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Full Length Research Paper

The Secularization Ability of Islamic Law: An Epistemological Analysis

Karim Daghbouche *
Hanover (Germany)

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ABSTRACT

The question of the secularization ability of Islamic law is investigated on the basis of analytical science. It shall attenuate the methodological criticism on Islamic reasoning. The classic constellation in the interplay between unlimited dialectics of *secularism* and rigid doctrines of Islamic *integrism* suggests applying a covariant evaluation scale. Otherwise, it is evident that the application of multiple standards deviates the results *a priori*. It is therefore crucial for the covariant evaluation basis to be developed sufficiently abstract, namely by means of mathematical logic and algorithmic science, as well as by quantum- and system theory. The trade-off of an equally applied, balanced analytical evaluation scale eventually yields a purely *syntactic* comparison with important heuristics for *transparent* and complete algorithmic computing of the Islamic law eventually providing with *legal security* and *full accountability*.

Key words: secularism, secularization, integrism, laicism, Islam, Shariah, Islamic law, algorithm, epistemology, ontology, syntactic truth, logic, transparency, accountability

1. INTRODUCTION

This paper is organized in three major sections A, B, C. The first section prepares a formally adequate discussion by working out the characteristics of mathematical logic and system theory. To avoid unnecessary complications the presentation will be restricted by general considerations without lack of argumentative power. Where deemed appropriate, necessary differentiations are implemented explicitly into the then following context.

The second section seeks a pragmatic definition of the presumed antagonists (secular- vs. Islamic principle) to derive implicit formal qualities. Finally, a methodological and epistemological assessment with the previously developed analytical criteria constitutes the concluding part of this investigation (Fig. 1):

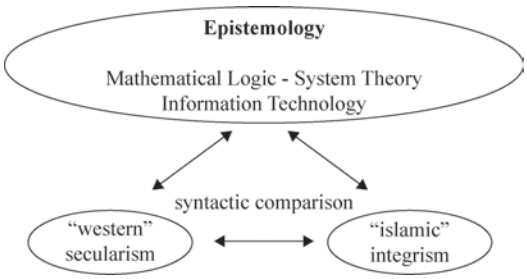

Figure 1

A. FORMAL TREATIES

2. MATHEMATICAL LOGIC

The mathematical logic comprises of two constitutive features for the here presented:

*Corresponding author: karim.daghbouche@gmail.com

Firstly, it intends a complete and concise formulation of formal logic [1] in so far that complex mathematical theorems can be expressed in simple, singular formal propositions. [2]
This has the reductionist advantage that secondly, mathematical axioms in arithmetic, algebra, geometry, etc., can be described by countable many logical calculi in terms of statements about classes, relations, and syntax. [3]
In this sense, the second constitutive feature of mathematical logic according to the "western" [4] understanding was first understood by *Leibniz* (1646-1716) in his "*Characteristica Universalis*". [5]
The symbolism, the hierarchy of classes of statements, the syntactic linking of rules, simply, the properties of a system of concepts constitutes all necessary areas of human mental activity, which in turn, using this very system, becomes communicable. [6]
Thus, the constitutive role of mathematical logic may be introduced as preceding all other sciences, or in the words of *Leibniz*:
"…that humanity would have a new kind of an instrument increasing the powers of reason far more than any optical instrument has ever increased the power of vision." [7]
For the here following discussion it is largely irrelevant whether mathematics is regarded as a further development of logic (Logicism, represented by *G. Frege, B. Russell, R. Carnap*) or if it consists of calculi that are formed out of formal systems by preceding axioms using inference rules corresponding to theorems (Formalism, represented by *D. Hilbert, W.v.O. Quine, H.B. Curry*) or whether mathematics represents basic mental processes where the critical path consists of what can be constructed effectively due to these processes, but not what was raised as object of observation by the mathematician (Intuitionism represented by *L. Brouwer, A. Heyting, L. Wittgenstein, Lorenzen*).

3. FORMAL MATHEMATICAL SYSTEMS

Formal mathematical systems constitute the entirety of statements formulated in mathematical logic. They define the formal i.e., syntactic aspects of expressiveness.
For the following, we define a formal system as:

Def. 1 There exists a triple <L, A, R>, wherein:

Def. 2 <L> corresponds to a set of symbols

Def. 3 <A> corresponds to a set of axioms which are formulated in <L>

Def. 4 <R> corresponds to a set of inference rules such that:

Def. 5 There is at least an axiom or an inference rule in the system (<A> or <R> ≠ 0). [8]

In other words:
We use an arbitrary but finite number of symbols, e.g., the Latin and Greek alphabet along with an Arabic number notation.
With these characters we formulate a finite number of general statements, or rules, i.e., our axiomatic scheme in terms of inference rules e.g., *Modus Ponens*: A ---> B, A, thus conclude B, i.e., if it is raining it gets wet, it's raining, so it is getting wet.
Starting with general statements (A), formulated in the symbolism (L) on the finite rules (R), we can now consider given facts, and assuming that the general statements (A) are "true" generate "true" conclusions/theorems

which have not previously been explicitly formulated in (A).

4. SYNTACTIC CRITERIA

David Hilbert

The name *David Hilbert* (1862-1943) is linked to all those efforts hoping to develop a system within mathematics, which would provide common axioms to all possible sub-areas [9]. Moreover, *Hilbert* intended the provability of consistency of mathematics (the so-called *Hilbert program*). [10]

The evidence of the program originates of the *desideratum* that the foundations of mathematics would finally be set on a firm ground, or "that the customary methods of mathematics would be recognized as being consistent" [11].

The problem with this approach developed around the notion of "mathematical truth" or "mathematical proof" [12] as well as around the conception of an universal mathematical method for the provability of all required axioms of the presumed complete formal system. [13]

Completeness, **Seclusiveness**, **and Consistency**

The necessary *desideratum* concerning formal mathematical systems, in particular with regard to practical implementations in computer science, emphatically reaffirmed the evidence of the *Hilbert program*.

To sum-up the criteria we set for above defined formal systems are:

a) Completeness
b) Seclusiveness
c) Consistency [14]

We consider those systems as complete and seclusive for which:

The finite number of axioms <A> and deduction rules <R> which consist of a finite number of symbols of a formal languages <L>, always allow for space- and time-invariant treatment of any facts, which in turn are not formulated as an axiom <A>. [15]

The consistency condition shall simply be that neither on the axiomatic nor on the concluding-level must be a statement with its own negation, e.g.:

("--->" = "Implies", "¬" = "negator")

(A ---> $P_k(k)$, while A ---> ¬ $P_k(k)$). [16]

If, and only if, all above criteria are met, deductions within a formal system could be considered as "true".

Syntactic Restrictions

We will now investigate how the syntactic criteria could be applied to a formal system with respect to their mathematical, i.e., to their formal implementation options.

"A contemporary epistemologist cannot bypass the results of the logical and mathematical research. In particular, many of the results obtained within meta-mathematics are of such an extraordinary theoretical significance and importance that their detailed study is essential for anyone who wants to perform epistemological investigations. By those results we gain profound insights into the reality of our ability to think, in the scope and limitations of the axiomatic-deductive approach, in the relation between formal, calculus-based logical systems and non-formal intuitive conclusions, into the relation between logical and intuitive truth on the one hand and provability on the other hand, as well as into the relation of disputable methods of classic logic versus safe operations, by which the former are to be justified subsequently." [17]

Kurt Goedel

The Austrian-American mathematician and logician *Kurt Goedel* (1906-1978) provided the efforts of mathematics to develop an indisputable scientific discipline with an absolute limit.

It is his achievement from 1931 [18] to have "proven" by the most proper means of mathematics that we can formulate statements within a complete formal system for which this very system cannot provide evidence of validity while, however, being necessarily "true" (*Goedel's second incompleteness theorem*).

Goedel's Second Incompleteness Theorem

In order to have a detailed insights into state-of-the-art reasoning which is constitutive in furtherance of this paper, we will formulate a simplified version of a *purely syntactic* [19] statement which cannot be proven within its formal system. And just because there cannot be a formal proof, this very statement is necessarily "true".

To do so, we index all arithmetic statements about natural numbers, i.e., every statement is transferred to such a lexicographic order that there exists no statement without unambiguous identification within arithmetic.

For:

$<P>$ = any arithmetic statement
$<k>$ = lexicographical index for arithmetic statements
$<\pi>$ = proof
$<x>$ = arbitrary natural number to index proofs
$<w, k>$ = any natural number
$<\exists>$ = there exists
$<\neg>$ = negation

Goedel showed the following sentence:

(A) $\neg\, x\, [\pi_x \text{ proves } P_w(w)] = P_k(w)$

(B) for $k = w$

(C) $\neg\, x\, [\pi_x \text{ proves } P_k(k)] = P_k(k)$ [20]

which says:

(A) There is no x for the x-th proof which proves that the arithmetic statement (P) in the lexicographic order at (w) about the natural number w ($P_w(w)$) is true, i.e., there is no proof for the proposition $P_w(w)$.

This statement in turn makes a statement about the natural number (w) in the system. We need to include it in the lexicographical order, i.e., we have a new statement about the natural number (w), namely $P_k(w)$.

(B) Now we consider the statement ($P_k(w)$) for the natural number (k) (w=k), i.e., we look for a proof of a statement which says that there is no proof for it:

(C) There is no x for the x-th proof which proves that the arithmetic statement P(k) in the lexicographical order at (k) ($P_k(k)$) is true. Since this very statement is already indexed with k, we do not need to add any new statement to our lexicographical records.

If there would be a syntactic proof for $P_k(k)$, this would imply a clear contradiction because $P_k(k)$ simply says that there is no proof for it.

If we could prove the opposite of the statement $P_k(k)$ syntactically, i.e., $\neg\, P_k(k)$, we would have proved a false statement to be correct which should be impossible in a system assumed to be consistent.

Since neither $P_k(k)$ nor $\neg\, P_k(k)$ can be proven syntactically, it is non-algorithmically [21] "proven" that $P_k(k)$ is indeed "true" (because this is all $P_k(k)$ says).

