjective act, nothing to say about the angle of view and the form of reflection. Objective and subjective logic are hence opposed to each other in a relative way, as a kind of duality rather than segregation. This requires yet another level of logic pertaining to the synthesis of the two poles; in this "productive" logic, truth is objective in the sense of a social necessity, while it is also subjective as a motive for individual activity.

However intricate, this hierarchical structure of truth has long since penetrated the ordinary language. We readily attach the labels 'true' and 'false' to anything we learn, combining all the three levels in a situational manner. The assessment of truth/falsity may refer to a true observation, true person, or true something (which may be a thing, a person, or both). In the latter sense, the word 'real' is also used. Within objective logic, the statement "They always lie, even when they're telling truth" is a contradiction; there is no conceptual problem for a hierarchical vision, admitting that somebody may intentionally lie, while telling truth in the objective sense. True lie is a quite normal occurrence in any culture, giving birth to the ambiguity of the phrase, both expressive and impressive.

Objective logic is the "logic of things"; one does not need to be too smart to guess that subjective logic is the logic of the subject. Using objective logic, we organize our "workbench"; subjective logic organizes our preferences, the selection of instruments and tools. We need both in every particular activity. To be logical, both in the objective and subjective sense, one needs consistency and integrity of action (including thought and feelings). Both kinds of logic apply to anything at all, they are equally universal. And both can be either meaningful, or formal.

For instance, the traditional idea of rationality includes some kind of "logical derivation", grounding our assumptions in the objective necessity. The stability of inter-object relations is due to the character of cultural development in a specific historical epoch: for quite a while, the humanity has to assimilate the already achieved modes of production, gradually accumulating experience and sound out the boundaries of applicability; then a qualitative leap puts us in a different cultural context, which also demands revolutionary changes in our formal schemes (from mere reformulation to an entirely new paradigm). Similarly, during the periods of relative stability, subjective logic becomes a kind of common sense, tradition, prejudice; conscious interference will break this formality to regain the universal flexibility of reason, in order to cope with the next (economic, social, or cultural) revolution; subjective formality then gives way to a creative approach, with its own logic. When the hierarchy of the human activity undergoes a revolutionary change, the very distinction between the object and the subject may need reassessment; in this way, objective and subjective logic penetrate each other and give birth to a new structure of logicality in general.

Formal Logic and Mathematics

Logic in general belongs to the synthetic level of reflection. No analytical study can cover all aspects of logicality. However, analysis is certainly useful for us to comprehend our logicality and

seek for its possible improvements. In real life, logic is incorporated in all branches of conscious activity, and this is its only real mode of existence. Analytical approach mentally separates logic from its manifestations, splitting the whole into many partial aspects, each of them, in its turn, being a kind of integrity, so that the process could be continued as long as needed. Of course this is nothing but an expression of the hierarchical nature of human activity, with its movable distinction between activities, actions and operations. In this way, we eventually come to the art of logic, the science of logic, and the philosophy of logic. Basically, art provides us with the raw material to further formalize in science in the lines of some philosophical categorization. This "objective" treatment of logic is quite possible and justified, since logic is objectively present in any culture, on any level of development. The diversity of practical cases may result in numerous complementary views of logic tending to unfold into self-contained disciplines. Such abstract representations are objectively necessary and quite valid, provided we do not forget about logic as a universal aspect of any activity at all. In other words, discussing a particular feature of something, we should not forget about that very something behind the scene, without which our considerations would be pointless.

Leaving aside, for a while, the artistic visions and philosophical teachings, let us ponder a little on the scientific side of logic commonly known as formal logic. From the very beginning we turn down the pretense of some scientists to the exclusive right of dealing with the subject; even less logic can be restricted to an individual scientific theory. Formal logic as a science (taken in a however wide sense) is not identical with the logic of science (including the science of logic). And, stressing it once again, formal logic is not indeed logic; it is merely the similarity of the name that leads to confusion. Though a scheme of a science can be elevated to the level of synthetic reflection and thus become applicable to people's activities as a part of their logic, this transformation is never inherent in the source science; it requires a special activity.

As science does not necessarily need to be institutionalized, formal logic too can penetrate all the levels of culture, from material production to the most sublime spirituality. We do not need a high school course to acquire outstanding skills in many everyday activities; though most of them admit formalized education, it is often an option, a matter of personal inclination, rather than an absolute necessity. Similarly, formal logic as a branch of science is a complement of the background usage, which does not render formal logic less scientific in character.