This simple statement implies that there is no completeness in the defined syntactic sense. Rather, we must refer to a meta-method which is no longer to be regarded mathematical in the sense of mathematics. This is the reason which leads to the incompleteness of the mathematical, i.e., the syntactic foundations of mathematics and hence of all hypothetical-formal systems. [22]
We can now leave the mathematic-logical premises and differentiate the discussion epistemologically.

5. EPISTEMOLOGICAL DISTINCTIONS

In order to establish the intended, covariant evaluation scale with respect to the dichotomy between any secularist principle and Islamic principle, this section will complete the mathematic-logic considerations with epistemological reflections.

The Hypothetic-Deductive Method
For the definition of the hypothetic-deductive method, let us re-illustrate, the three essential components of a formal system as:

Def. 1 There exists a triple <L, A, R>, wherein:

Def. 2 <L> corresponds to a set of symbols

Def. 3 <A> corresponds to a set of axioms which are formulated in <L>

Def. 4 <R> corresponds to a set of inference rules such that:

Def. 5 There is at least an axiom or an inference rule in the system (<A> or <R> ≠ 0).

We will now take a closer look at the properties of the axioms (A) and the derivation rules (R) while neglecting the symbolism (L) for the time being and consider formal systems as "axiomatic systems".
The term "axiomatic system" implies the characteristics that *Aristotle* (384-322 BC) [23] and *Euclid* (3rd century BC, 30-60 years after *Aristotle*) [24] have pointed out, i.e., that of "absolutely safe" assumptions and resulting "absolutely safe" deductions if the inference rules were applied correctly. [25]
However, since there is no formal evidence for "absolutely safe" or "true" assumptions as intra-systematically shown in the previous section, such assumptions will now be called "hypotheses" with the complete system of hypotheses and inference rules being called "hypothetic-deductive system."
The differentiation criteria between axiomatic- and hypothetic-deductive systems is therefore the validity of its basic assumptions. [26]
Accordingly, a hypothetic-deductive system is terminologically justified whenever any deduction has to prove in light of experience, intra- or extra systemically, where even in case of coherence between theorem and deduction, the validity of the premises (hypotheses) still remains to be questioned: [27]

Karl R. Popper
Born in Austria, *Karl Raimund Popper* (1902-1994), developed a very far-reaching epistemological work, which is considered interdisciplinary *par excellence* by incorporating a variety of fundamental scientific findings.
Popper connects epistemological and sociological considerations with evolution-theoretical aspects and considers the gradual transition from an amoeba to *Einstein* with the same characteristics:

"The preliminary solutions which animals and plants materialize in their anatomy and with their behavior are biological analogies of theories, and *vice versa*: theories correspond (like many exosomatic products such as honeycombs and especially exosomatic tools such as spider webs) endosomatic organs and their functioning. Just as theories are also organs and their activities tentative adaptations to the world in which we live." [28]

Popper implements this pattern in his social-critical postulate, namely, that empirical predictions play a major role for all government policies and all decisions of the executive and the administrative. Consequently, if we intend to do *A*, *B* will be the result; and if we also want to reach *C*, we have to strive for *D*. But since such causalities prove all-too often to be inadequate, it is always necessary to modify those objectives and measures.

For this reason all constitutional requirements of the political sphere are set equal to hypotheses which need to be tested against reality and must continuously be corrected as part of the experience.

This leads *Popper* to the only valid conclusion which he refers to as "critical rationalism" in philosophy and as "piecemeal social engineering in politics". [29]

The semantically negative term "piecemeal social engineering" is justified by *Popper* as follows:

"Every rational action must have a goal. It is rational just to the extent to which it pursues its goal consciously and consistently and sets its resources accordingly. The choice of a target is therefore the first task that we must solve if we want to act rationally, we must fix our real and ultimate objectives carefully, and we need that part clearly distinguishable from intermediate goals that can only be considered as a means or as steps on the way to the final objective: If we forget this distinction, we forgot to also ask ourselves whether it is likely that these sub-goals promote the ultimate goal, and so we cease to act rationally. Applied to the field of political activity, mentioned principles require the determination of our final policy goal or the ideal state before any practical action is taken. Only when this goal is determined, at least as a rough outline, if we have a blueprint of our intended society structure, only then can we begin to consider the best ways and means to achieve them and develop a plan for practical action." [30]

But since according to *Popper* just these final objectives of political action have hypothetical character, i.e., the final objectives must never get out of the focus of criticism (*falsification*), his thesis represents a seemingly inductive circle, which is why he coined any political action with "piecemeal social engineering". [31]

In summary, we find in *Popper's* considerations the aspect of indeterminism, i.e., the recognition of a pronounced interaction of cognitive components of the tangible world in terms of an insufficiency in mastering the causal relationships of all relevant factors.

This constitutive epistemological fact is derived from his exhaustive studies on quantum mechanical problems [32] which is why we want to follow this system theoretical aspect as well:

Systems Theory

A look at some basic system-theoretical aspects shall reveal *Popper's* main theses explicitly.

In particular, we will investigate quantum mechanical implications (*Heisenberg uncertainty principle* and *Bohr's* notion of *complementarity*), and

some empirical consequences of the theory of *complex dynamical systems*.

The Heisenberg Uncertainty Principle (1927)

The German physicist and Nobel laureate *Werner Heisenberg* (1901-1976) made an incision with respect to the common conception of mechanics. [33]

According to his results on the mechanics of atomic- and subatomic structures beginning of the last century, it is not possible to simultaneously fix the position *and* momentum of a particle "exactly".

The *Heisenberg uncertainty principle* implies an absolute accuracy limit for the product of the two measurement parameters, namely the *Planck quantum of action* [34]:

$$\frac{h}{2\pi} = \hbar : \qquad \Delta x \, \Delta p \geq \frac{\hbar}{2\pi}$$

In practice, the experimenter has to determine the dynamic variables of his measurement instrument, i.e., *either* to approximate the position of a particle *or* the momentum.

In a nutshell, the *Heisenberg uncertainty principle* states that the measurement process necessarily disturbs the object to be measured. [35]

Since measurements on atomic- and subatomic scales are performed by electromagnetic waves (light), the order of the respective degree of uncertainty depends on the "included" energy. According to $\Delta E = hf$ the energy E is proportional to the frequency f (where h is the *Planck constant*), i.e., the more precise the localization the higher the frequency to be used, thus the momentum of the particle will be "uncertain" and *vice versa*, the more accurate the momentum quantification, the lower the corresponding frequency of the electromagnetic wave which in turn implies a "smeared" localization of a particle. [36]

The formalism of quantum mechanics accounts for this with probabilistic factors (probabilistic interpretation of the *psi-function*), hence incorporating an indeterministic character. [37]

This aspect caused deep unease for a number of former physicists such as *Max Planck* (1858-1947), *Albert Einstein* (1879-1955) and *Erwin Schrödinger* (1887-1961) which materialized in the so-called "*Bohr-Einstein debate*" and coined a very heuristic term, i.e., that of "complementarity":

Complementarity

The Danish nuclear physicist and Nobel laureate *Niels Bohr* (1885-1962) introduced the term "complementarity" in the same year of the publication of *Heisenberg's uncertainty principle* in 1927. [38]

The following debate between *Einstein* and *Bohr* developed around a for *Einstein* apparent contradiction in the formalism of quantum mechanics:

How can one consistently understand that a light quantum (*photon*) has moved simultaneously in two different ways in a particular experimental setting? [39]

According to *Einstein*, this quantum-theoretical fact renders constitutive assumptions in physics absurd, namely causality and quantifiability. [40]

In contrast, *Niels Bohr* didn't see any inconsistency but rather logical necessity. In his view, one can study "nature" from different perspectives. These perspectives cannot be applied at once but only one after the other. [41]

In other words, the higher the level of abstraction to describe phenomena the more limited the formal means of expression will get (the language of

physics, i.e., mathematics) so that at maximum-formal description one will necessarily find mutually exclusive descriptions. [42]
In the following this complex discussion shall be conceived as limitation of quantifiability and as a limit of conceptual systems [43]. Thus we can translate above findings to mesocosmic [44] phenomena, i.e., to the theory of complex dynamical systems:

Theory of Complex Dynamic Systems
As indicated in the previous section, one of the consequences of the quantum mechanics concerns the incomplete quantification of physical conditions on principle fueling a fierce debate about the indeterministic character of the new theory.
An indeterminism in the formalism of theories however represents an extraordinary problem for the application of fundamental logical reasoning such as:

If A, then always B

A ---> B; *Modus Ponens*

It not only implies a "failure" of the law of causality on microscopic levels, but also in everyday mesocosmic systems.
As a result of the tremendous interactivity of all incompletely quantified systems, the necessary causal relations cannot be adequately demonstrated on principle.
For the paradigmatic example of weather research and forecasting it simply means: "At MIT in Boston, *Lorenz* had studied nonlinear equations of hydrodynamics with three variables which he plausibly reduced from Navier-Stokes equations. They should constitute a simplest (dissipative) model of weather dynamics and he discovered that the dynamic effects of a butterfly flapping somewhere in the atmosphere is sufficient to render it a hopeless undertaking to perform any long-term forecast of weather dynamics ('butterfly effect')." [45]
This effect can also be demonstrated with seemingly less complex systems such as a billiard table by assuming the following initial conditions:
The flat, rectangular (four right angles) surface of the billiard table, nine billiard balls of the respective mass (m) which are located on the table at a specific location (x) at time (t), and the constant earth acceleration (g) acting uniformly on all just cited agents towards the planet's center of gravity. The friction of the felt cover shall be neglected while the game of billiards is simulated on a computer under exclusion of all possible external disturbances.
If now an average billiard shot is performed the common assumption was that the game would develop according to the laws of Newtonian mechanics, that is completely deterministic, i.e., ball entrance angle equal to its exit angle, transfer of momentum, etc. ...
But the consequences of *Heisenberg's uncertainty principle* with its principal limitation of determining the initial conditions of our billiard game setup already manifests after about nine ball collisions. Our billiard game would develop totally different than assumed by Newtonian mechanics by just neglecting the gravitational effect of a moving spectator of $\sim 10^{-9}$ of the tare weight of the balls. Even the gas molecules of the surrounding air which interact by collisions would yield an unpredictable development on the pool table by just neglecting the force of gravity of an electron at the "edge" of the universe (with some 10^{9} light years distance to earth and only 9.11×10^{-31} kg mass). [46]

The current conception of the theory of complex dynamical systems are further differentiated as areas of apparent lawlessness (chaotic systems) and areas of classical correlations where these states can merge into one another, that is, apparently harmonic (linear) systems can become chaotic (non-linear) under the slightest deviation in the initial conditions (sensitivity) [47] such as vibrations, movements, growth, behavior, etc. [48]

In addition, the formalism provides the ability to demonstrate the ranges between predictability and fundamental unpredictability and to simulate the dynamics of the respective transitions (law of period doubling). This ability is considered as most heuristic aspect by leading scholars of this interdisciplinary research field. [49]

Among others, an independent research center emerged to study efficient policies in the sense of *Karl Popper*, i.e., a department for administrative and political technology, as well as for management science [50]:

"Now the human society is also such a multi-component system where a variety of material and spiritual interactions takes place between the elements, the individuals. Therefore, the synergy should also be applicable for the society, i.e., the modeling of social processes." [51]

The main results shall be summarized once again:

Intermediate Summary

(1) There are absolute limits to quantify physical objects (*Heisenberg uncertainty principle*).
(2) This fundamental failure also affects mesocosmic systems.
(3) An empirical failure of the causal law limits the consistent application of logical methods of inference considerably. [52]

Above implies massive methodological restrictions which have been initially discussed now. However, since we seek a general analytical scale for the assessment of the secular- and the Islamic principle in furtherance of this paper, we have to consider the methodology explicitly in epistemological and system theoretical settings again:

6. METHODOLOGICAL ASPECTS

The is-ought dichotomy

According to *Popper*, the determination of the ought-sate of a system is a mandatory prerequisite for a rational, problem-solving driven approach.

His reflections however yield reasons why this approach lacks necessary means *a priori* already:

Firstly, there is the basic impossibility of determining the is-state of a system which has already been introduced in the scientific formalism (*Heisenberg uncertainty principle*). This implies a significant restriction for any statement about the further development of the considered systems (theory of complex dynamic systems).

Secondly, there is constant debate regarding the normative ought-state of a system so that whatever target-state risks as well as both, not being predictable (non-linearity), and

Thirdly, to remain formally incomplete and inconsistent (*Goedel's 2nd incompleteness theorem*).

Trial and Error

This manifests methodologically in the inability of *Popper's* "piecemeal social engineering", hereafter called more profane "trial and error" and being irrational in *Popper's* proper sense. [53]

The safe, deductive "reasoning from above" (axiomatic systems) is substituted by the weak variant of

hypothetical-deductive systems, as a quasi-inductive method [54], that is, in addition to the uncertainty of assigning empirical facts to the formal hypotheses, the uncertainty concerns the formal hypotheses themselves, for how else are hypotheses anticipated, if not empirically? [55]
It is this very context we implement into the relation between the secular- and the Islamic principle and into the discussion how an axiomatic method can nevertheless be justified and applied consistently:

B. SEMANTIC IMPLICATIONS

7. THE SECULAR PRINCIPLE

In terms of its specific relevance for Islam, the study of the secular principle is carried out in four phases:
After a pragmatic definition we derive formal qualities before performing a methodological classification and finally an epistemological assessment according to the previously developed analytical criteria.

Definition
In the following, the term "laicism" is to be understood as an ideological direction, which champions a full separation of influence between church- and state spheres in the strict sense that "by a disempowerment and privatization of the Church a complete detachment of the whole public life (government, society, law, economy, culture, education) from religious ties and influences results" [56].
To be ignored shall be the specific context of medieval Christianity development [57], so that the above definition can be subsumed under the pragmatic, but not as powerful concept [58] of "secularization".
Furthermore we will abstain from a definition of the terms "religion" and "politics" until the concluding part of this paper.
With this formal covariance with respect to the terminological scope we are now able to present some contemporary "Western" and "Islamic" authors to derive a sufficiently detailed, formal secular hypothesis:

8. THE SECULAR HYPOTHESIS

The "Western" variation
A formal interpretation of the semantically vague notion of secularization [59], leads *Niklas Luhmann* to the following definition:
"Secularization is a consequence of the restructuring of the society in the direction of a primarily functional differentiated system in which each functional area gains greater independence and autonomy but is also dependent on the assumption that and how other functions are fulfilled." [60]
That is, in view of his implicitly restrictive definition of religion, that "with the transition to a functional differentiated social system [...] the access form the overall social system to the subsystems [changes], moving to the structures of the subsystems on their inner social environment." [61]
Luhmann doesn't attest a religious system enough formal power in the sense that its axioms are not invariant with respect to a "non-arbitrarily, as a society guaranteed and pre-structured environment ..." [62]. [63]
On the same vein, *Thomas Luckmann's* functional understanding lines up with *Luhmann's* observation:
"... the originally underlying values of church religion were not institutional norms, but those which should give meaning to the life of an individual. As such they were superior to the standards of all institutions which dominated the behavior of individuals in diverse areas of everyday life, extended over their

entire lifecycle. The industrialization and urbanization were events that reinforced the tendency for institutional specialization. The institutional specialization in turn "liberated" the norms of different institutional areas from the influence of their original superordinated "religious" values" [64]
Although *Karel Dobbelaere* differs in analogy with *Thomas Luckmann*, that "secularization" would not equal a loss of religion but rather a "laicization", i.e., a preference shift of the religious-institutional to the private sphere [65], he restricts religion:
"What I intend to do is to study secularization as a process of laicization, conceptualized as a process of differentiation, i.e., a process of growing independence of institutional spheres (such as politics, education, economy, and science), each developing its own rationale, which implies the rejection of the overaching claim of religion." [66]
In sum, the "Western" hypothesis of secularism and secularization reads formally:

The empirical-worldly conditions of human existence (in instantiation: the human social existence in the dynamic process of industrialization and privatization in connection with "functional differentiation"), necessarily entails the restriction of religious axioms to individual privacy.
It follows the concise hypothesis:
The religious system of standards has no axiomatic character, but proves necessarily (empirically), in relation to functionally differentiated subsystems of human society, as incomplete.

The "Islamic" version
Bassam Tibi explains that secularization is not a voluntary act, "but the product of a complicated social evolution, represented at its zenith by modern industrial society." [67]
He concludes according to the "Western" understanding that secularization does not abolish religion, "because in a functionally differentiated system religion merely takes on social significance of a different nature and thus maintains meaning." [68]
For the thematic complex more relevant, *Tibi* expresses explicitly what we could only deduce from the "Western" hypothesis, namely the negation of any space- and time invariance of religious axioms:
"The declarations of the Qur'an and the *Sunnah* from which the dogmatic material is constituted are used out of context. They are applied in a technological-scientific age even though they originated in a nomadic society in the process of transformation." [69]
"*Al-Salih* points out that we live in a scientific-technological age but is of the opinion that the Islamic *Shari'a* is completely adequate to meet the demands of this age. I am inclined to dispute this, ..." [70]
Following this view, *Fuad Zakariya* also sees "a reason-given need" for the "Islamic secularism" because in politics there is nothing, "what would be everlasting and irrevocable, 'valid at any time and any place', as Islamic fundamentalists have in mind." [71]
Thus, the "Islamic" secularists are lined-up with the hypothesis we already extracted from their "Western" colleagues:
The religious system of standards has no axiomatic character, but proves necessarily (empirically), in relation to functionally differentiated subsystems of human society, as incomplete.

We now evaluate the hypothesis by applying the previously developed analytical scale:

9. ANALYTICAL EVALUATION

Methodological classification

For the methodological classification, we follow *Popper's* view according to which the negation of the axiomatic method leave political and social issues to a hypothetic-deductive process, in *Popper's* "piecemeal social engineering" in "trial and error", i.e., in an inductive loop.

The system theoretical implications are, as *Niklas Luhmann* has identified correctly [72], to be evaluated as follows: "Every single decision may be treated as a trifle and be left to chance or freedom, but in the aggregation of the consequences those decisions can affect the structure of society in a way that one can neither control nor take responsibility for, but which one may discover as a problem and try to correct at the most." [73]

According to the here discussed system-theoretical insights, the application of the hypothetic-deductive process leaves social- and political issues in potentially unmanageable contexts which is less related to the advanced "functional differentiation", but rather due to the empirical, epistemological, and formal impossibility of re-transforming the "functional differentiation" into a consistent system of values and axioms.

However, the formulation of a consistent axiomatic system is just our most important *desideratum*, i.e., the scientific method seeks a maximum of formal unification which should be "true" and "safe" in light of empirical falsification.

Epistemological assignment

Embedded into *Popper's* approach, the reasons for the impossibility of a re-transformation (unification) of "functionally differentiated" problems into a consistent system can be found in the existence as a human being per se:

To illustrate once again: The reciprocity between men and environment, i.e., in *Popper's* terminology between "endo- and exosomatic" entities, reduce any supposedly safe and goal-oriented thinking and action into the profane formula:

"One can not jump over ones own shadow!"

The importance of this aspect will be adequately evaluated in the light of an Islamic epistemology yet to come up further down.

10. THE FORMAL CHARACTERISTICS OF THE ISLAMIC PRINCIPLE

Introduction

In analogy to the approach with the secular principle, the formal characteristics of the Islamic principle will be discussed in various stages with the results of the methodological aspects being investigated with additional pragmatic aspects.

The Islamic postulate is extracted from the *Shariah* per self-definition, whereas studies on the methodology and epistemology necessarily include deductive considerations.

Furthermore, the evaluation of the formal characteristics of the *Shariah* are performed using the same criteria derived in the previous section. By doing so, we guarantee the uniform analytic evaluation process.