The full-fledged formal logic is a very peculiar branch of science, as it seems to have no real object and apply to anything at all. There is yet another science showing as wide universality, namely, mathematics. One is strongly tempted to identify the two, presenting them as a common foundation for scientific thought in general. Indeed, logical rules are readily representable by mathematical structures; and conversely, mathematics could be pictured as a reformulation of formal logic. Yet formal similarity does not mean identity. Who would serious contend that the smell of a rose is the same as electric current or market price levelling on the grounds of the standard diffusion law underlying these and many other phenomena? In any comparison, commonalities and distinctions are equally important. The great unification program somehow keeps glitchy, and there is yet no purely logical mathematics, and mathematical logic still does not (and will never) reflect all the aspects of formalization.

Intuitively, mathematics tells us how one thing is connected to another, in a most general sense. We admit that all the conceivable constructs co-exist in some huge formal domain, and all we need is to track the interdependencies and reveal formal similarities. However complex, this object area is deemed to be the same, so that the development of mathematics is to extend our acquaintance with its reign rather than the reign itself. Mathematical entities are essentially static; we can relate one entity to another, but we are not allowed to change them in the course of study. This vision can be expressed in a few words: mathematics is the science about structures. This readily explains the apparent ubiquity of mathematical methods, as structures are everywhere, and, in particular, any science is structured.

Formal logic is different. Its main purpose is to demonstrate how one structure can be obtained from another. What mathematics takes in simultaneity formal logic unfolds into a sequence. What mathematics pictures as mutually connected formal logic represents as a process of connecting one part to another through the work of some deductive machine. That is, we take some structure as input and produce another structure as the output following the rules incorporated in the derivation scheme. Obviously, this is a very general idea of a system. Formal logic can consequently be characterized as

the most general science about systems. This, of course, assumes the presence of all the components of a regular science, including the empirical level, theory and general methodology; the traditional term "systems theory" currently tends to refer to any of these levels, depending on the context.

Now, the ubiquity of formal logic quite understandable, as systems are everywhere. Any science is a system too, including mathematics, whose deductive schemes are often explicit and intentional. Moreover, it is the prevalence of the systemic aspect that gives science its dedicated place in the modern culture. Indeed, knowledge (the principal product of science) is for learning. Early science just sorts out facts and skills, theoretical science allows sharing the principles of processing, but in any case we are given a formal tool for decision making, a collection of useful recipes to pass from one person to another.

The mutuality of formal logic and mathematics thus gets a simple explanation, since any structure can be "serialized" (albeit assuming a nontrivial underlying structure), as well as any system can be decomposed into a structure (albeit built of systemic elements). Structures and systems are the different aspects of the same; so are mathematics and formal logic. The opposites look much like one another, just because they are opposites. In the philosophical language, they are said to be mutually reflected. However, they can never be reduced to each other; again, just because they are opposites.

In particular, the area of mathematical research known as mathematical logic has nothing to do with formal logic, and even less with logic as such. The product of such theories remains structural, static; it does not imply any immediate application. To suppress terminological liberty, one could call it somewhat else, rather than logic; the result does not depend on the nomenclature. Such "logics" can be most intricate and peculiar; still, most of these mental toys will never refer to any real activity, and even mathematicians will hardly ever act like that. It is only in the framework of some other science that mathematical logic could develop systemic qualities, thus leaving the domain of mathematics and becoming a branch of formal logic. And it is only in the context of some practical activity (however reflexive) that both mathematics and formal logic transform into a kind of regulatory mechanism, logic as such. Thus applied science does not coincide with neither mathematical abstractions, nor formal derivation schemes; it will always include some elements foreign to scientific rigor.

Mathematical logic, just like any other branch of mathematics, was certainly inspired by some objective phenomena related to the organization of human activity (conventionally restricted to sheer reasoning). But a formal structural description is not enough for a realistic scientific model of (at least) formal reasoning; it must be complemented by systemic interpretations as well as certain pragmatic considerations relating the science to its object.

Of course, mathematics as science is never entirely structural; it incorporates the whole range of formal and informal components. The same hold for formal logic as a scientific discipline. It is this practical commonality that leads their numerous interdependencies.

From the logical viewpoint, the opposition and complementarity of the static (structural) and dynamic (systemic) modes of description means that there is yet another paradigm, a synthesis of the both, combining the features of a structure and a system. This idea could be conventionally called "hierarchy", dynamically layered complexity. Taken in any particular respect, a hierarchy shows up as a hierarchical structure (a number of levels) or a hierarchical system (transforming one hierarchical structure into another). When the levels of hierarchy are treated as structures, the inter-level transitions are systemic; conversely, considering the levels of hierarchy as systems, we get a structured collection of the possible scales.