11. TERM DEFINITIONS

Shariah

Under the term "*Shariah*" [74] we only subsume those laws of the Quran and the *Sunnah* [75], which are formulated explicitly therein. [76] Hence, we only consider the Quran and *Sunnah* as

syntactic sources for the Islamic law [77].
This implies that a large range of Islamic jurisprudence (*fiqh* [78]) is excluded by this definition. Although the *fiqh* is based on the *Shariah*, it represents however only divers convictions (*fatwa'i*) of Islamic jurists (*ulama*).
This includes in particular the four major schools of law (a*l madhahib al arba'ah* [79]), as explicitly required by their autobiographies:

"*Abu Hanifa* (deceased 150 H. [80] / 767 AD) said:
'It's not right when someone joins our view, without knowing how we got it.'
And he said further:
'It's defarmation, if one says that we prefer our qijâs than the Sharee'ah. Are we in need to develop an own opinion, in the presence of a sacred text?'

Malik (deceased 179 H. / 795 AD) said:
'I am nothing more than a man. It may be that I am wrong and it may be that I'm right. Check first what I say. When it is in agreement with the Holy Book and the *Sunnah* you can adopt it. But if it does not agree with it, you shall reject it.'

Al-Shafi'i (deceased 204 H. / 820 AD) said:
'If ever my view differs from the tradition, then you shall always follow the tradition and do not be directed by me. And when a tradition will be confirmed as true to tradition later on, then all of my views which are in contradiction to that are void, and you shall only follow the tradition.'

Ibn Hanbal (deceased 214 H. / 855 AD) said:
'Do not rely on me or on *Malik* or *Al-Shafi'i* or *Al-Thawri* and rely directly on what they have relied on.'" [81]

Usul fiqh
"*Usul fiqh*" is the precise term which includes the very area of Islamic jurisprudence (*fiqh*), which describes the methodology for the derivation of laws from its sources (Quran and *Sunnah*).

12. SYNTACTIC QUALITIES

Formal system
At this point we will have to examine whether the *Shariah* considers itself as a formal system.
To repeat, we provide the criteria of this definition above again:

Def. 1 There exists a triple <L, A, R>, wherein:

Def. 2 <L> corresponds to a set of symbols

Def. 3 <A> corresponds to a set of axioms which are formulated in <L>

Def. 4 <R> corresponds to a set of inference rules such that:

Def. 5 There is at least an axiom or an inference rule in the system (<A> or <R> ≠ 0).

Now we implement the relevant facts of *Shariah*:

The *Shariah* consists of a finite set of symbols <L>:
The characters of classical Arabic and hereafter the unification of the entire class of Arabic grammar. [82]

The *Shariah* consists of a finite set of axioms <A>:
Here the set of all axioms:

- Family Law (70 rules)
- Civil Law (70 rules)
- Criminal (30 rules)
- Jurisdictional/procedural methodology (13 rules)
- International Relations (25 rules)
- Economic and Financial Rules (10 rules) and
- Ethics as well as Metaphysics [83]

The *Shariah* implies a finite number of inference rules: [84]

Material Implication "if - then" (--->) (Quran, 21:22)
21:22 Had there been within the heavens and earth gods besides Allah, they both would have been ruined. So exalted is Allah, Lord of the Throne, above what they describe.

Modus Ponens (A ---> B, A; infers B) (Quran 2:258)
2:258 Have you not considered the one who argued with Abraham about his Lord [merely] because Allah had given him kingship? When Abraham said, "My Lord is the one who gives life and causes death," he said, "I give life and cause death." Abraham said, "Indeed, Allah brings up the sun from the east, so bring it up from the west." So the disbeliever was overwhelmed [by astonishment], and Allah does not guide the wrongdoing people.

Modus Tollens (A ---> B, ¬ B; infers ¬ A) (Quran 6:76-79), (62:6-7)
6:76 So when the night covered him [with darkness], he saw a star. He said, "This is my lord." But when it set, he said, "I like not those that disappear."
6:77 And when he saw the moon rising, he said, "This is my lord." But when it set, he said, "Unless my Lord guides me, I will surely be among the people gone astray."
6:78 And when he saw the sun rising, he said, "This is my lord; this is greater." But when it set, he said, "O my people, indeed I am free from what you associate with Allah.
6:79 Indeed, I have turned my face toward He who created the heavens and the earth, inclining toward truth, and I am not of those who associate others with Allah."

62:6 Say, "O you who are Jews, if you claim that you are allies of Allah, excluding the [other] people, then wish for death, if you should be truthful."
62:7 But they will not wish for it, ever, because of what their hands have put forth. And Allah is Knowing of the wrongdoers.

Xor (Either A ---> ¬ B or B ---> ¬ A) (Quran, 34:24)
34:24 Say, "Who provides for you from the heavens and the earth?" Say, "Allah. And indeed, we or you are either upon guidance or in clear error."
so that:

There is an axiom in the system or at least one inference rule (<A> Or <R> ≠ 0). [85]

From now on we treat *Shariah* as a formal system looking at its syntactical attributes:

The mathematical-logical attributes
To examine the attributes of completeness, seclusiveness, and consistency, we refer to our previously developed formal treatise.
Thus, we consider a formal system to be complete and seclusive if the finite number of axioms <A> and inference rules <R>, expressed in the language <L> which consists of a finite number

of symbols, allow a space- and time-invariant treatment of any facts, which are in turn not formulated as an axiom <A>.
The consistency condition requires neither on the axiomatic nor on the concluding level a statement with its own negation:

(A ---> $P_k(k)$ and A ---> ¬ $P_k(k)$). [86]

This condition is referred to in the Quran in the following statements:

Seclusiveness and completeness: (Quran, 5:3, 33:40, 2:2)

5:3 …This day I have perfected for you your religion and completed My favor upon you and have approved for you Islam as religion. ...

33:40 Muhammad is not the father of [any] one of your men, but [he is] the Messenger of Allah and last of the prophets. And ever is Allah, of all things, Knowing.

2:2 This is the Book about which there is no doubt, a guidance for those conscious of Allah –

Consistency: (Quran 4:82)

4:82 Then do they not reflect upon the Quran? If it had been from [any] other than Allah, they would have found within it much contradiction.

Above attributes raise the question whether the already terminological anticipated axiomatic status of rules, i.e., the space- and time invariance, is satisfied. The *Shariah* is explicit on that:

Space invariance: (Quran 68:52)

68:52 But it is not except a reminder to the worlds.

Time invariance: (Quran 103:1-3)

In the name of Allah, the Beneficent, the Merciful!

103:1 By time,
103:2 Indeed, mankind is in loss,
103:3 Except for those who have believed and done righteous deeds and advised each other to truth and advised each other to patience.

We can now formulate the Islamic postulate:

The religious system of standards has axiomatic character and is per self-definition (theoretically), in relation to functionally differentiated subsystems of human society, to be considered as valid and complete.

At this point we need to follow up with methodological studies because it is evident, that a supposedly axiomatic status of a formal system, as powerful as the attributes may be, could only be subject to testability, if a deductive practicability can be observed.

13. AXIOMATIC-DEDUCTIVE METHODOLOGY

Introduction
The axiomatic-deductive methodology constitutes as well as both, the heuristics and the formal limits of the Islamic postulate.
Therefore we need to project the syntactic restrictions of mathematical logic as well as system-theoretical restrictions of quantum mechanics and theory of complex dynamical systems to the *Shariah*.

Knowledge acquisition

The only consistent way for knowledge acquisition in an axiomatic system is the recursion on an ontological reality [87].

This is already evident by reconsidering the essence of *Goedel's second incompleteness theorem*:

At the very moment where we define a given formal system [88], i.e., we choose the set of axioms before establishing a proof method [89], syntactic proof limits are necessary. As *Goedel* showed, we can always formulate statements in a sufficiently expressive system for which it just cannot provide a syntactic proof within itself. [90]

This takes the evidence for the validity of a particular statement outside the formal system in which it was initially formulated, hence, extrapolating the "proof" to a trivial level and attributing the formal system to be syntactically incomplete.

The *Shariah* provides an analogous situation here with the crucial difference, that we cannot make reformulations in *Shariah* that lead to a statement of the *Goedel type*. [91]

From the mathematical-logical point of view, it is impossible to find a syntactic proof of the validity of the axioms for the *Shariah*. But this inability, unlike in mathematics, does not lead to an incompleteness of the formal system but is on the contrary an epistemologically sufficient need. We will deepen this insight with dedicated epistemological analysis further down.

For the methodological study, we only set the necessary condition that the knowledge acquisition has to be ontological.

The formal language

Language is a key aspect for appropriately analyzing *Shariah*.

Accordingly, we need to introduce some basic reflections for dealing with the *Shariah*:

The knowledge acquisition in an axiomatic system must necessarily lead to a linguistic representation [92].

This is a trivial statement. An axiomatic system is by definition formal, i.e., linguistically, and the only reason it was attributed to be "axiomatic" was due to its formally (i.e., syntactical) unproven, but consistent and complete set of rules.

As an axiomatic system is necessarily linguistically, language constitutes the limits of the formal expressivity where the more expressive the formal system the more necessary is the exhaustion of language in complementarities.

The system-theoretic formulation of this conjecture is based in the *Heisenberg uncertainty principle* while the philosophical framework is constituted by the entire quantum theory. [93]

On this vein, *Bohr* admitted in a lecture in Copenhagen:

"Moreover, the purpose of such a technical term is to avoid, so far as possible, a repetition of the general argument as well as constantly to remind us of the difficulties which, as already mentioned, arise from the fact that all our ordinary verbal expressions bear the stamp of our customary forms of perception, from the point of view of which the existence of the quantum of action is an irrationality. Indeed, in consequence of this state of affairs, even words like 'to be' and 'to know' lose their unambiguous meaning.

In this connection, an interesting example of ambiguity in our use of language is provided by the phrase used to express the failure of the causal mode of description, namely, that one speaks

of a free choice on the part of nature. Indeed, properly speaking, such a phrase requires the idea of an external chooser, the existence of which, however, is denied already by the use of the word nature. We here come upon a fundamental feature in the general problem of knowledge, and we must realize that, by the very nature of the matter, we shall always have last recourse to a word picture, in which the words themselves are not further analyzed." [94]
It is therefore expected that in an axiomatic system *par excellence* such as *Shariah* complementarities will be present: [95] Quran (81:19-29):

81:19 [That] indeed, the Quran is a word [conveyed by] a noble messenger
81:20 [Who is] possessed of power and with the Owner of the Throne, secure [in position],
81:21 Obeyed there [in the heavens] and trustworthy.
81:22 And your companion is not [at all] mad.
81:23 And he has already seen Gabriel in the clear horizon.
81:24 And Muhammad is not a withholder of [knowledge of] the unseen.
81:25 And the Quran is not the word of a devil, expelled [from the heavens].
81:26 So where are you going?
81:27 It is not except a reminder to the worlds
81:28 For whoever wills among you to take a right course.
81:29 And you do not will except that Allah wills – Lord of the worlds.

Above extract of Quran deals with the classic "problem" of *free will*: On the one hand the will of the people is referred to with an immediate override by the absolute will and power of God. Analogously but in a collective context: Quran (13:11):
13:11 For each one are successive [angels] before and behind him who protect him by the decree of Allah. Indeed, Allah will not change the condition of a people until they change what is in themselves. And when Allah intends for a people ill, there is no repelling it. And there is not for them besides Him any patron.

With regard to a summary of the complementarity aspect, the exhaustive expressiveness of formal systems is explicit in Quran (18:109) and (31:27):

18:109 Say, "If the sea were ink for [writing] the words of my Lord, the sea would be exhausted before the words of my Lord were exhausted, even if We brought the like of it as a supplement."

31:27 And if whatever trees upon the earth were pens and the sea [was ink], replenished thereafter by seven [more] seas, the words of Allah would not be exhausted. Indeed, Allah is Exalted in Might and Wise.

With the complementary nature of the formal system of *Shariah* our requirement for consistency could be impaired because the formal consideration leads, as we have shown, to statements which apparently represent syntactic antinomies which would be subject to restrictions within our methodological framework.
We must therefore set the condition, that the areas of *Shariah* to be treated deductively have to be free of complementarities, i.e., that we can perform appropriate deductions with the given, natural language resources. *Shariah* highlights this fact explicitly as well: Quran (3:7)

3:7 It is He who has sent down to you, [O Muhammad], the Book; in it are verses [that are] precise – they are the foundation of the Book – and others unspecific. As for those in whose hearts is deviation [from truth], they will follow that of it which is unspecific, seeking discord and seeking an interpretation [suitable to them]. And no one knows its [true] interpretation except Allah. But those firm in knowledge say, "We believe in it. All [of it] is from our Lord." And no one will be reminded except those of understanding.

Furthermore, it says in a *Hadith*: [96]

"Allah, The Exalted, prescribed religious duties, so do not neglect them. He set boundaries, so do not surpass them. He has prohibited some things, so do not violate them. He remained silent about some things as a mercy for you and not due to forgetfulness; so do not search for them." [97]

Our condition, that the areas of *Shariah* which have to be treated deductively have to be free of complementarities, is therefore explicitly considered within *Shariah* as a self-evident axiom. We can now discuss a concrete example of the deductive process with *Shariah*:

14. DEDUCTION - *AL QIYAS* -

The legitimacy of our legal definition of *Shariah*

Before taking first steps to perform deductions within *Shariah*, the legitimacy to treat *Shariah* as axiomatic basis has to be made up.

In the previous sections we have definied the term "*Shariah*" to be a composition of the two sources "Quran" and "*Sunnah*".

This definition is legitimized with Quran (4:59) and (8:20):

4:59 O you who have believed, obey Allah and obey the Messenger and those in authority among you. And if you disagree over anything, refer it to Allah and the Messenger, if you should believe in Allah and the Last Day. That is the best [way] and best in result.

8:20 O you who have believed, obey Allah and His Messenger and do not turn from him while you hear [his order].

The legal legitimacy of *al qiyas*

Furthermore, we have to legitimize whether deductions may be made from *Shariah*, although the negation of this process would imply an evident contradiction to the axiomatic status of *Shariah*.

The explicit evidence to practice the deduction provides a *Hadith*: [98]

"... Narrated Mu'adh ibn Jabal:

Some companions of Mu'adh ibn Jabal said: When the Apostle of Allah (peace_be_upon_him) intended to send Mu'adh ibn Jabal to the Yemen, he asked: How will you judge when the occasion of deciding a case arises?

He replied: I shall judge in accordance with Allah's Book. He asked: (What will you do) if you do not find any guidance in Allah's Book? He replied: (I shall act) in accordance with the *Sunnah* of the Apostle of Allah (peace_be_upon_him).

He asked: (What will you do) if you do not find any guidance in the *Sunnah* of the Apostle of Allah (peace_be_upon_him) and in Allah's Book?

He replied: I shall do my best to form an opinion and I shall spare no effort.
The Apostle of Allah (peace_be_upon_him) then patted him on the breast and said: Praise be to Allah Who has helped the messenger of the Apostle of Allah to find something which pleases the Apostle of Allah."

The effort in *fiqh* to form an independent opinion is referred to as *al ijtihad* [99]. It is precisely the process of performing an own deduction through an effort of reasoning. [100]
A brief illustration of how a Muslim has to observe the specific direction of prayer leads directly to the methodological concept of *al qiyas*:

First we consider the *Ayat* [101] (2:150) and (16:15-16):

2:150 And from wherever you go out [for prayer], turn your face toward al-Masjid al-Haram. And wherever you [believers] may be, turn your faces toward it in order that the people will not have any argument against you, except for those of them who commit wrong; so fear them not but fear Me. And [it is] so I may complete My favor upon you and that you may be guided.

16:15 And He has cast into the earth firmly set mountains, lest it shift with you, and [made] rivers and roads, that you may be guided,
16:16 And landmarks. And by the stars they are [also] guided.

Above indicates that an "effort of reasoning" is required for our intention to observe the "right" direction of prayer. The knowledge of geographical and astronomical facts enables us to approximate the "most correct" direction of prayer.

The approximation in turn is done by the process of natural deduction, i.e., if we assume the incomplete, yet sufficient facts, e.g.:

Location for prayer; Frankfurt, Germany: 52 ° 20 'N, 14 ° 31' E
Location of Al Kaaba / Holy Mosque Makkah, KSA: 21 ° 27 'N, 39 ° 45' E
Astronomical conditions:
Summer, sun at 5pm (GMT + 1) = Afternoon ==> sun in western sky

We can now perform a simple logical deduction A ---> B (Modus Ponens) to observe the "most correct" position for prayers through the position of the sun, i.e., geographical tangent to Al Kaaba / Holy Mosque Makkah: South East axis (138 ° 04 'SO).
We resume the terms "*al ijtihad*" and "*al qiyas*" with the following relation: [102]

al ijtihad = intention and means
= effort of reasoning

al qiyas = methodology
= deduction

***Al qiyas* practically**

To illustrate a clear and straightforward example of the actual handling of *al qiyas* in the deductive practice, we develop a model (hereafter referred to as "MSF" model):
Someone who considers the *Shariah* as binding, i.e., a Muslim <M> is confronted in a well-defined situation <S> with an unknown fluid <F> and is thirsty.
The Muslim <M> must now take the following steps to fulfill the chosen commitment towards *Shariah*:
He has to engage his mind (*al ijtihad*).
Apart an awareness about the axioms, he has to investigate the available facts together with their attributes for this.

The investigation must be carried out in analogy to the axioms of *Shariah*.
He will need to perform a deduction (*al qiyas*).

The intellectually guided process would evolve as follows:
The thirsty Muslim <M> considers the fluid <F> primarily in terms of whether it is a consumable substance.
Since we want to interpret his current situation <S> in the context of a coffee house, he concludes intuitively a drink <D>, but not a lubrication, cooling, cleaning, or fuel substance.
A quasi-search process recalls him the axioms of *Shariah*:

Quran (5:90)
5:90 O you who have believed, indeed, intoxicants, gambling, [sacrificing on] stone alters [to other than Allah], and divining arrows are but defilement from the work of Satan, so avoid it that you may be successful.

Hadith [103]
4956. 'A'isha reported: Allah's Messenger (may peace be upon him) was asked about Bit, whereupon he said: Every drink that causes intoxication is forbidden.

The Muslim <M> finds that the *Shariah* treats drinks under the attribute "intoxicating" and thus goes beyond the syntactic fact of "wine" as stated in the Quran.
<M> must now either analytically or empirically set the attribute "intoxicating" <*i*> or its negation, i.e., "not intoxicating" <¬*i*> with respect of the fact drink <D>.
By means of a request to fellow visitors to the coffee house, our thirsty Muslim <M> becomes aware that the liquid substance he is confronted with is an alcoholic drink called "Southern Comfort".
Through analysis and maybe a little experience it is quickly determined that an oral consummation <*o*> of the liquid "Southern Comfort" would yield the attribute "intoxicating", i.e., by interaction with his metabolism.
From the axioms of *Shariah*, the acute facts together with their attributes, it implies a prohibition to consume the drink in question. This process can formally be put as:

$$\exists_i \, S_i(M); \; \forall x \, M_x(D); \; \forall k \, D_k(b) \dashrightarrow M_x(\neg o)$$

In contrary to our first contextual assumption it might be, however, that the situation of the Muslim <M> requires the attribute "emergency" <*e*>, e.g., he may have had a car breakdown in a desert area next to another car which broke down earlier and left a bottle of Southern Comfort inside. In this context the axiomatic-deductive process runs on a whole different level, namely by considering the rules:

Quran (2:173)
2:173 He has only forbidden to you dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah. But whoever is forced [by necessity], neither desiring [it] nor transgressing [its limit], there is no sin upon him. Indeed, Allah is Forgiving and Merciful.

because of:

Quran (2:195)
2:195 And spend in the way of Allah and do not throw [yourselves] with your [own] hands into destruction [by refraining]. And do good; indeed, Allah loves the doers of good.

because of:

Quran (4:29)
4:29 O you who have believed, do not consume one another's wealth unjustly but only [in lawful] business by mutual consent. And do not kill yourselves [or one another]. Indeed, Allah is to you ever Merciful.