Since any hierarchy can only manifest itself through hierarchical structures and systems, the idea of hierarchy as a self-contained paradigm may be different to grasp. To begin with, one could think about something that is left when we take the structural load from a hierarchical structure, and the systemic background from a hierarchical system. In other words, there is a clearly perceptible difference between hierarchical something and a "plain" thing. This distinction is neither structural nor systemic; that is why we need a special term to denote it, just to be able to proceed.

The irreducibility of hierarchy to mere structure or system means that there is no "natural" (or "inherent") structure or system in a hierarchy. We can start with any element of the hierarchy and unfold it into a number of hierarchical structures or systems, which are not arbitrary but widely flexible. Than we can fold the hierarchy in a different element and unfold it from scratch, in a different

manner. Such hierarchical conversion makes the distinction between the levels relative, and the very notions of "up" and "down" depend on the particular representation. An unprejudiced mind will readily observe the same picture in any cultural sphere. Hierarchies are as ubiquitous as structures and systems. In particular, the hierarchical nature of science is quite obvious. There are all kinds of "vertical" relations (the structural aspect), as well as numerous examples of generalization or specification (systemic transitions). For each science there is a meta-science; thus, one could speak about meta-mathematics and meta-logic (meaning the reflexive form of formal logic). However, the principles of ordering may vary, and no science can be said to be above the others in an absolute sense.

As a complement to both mathematics and formal logic, one could also imagine some science of hierarchies, which would accumulate knowledge about the possible usage of structural and systemic models, treating the history of science as a manifestation of the its inner organization as well as revealing the cultural background in the foundations of science.

Deductive Uncertainty

There ain't no such thing as a proof. No formal argument can be convincing enough. All we can do is to support a newly coined statement by linking it to a number of earlier statements whose validity we tend to accept without further justification. The character of the link depends on the chosen logic, and no logic's adequacy is out of any suspicion at all. However rigorous, a proof implies a whole lot of implicit assumptions, while any attempt to clarify at least some of them inevitably throws us into the abyss of inexhaustible circularity.

That is why deduction cannot provide knowledge; at its best, it only may be of a heuristic value as a source of promising hypotheses. The same propositions could be formulated in an intuitive manner, with no reference to any deductive system. In fact most working mathematicians behave exactly this way, leaving the traditional derivation for academic reports. Moreover, stretching a clear idea to the frozen standards will often dilute the original thought in uncanny technicalities, and thus undermine the public trust instead of reinforcing it. People don't need to know why it works, as long as it works. No matter deductive or not, a formal theory is true when it is applicable in a range of practically important cases: science is a thing to heavily use rather than merely contemplate. Logic suggests, people decide.

To become truth, the outcome of a formal proof must be socially "digested", acknowledged and practically tried. Otherwise, any attempts to derive consequences of what has not yet been generally accepted as really proven would just pile up one doubt on top of another. That is why mathematical theories are often treated as whimsical toys, with their public value reduced to a couple of common recipes, or a pretentious claim. Their professional beauty cannot seduce those who needs friendliness rather than glam. In science, extensive development leads from obvious remarks to conventional generalizations, and then to an incomprehensible chaos to satisfy nobody. In every derivation, we proceed from direct observations to indirect, thus increasing the overall uncertainty.

Why should that happen? A well-developed theory is much like a thermodynamic system, with lots of assertions interacting in an almost chaotic manner. When such a science approaches self-contained existence, when in becomes conceptually closed, any inner motion would only increase the entropy of the system. The more fundamental is science, the less conclusive it is. A theory of everything is virtually a theory of nothing.

It is only in an open science that the full power of logic could be productively exploited. From one practical truth to another; from the well-established to the well-justified. Nobody prevents us from inventing a huge formalism, provided we never forget about the final goal of simplifying people's life rather than merely decorating it. What you may find quite logical may seem arbitrary to the others; it does not really matter, since we have to check the adequacy of the tool any time we need it. There is no final truth, as long as the world goes round. Things will change, and our ideas will follow.

We need deductive theories despite all their unreliability, and possibly just because of it. How can one fall in love with eternity, with death? We do not believe in logical rigor, but we want being persuaded to believe, just for a sign of compassionate esteem.

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