It should become evident, that an axiomatic hierarchy exists, which can make the deductive process extremely complex. [104]
The new expression now provides over $i=e$, that is, $S_i(M)=S_e(M)$, the sequence:

$$\exists_e S_e(M);\ \forall x M_x(G);\ \forall k\ G_k(b)\text{--->}M_x(o)$$

With reference to the above presentation we can begin to discuss the formal limits of the axiomatic method on the one hand, and natural deduction on the other hand:

C. METHODOLOGICAL AND EPISTEMOLOGICAL ASSESSMENT

15. ANALYTICAL EVALUATION

Methodological classification
In terms of methodology, we have to refer to the deductive method of mathematical logic. [105]
As explicitly stated in the *Shariah*, we consider a complete and consistent formal system.
Conclusions are hence drawn purely deductively, i.e., truth-preserving, and since the formal system has an axiomatic status, the obtained conclusions in conjunction with the axioms are extending knowledge. [106]
As a result of the intended full deduction from the axiomatic basis [107], we call those conclusions "deductive theories": "not only is every mathematical discipline a deductive theory, but also, conversely, every deductive theory is a mathematical discipline (and according to this view, deductive logic likewise is to be regarded as a mathematical discipline)." [108]
We therefore have to account for the question how the diversity of perceivable (empiric) or imaginable phenomena can be implemented in the formal system, what logic value may be assigned, and what pragmatic value a mathematical conception of *Shariah* may represent.
An epistemological differentiation of the deductive methodology will lead us to a sufficient scale:

Epistemological differentiation
At this point, we have to examine the principles of Islamic epistemology with regard to what extent our already developed, epistemological, syntactic, and system-theoretical facts can be anticipated.
We first turn to the ontological statements of the *Shariah*. This step will allow us to determine the area of the actual epistemology.

Islamic ontology
The Islamic ontology is constituted by the concept of God:

Allah (*Al ilah* = the God)

It is *monotheistic* (Quran 2:163):

2:163 And your god is one God. There is no deity [worthy of worship] except Him, the Entirely Merciful, the Especially Merciful.

In this sense, it is an *abstractum per definitionem*: (Quran 112: 1-4)

112:1 Say, "He is Allah, [who is] One,
112:2 Allah, the Eternal Refuge.
112:3 He neither begets nor is born,
112:4 Nor is there to Him any equivalent."

For this reason, it is not quantifiable on principle: (Quran, 6:103, and 16:17-18)

6:103 Vision perceives Him not, but He perceives [all] vision; and He is the Subtle, the Acquainted.

16:17 Then is He who creates like one who does not create? So will you not be reminded?
16:18 And if you should count the favors of Allah, you could not enumerate them. Indeed, Allah is Forgiving and Merciful.

The Islamic concept of God has both, immanent and transcendental attributes. Accordingly, this highest of all axiomatic hierarchies consists of complementary properties (Quran, 50:16, 58:7, 57:3):

50:16 And We have already created man and know what his soul whispers to him, and We are closer to him than [his] jugular vein.

58:7 Have you not considered that Allah knows what is in the heavens and what is on the earth? There is in no private conversation three but that He is the fourth of them, nor are there five but that He is the sixth of them – and no less than that and no more except that He is with them [in knowledge] wherever they are. Then He will inform them of what they did, on the Day of Resurrection. Indeed Allah is, of all things, Knowing.

57:3 He is the First and the Last, the Ascendant and the Intimate, and He is, of all things, Knowing.

Everything worldly is already ontologically determined:
(Quran, 59:24, 9:51, 54:52-53, 81:28-29, *Hadith*):

59:24 He is Allah, the Creator, the Inventor, the Fashioner; to Him belong the best names. Whatever is in the heavens and earth is exalting Him. And He is the Exalted in Might, the Wise.

9:51 Say, "Never will we be struck except by what Allah has decreed for us; He is our protector." And upon Allah let the believers rely.

54:52 And everything they did is in written records.
54:53 And every small and great [thing] is inscribed.

81:28 For whoever wills among you to take a right course.
81:29 And you do not will except that Allah wills – Lord of the worlds.

"Young man, I will teach you some words: Preserve (your obligations toward) Allah and He will preserve you. Guard (your obligations toward) Allah, and you will find Him on your side. When you ask, ask Allah. When you seek aid and succour, seek it from Allah. And know, that if the entire nation got together to benefit you in some way, they could never benefit you at all except for that which Allah had already decreed for you. And, if they all got together to harm you in some way, they could do you no harm except for that which Allah had already decreed for you. The pens have been lifted, and the tablets have dried." [109]

Islamic Epistemology

Based on the presented Islamic ontology, we now develop the body of the actual epistemology.

The knowledge acquisition is neither inductive nor deductive, but declarative (Quran 96:3-5, and 32:2):

96:1 Recite in the name of your Lord who created –
96:2 Created man from a clinging substance.
96:3 Recite, and your Lord is the most Generous –
96:4 Who taught by the pen –
96:5 Taught man that which he knew not.

32:2 [This is] the revelation of the Book about which there is no doubt from the Lord of the worlds.

The fact that the quranic revelation can be treated as a formal system *per definitionem* provides a very strong epistemological argument for the axiomatic status of its rules, i.e., that cognitive restrictions have no relevance. Rather, this kind of knowledge acquisition (i.e., revelation) implies that the ontology has informed the cognitive dimension, that is, any cognitive limitations that apply to all perceiving subjects to identify the ontology do not hold in the reverse process. [110]

A deduction is considered hypothetical maximal-approximation being not an axiom itself (Quran 29:41-43):

29:41 The example of those who take allies other than Allah is like that of the spider who takes a home. And indeed, the weakest of homes is the home of the spider, if they only knew.
29:42 Indeed, Allah knows whatever thing they call upon other than Him. And He is the Exalted in Might, the Wise.
29:43 And these examples We present to the people, but none will understand them except those of knowledge.

Remarkably, this parable provides a qualitative coincidence with the example given by *Karl Popper* in support of his epistemological view. [111]
For the epistemological interpretation of the Quranic parable we note that a spider works "error-free", i.e., that its *endosomatic* organs produce flawless *exosomatic* products, in this case, perfect spider webs. [112] These webs approach even regular geometric figures in the mathematical sense.
In spite of this perfection there is an inherent weakness:
A spider always builds its web between at least $n \geq 3$ points, and it is easy to see how sensitive spider webs respond to their external environment, e.g., with regard to heavy-rains, strong winds or larger creatures which destroy the webs if they pass through. [113]
The real phenomenon here is that a spider will proceed after the destruction of its "house", so it has survived, with the design of a new web and with the same perfection previously evinced. [114]
In view of the self-defined ontology we conclude to this parable, that the worldly perfection of a "spider house", as measured by the transcendent/immanent reality of the ontology, represents a maximal-approximation of the worldly possible to the ontological reality.
The worldly, which are primarily the physically quantifiable components of our perceivable world, should not obscure the fundamental inaccessibility of the ontology, even in the highest formal perfection.

It follows that all cognitively comprehensible only has the status of a hypothetic formalization, i.e., it should not raise any ontological claim, which represents another coincidence with *Karl Popper's* epistemological and system theoretical view.
The formal system of *Shariah* is therefore subject to the hypothetic-deductive restrictions previously discussed, namely that all conclusions, or deductive theories may at the most be considered as "most correct" maximal-approximations.
Hence, any truth-value of a full deduction is restrictively conditioned.
In order to substantiate this constitutive theory, we will recall the example of finding the direction of prayer (*Qibla*) where the approximation-axiom is explicit. The requirement in the Quran (2:150):

2:150 And from wherever you go out [for prayer], turn your face toward al-Masjid al-Haram. And wherever you [believers] may be, turn your faces toward it in order that the people will not have any argument against you, except for those of them who commit wrong; so fear them not but fear Me. And [it is] so I may complete My favor upon you and that you may be guided.

is conditioned with the Quran (2:115):

2:115 And to Allah belongs the east and the west. So wherever you [might] turn, there is the Face of Allah. Indeed, Allah is all-Encompassing and Knowing.

As anticipated, an approximation-axiom exists on the axiomatic level already, and not just on a deduced layer:
While the direction of prayer occupies a geographically discrete spatial variable, which is intentionally to be realized by every Muslim, the approximation-axiom implies that at the end of all efforts to adhere to these local variables (*al ijtihad*), the degree of approximation by the effort of mind, depending on the available facts (*al qiyas*), represents the decisive factor.
To provide with an illustration, we could imagine the case where a Muslim is at a geographically unknown place to him in a hermetically sealed room (e.g., by detention) so that in this context there is no way for him to derive the direction of prayer in any sense from the facts of his current situation (no location variable and no ex- and internal navigation means such as sun, moon phase or other navigation instruments). Under these initial conditions, all directions relate to one another invariant. Accordingly, *Al-Shafii* discusses these axioms with the same opinion:
"If they [the Muslims] exert their minds and exhaust all the possibilities of knowledge available to them they have fulfilled their duty. It is only this "striving" that God requires of them, not the "certainty of accuracy" which to achieve may not even be possible for them." [115]
Thus, before discussing the formal limits of *Shariah*, we will deliver the still pending aspect why it is impossible to find a syntactic proof of the validity of the axioms of *Shariah* within *Shariah*, while this inability, unlike in mathematics, does not yield an incompleteness of the formal system, but on the contrary, an epistemological necessity:

Proof of axiomatic completeness of *Shariah*

As long, as we as we have shown, we try to approximate ontology, the very fact of this trial limits us on principle. The reason for this can be seen in the

fundamental limitations of all formal means of expression. [116]
This implies for the epistemological context that the Quran represents the outermost level of expressivity in syntactic form. If this system would be incomplete, we should have a statement in it which would *mutatis mutandis* say: "You will find proofs for the validity of the revelation in the perceivable, expressible world." This, however, would imply that the formalization of the perceivable world would yield a more powerful formalism than the revelation of the ontology represents by itself, so that the proof of validity of the revelation would reside outside the formal system. This would render the formal system, in the sense of *Goedel's second incompleteness theorem*, incomplete. [117]
Nevertheless, we find that the perceivable world only provides with indicators for intellectual reflection of the revelation (Quran 6:97): [118]

6:97 And it is He who placed for you the stars that you may be guided by them through the darknesses of the land and sea. We have detailed the signs for a people who know.

The proof of the validity of the revelation can trivially only be provided by the revelation itself, i.e., the formal system, *mutatis mutandis*, must contain three conditional statements to prove complete:

(1) The proof of completeness of the formal system is ontological.
(2) Therefore, the revelation is its own proof.
(3) No perceiving subject can construct a similar formal system.

We find these statements explicitly in the following form (Quran 6:149, 22:72, 2:23-24):

(1) 6:149 Say, "With Allah is the far-reaching argument. If He had willed, He would have guided you all."

(2) 22:72 And when Our verses are recited to them as clear evidences, you recognize in the faces of those who disbelieve disapproval. They are almost on the verge of assaulting those who recite to them Our verses. ..." [119]

(3) 2:23 And if you are in doubt about what We have sent down upon Our Servant [Muhammad], then produce a surah the like thereof and call upon your witnesses other than Allah, if you should be truthful. 2:24 But if you do not – and you will never be able to – then fear the Fire, whose fuel is men and stones, prepared for the disbelievers.

At this point we don't want to provide with an "ontological proof of God", but on the contrary, with the stringent argument for the completeness but non-provability of the axiomatic system.
The integrity of the formal system is preserved because it cannot be syntactically proven by a more powerful, external formal system. Accordingly, the decisive aspect is the inability of having an external proof. And only this inability "proves" that the formal system is complete.
This fact is evident in mathematical and logical terms, as the "completeness axiom" [120] holds simultaneously with the "non-provability axiom" [121].

Hence, part of the axioms of the seclusive [122] formal system of *Shariah*, contrary to the *Goedel system* [123], is the "non-provability axiom", which makes the major difference to the non-seclusive mathematical system of axioms. [124]
We finally extrapolate the *Goedel statement* for *Shariah* as:

<S> = any propositional function within *Shariah*
<*w*> = index for any propositional function in <S> (seclusive and complete [125])

<*x*> = arbitrary natural number to index proofs
<a> = non-arbitrary propositional function of the *Shariah*, but:
(1) The proof of completeness of the formal system is ontological.
(2) Therefore, the revelation is its own proof.
(3) No perceiving subject can construct a similar formal system.
= <*a*> = no syntactic proof for <*S*> except <*S*>
<π> = proof
<ə> = there exists
<¬> = negation

(A) $\neg x$ [π_x proves $S_w(S)$] = $S_a(S)$

(B) for $w = a$

(C) $\neg x$ [π_x proves $S_a(S)$] = $S_a(S)$

Read from left to right:
(A) There is no *x* for the *x*-th proof which proves that propositional function of the *Shariah* S(*w*) is true.
This statement is contrary to *Goedel's system* no new propositional function within <S>, but the equivalent of the existing statement (*a*).

(B) Now we consider the self-referential propositional function ($S_w(S)$) for the statement (*a*) (*w* = *a*):

(C) There is no *x* for the *x*-th proof which proves that propositional function of the *Shariah* S(*a*) is true, and this in turn is exactly the propositional function, which is to the right ($S_a(S)$).

Hence, we are in the trivial situation to have a syntactic proof of the statement $S_a(S)$, for $S_a(S)$ indeed syntactically already exists!
If, however, contrary to the declarative statement $S_a(S)$, there would be no propositional function of the type $S_a(S)$, it would have implied a clear contradiction, because $S_a(S)$ says, that <S> proves itself.
If we could prove the opposite of the statement $S_a(S)$, i.e., $\neg S_a(S)$ [126], we would have proven a false statement to be true, which may not be possible in a consistent system [127]. Such a proof could hence only be deduced by disregarding $S_a(S)$ as part of the axioms.
Since $S_a(S)$ could be proven *syntactically*, the formal system is complete, with the pragmatic and thus heuristic value of having a *syntactic notion of truth*. [128]
That this syntactic notion of truth in turn has only approximate value for a deductive approach to *Shariah*, will be subject of the following section:

Formal limits
Presupposing the axioms of *Shariah*, the perception of this formal system by perceiving subjects is *per se* a deductive process already.
Following *Karl Popper*, the fact of hearing or seeing [129], already presupposes an "anatomical" theory of cognition:
"Since all our dispositions in a sense are adaptations to constant or slowly

changing environmental conditions, it can be described as theory-impregnated, the term "theory" is to be taken in a sufficiently broad sense. [...] And I think we can even say more. There are no sensory organs, were anticipatory theories are not genetically built-in." [130]

We thus have developed the ultimate limit in dealing with the axiomatic formal system. It can be classified psychological, but sine we don't seek any theory of mind, we just consider the general manner how we anticipate the syntactic expressions of *Shariah*.

The human anticipation of the first syntactic and eventually semantic expressions of *Shariah* are subject to well-defined restrictions set out in the Islamic epistemology. It led us to the conclusion that *de facto*, there is no sufficient criterion of truth in the descriptive cognitive process.

Rather, we concluded that through mind-guided anticipation of the perceivable world we can generate maximal-approximations of ontology at the most. Accordingly, the axiomatic value of the *Shariah* can only be ensured through permanent, non-stop intellectual activity:

(*Hadith* 222, 229) [131]
Narrated / Authority of: *Anas bin Malik*
"Seeking knowledge is a duty upon every Muslim, and he who imparts knowledge to those who do not deserve it, is like one who puts a necklace of jewels, pearls and gold around the neck of swines." (*Daif*)

Narrated / Authority of: *Abdullah bin Amr*
"The Messenger of Allah (saw) came out of one of his apartments one day and entered the mosque, where he saw two circles, one reciting Qur'an and supplicating to Allah, and the other learning and teaching. The Prophet (saw) said: 'Both of them are good. These people are reciting Qur'an and supplicating to Allah, and if He wills He will give them, and if He wills He will withhold from them. And these people are learning and teaching. Verily I have been sent as a teacher.' Then he sat down with them." (*Daif*)

This imperative leads us to the only pragmatic value of a seclusive, complete formal system with axiomatic status, because as the quoted *aHadith* clearly show, *Shariah per se*, without rationally guided reflection from outside, does not lead to the required maximal-approximations. [132] These days it requires an adequate and sufficiently complex "knowledge engineering":

16. PRAGMATIC PERSPECTIVE

Introduction

The pragmatic aspects of *Shariah* shall be discussed in the context of Artificial Intelligence (AI) research.

We have to show the extent to which the formal system can hold its high logical value as an Islamic "expert system".

To this end, we will perform the following introductory treatment of AI research to finally evaluate several heuristic classification criteria for conventional paradigm of this research.

AI Research - the classic paradigm

The classical paradigm of AI research was formulated by its leading proponents (*A. Barr* and *E. A. Feigenbaum*) as follows:

"Artificial Intelligence (AI) is a part of computer science concerned with designing intelligent computer systems, did is, system did exhibit the characteristics we associate with intelligence in human behavior -

understanding language, learning, reasoning, solving problems, and so on." [133]
They were convinced that the construction of computer-based systems could emulate human mental activity much faster and more reliable than humans could ever act. [134]
This *desideratum* is based on the assumption that the human neurophysiologic activity could be simulated "algorithmically" providing with algorithmic "expert systems", i.e., computerized experts.
The term "algorithm" has its morphological origins in the Persian name bearer and explorer *Al-Khwarizmi* (deceased ~ 231 H. / ~ 846 AD). In his book on arithmetic [135] he introduced a "mechanical" process for ever-repeating deductions concerning legal questions in Islamic law (*al fiqh*) which resulted in very efficient processing and transparency all-along. [136]
We will follow up with this aspect and define the algorithm for the following as:
A computation rule which can be grouped into a finite text and which determines a computational procedure completely. It is complete, that is, it may only refer to such values which are uniquely determined by itself. [137]
Whether we can emulate human mental activity and specific expertise according to above definition shall be subject of the next sections.
First we examine the definition of "expert systems":

Expert Systems

Expert systems are computer-based systems, which represent discrete areas of expertise to solve problems or to help with further advice on subject matters.
They differ from the actual field of artificial intelligence in terms of their limited range. [138]
In general, there are three requirements, namely: [139]

(1) They should represent a sufficiently large part of human knowledge.
(2) They should work much faster and reliable than their human counterparts.
(3) All generated solutions or advices must be transparent in order for the user to reproduce the evidence.

In order to realize this goal, the course of the 50s (classic AI-period), over the 60s (romantic AI-period), until the present, modern AI research from the beginning of the 80s, tested and explored different methods for knowledge- acquisition, representation and application. [140]
However, the results of this interdisciplinary research community with its ambitious, now and then naïve goals, were reduced to a realistic level.
In fact it turned out quite soon that algorithmic problem solving procedures alone could not represent sufficient expert knowledge. For this one would need essentially non-algorithmic methods. [141]
Thus, the current research focuses less on "intelligent", human problem-solving simulating expert systems, but rather on "knowledge-based systems" [142] which could be used for assisting with problems which may be formulated algorithmically. [143]
The schematic operation, criteria, and limitations of such knowledge-based systems shall be treated explicitly:

Knowledge-Based Systems

Figure 2 illustrates the data-flow in knowledge-based systems:

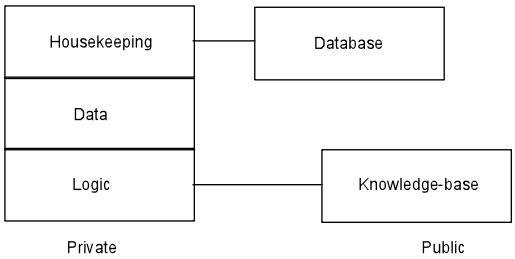

Figure 2: knowledge-based systems [144]

Its design provides for a separation between the actual basic program (housekeeping, data, logic), the fact base (database), and the knowledge base, so that the fact- and knowledge base is always subject to user-updates and corrections. [145]
The intended functionality of knowledge-based systems is therefore characterized by the explicit inclusion of variable components, i.e., not only searching for implicit knowledge, i.e., trivial reasoning on the basis of hypothetical knowledge, but searching for methods which generate new hypotheses with explicit expertise. [146]
Since computer programming doesn't mean anything less than mechanizing mathematical logic, the realization of this endeavor was subject to the entirety of known formal limits of mathematical logic. [147]
Accordingly, even the already lowered claims of knowledge-based systems (compared to expert systems) were more restricted which will be the subject of the following section:

Computation limits
The computation limits which affect more or less all areas of programming, but in any case the classical logic programming of knowledge-based systems shall be summarized as follows:

(1) There is no sufficient method to represent knowledge in a logical syntax. [148]
(2) The fact base is always subject to redundancies, uncertainties, and time dependencies. [149]
(3) There is basically no consistency and completeness in the rule set (expert hypothesis). [150]

The reason for the first restriction (1) is the standardized method to assign syntactic expressions with arbitrary semantics (e.g., *Possible Worlds Semantic*). [151]
The second restriction (2) reflects the fundamental inability to design an explicit representation language which would be coherent with the basic knowledge. [152]
Finally (3), as already discussed several times, the generation mechanism is necessarily subject to all inconsistencies and the principal incompleteness of the underlying set of rules
With these limits, knowledge-based systems remain in the background of classical cognitive efforts [153], in an "artistic" mix of "trial and error", "common sense" and game theory. [154]
But what would be the attribution of a knowledge-based system with regard to *Shariah*? With the whole concept of an algorithm being developed out of *Shariah*, there are reasonable indications that the constitutive limits of classical programming could be largely ruled out:

Re-algorithmization of Shariah
The concept of a re-algorithmization of *Shariah* pursues the development of algorithmic procedures to cope with the Islamic imperative of *al ijtihad* in an appropriate manner. For this purpose it is necessary to *completely* computerize

the methodological procedures on the axiomatic level (*Shariah*). [155]
The information-theoretic foundations are as well as both, morphological instantiations of the *Shariah* and applications of classical logic programming:

Information-theoretic foundations
With regard to our thematic framework, the discussion of the information-theoretical foundations is limited to a single constitutive aspect, namely to perform *syntactic* evaluations.
Pursuing the critical progression of the "Western" discussions around the concept of "truth" from among others, *Plato* (427-347 BC) [156] and *Aristotle* (348-322 BC) [157], *René Descartes* (1596-1650) [158], *Spinoza* (1632-1677) [159], *Leibniz* (1646-1716) [160] *Hegel* (1770-1831) [161], *Kant* (1724-1804) [162], *Bertrand Russell* (1872-1970) [163], *Wittgenstein* (1889-1951) [164], to *Alfred Tarski* (1902-1983) [165], etc., [166], we find that:

(1) There is no sufficient criterion for truth.
(2) We distinguish between:
    a) a syntactic truth (in the sense of logic values)
    b) an empirical truth (in the sense of cognitive facts)
    c) an ontological truth (in the sense of absolute truth)

As for any computerization and simulation of "knowledge", this differentiation yields the previously discussed restrictions on programming. That is, if we could operate with logical truths algorithmically (syntactically) on one hand but have basically no cognitive or ontological access to their semantic references on the other hand, we would only continue with our "trial and error" algorithmically.

This shortcoming is always present because investigations about semantics are generally characterized by not restricting the analysis of linguistic expressions as such and their relations to one another. Rather, they take into consideration what is being referred to in the sentences of the object language. And that is independent whether the method of denotation relation [167] or the method of extension and intension [168] is chosen because there is always the range of those objects taken into consideration to which the expressions of the object language relate. All specific semantic predicates such as "denotes", "term xyz-denotes", "satisfies", "true", etc. provide directly or indirectly (the latter as in the case of the predicate "true") with relations between linguistic expressions and their semantics [169].
Going one step further by not only abstracting away the semantics of the speaker who uses the expressions of the object language, but by also abstracting from what the linguistic expressions refer to, yields a purely formal analysis where any semantics are replaced by the syntax. Hence we return to the fact that logic can operate purely syntactically, that is:
The basic concept of logical deduction is exclusively defined syntactically (as opposed to the concept of "truth"). While a formal consideration of an expression doesn't provide knowledge of whether the sentence is true or not because this knowledge goes beyond the knowledge of that to which a sentence refers to, this knowledge is not required for the logic deduction *per se*. In a precisely structured language system however, it can be decided whether two submitted expression can be derived immediately one from the other or not (or any of several other submitted expressions) without

reference to their meaning provided that the term "immediately derivable" has been clearly determined in the system in question.
Therefore, any derivation, no matter how long or complex, can be characterized syntactically [170], i.e., the deductive part of *Shariah* could be mechanized completely, which takes us back to the origins of the term "algorithm". [171] [172]
Since with *Shariah* we can treat the theory of logical deduction, i.e., the axiomatic-deductive system, *purely syntactically* and have a *syntactic notion of truth* on the axiomatic level, the problematic knowledge acquisition of classic hypothetic-deductive systems only concerns the fact base of *Shariah*, which still remains accessible cognitively only. We will get back to the corresponding heuristics.
The following figure illustrates the concept of the re-algorithmization of *Shariah*: [173]

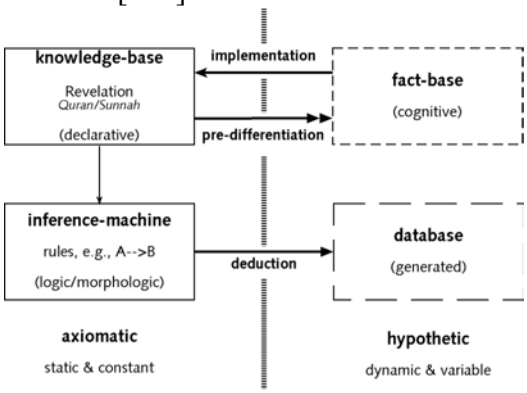

Figure 3

The left side of the scheme corresponds to the axiomatic part (*Shariah*) which is static (*space- and time invariant*) and complete. The right side corresponds to the hypothetical part, that is, the acquisition of cognitive facts (perceivable/quantifiable components of the "world") which is *space- and time variant* as well as subject to semantic restrictions which prevents an unambiguous and thus "safe" and "true" implementation into *Shariah*.
This distinction becomes clear by referring back to the MSF model with regard to the process of *al qiyas* in practice:
For the Muslim <M> in the situation <S> with respect to the fluid <F> to be consumed orally <*o*> and to come up with an adequate decision between "allowed" (*halal*) or "not allowed" (*haram*), it is necessary to consider the axioms of *Shariah*. So far our presentation was sufficient.
However, in order to take a decision in the algorithmic sense we need a more decisive step:
With a purely syntactical method, the algorithm has to decide whether, in the case of <S>; <M>; <F>; <*o*> the axiom

Quran (5:90)
5:90 O you who have believed, indeed, wine [intoxicants], gambling, [sacrificing on] stone alters [to other than Allah], and divining arrows are but defilement from the work of Satan, so avoid it that you may be successful.

is relevant or not by implementing syntactically from the fact base whether it is "wine" or "non-wine".
In the case of the fact "wine" an algorithm would be capable to deduce the predicate "not allowed", and *vice versa*, in the case of "non-wine", the predicate "not not allowed", that is "allowed".
However, we considered the fluid "Southern Comfort" in our model. And this empirical fact has no morphological equivalence to "wine". In this respect there cannot be a syntactic decision procedure because it requires a non-algorithmic pre-differentiation, which constitutes the heuristics of the re-algorithmization of *Shariah*:

Non-algorithmic pre-differentiated knowledge acquisition from the fact base

It has to be taken into account that there is no syntactic decision procedure which would allow our thinking to semantically relate morphologically different types of terms to each other because the understanding of the meaning of a sentence in natural language is the same as knowing its truth conditions. [174]

Since we only have an explicit grammar (syntax) in terms of the ontological-declarative *Shariah*, we need to perform a pre-differentiation of cognitively tangible facts (perceivable facts), which indeed renders the axiomatic, i.e., the explicit character of the facts, unattainable for *Shariah*. The hypothetical nature of the "trial and error", however, is conditioned by a heuristic maximal-approximate predicate which the MSF model may illustrate again: The semantic pre-differentiation for the syntax "wine" from *Shariah* is provided, e.g., by:

Hadith [175]

4956. 'A'isha reported: Allah's Messenger (may peace be upon him) was asked about Bit, whereupon he said: Every drink that causes intoxication is forbidden.

so that the fluid <F> is already pre-differentiated by the predicate "intoxicating". In analogy, the situation <S> can be pre-differentiated concerning an emergency <*e*> or not. [176]

In sum we call the pre-differentiation "non-algorithmic" because it is a consequence of the already extensively treated formal fact that we have no way to simulate human mental activity algorithmically [177]. Hence, a re-algorithmization of *Shariah* operates within the framework of knowledge-based systems as assistance to human brain activity, not as a substitution.

The heuristics

This section marks the end of a long formal discussion which we want to conclude with heuristic analysis.

Comparing the classical model of knowledge-based systems with the Islamic conception as illustrated in the Figures 2 and 3, the aspect of knowledge acquisition from the fact base is equally hypothetical and dynamic in both conceptions.

The only but decisive aspect concerns the formal attributes which are open and dynamic (*space- and time variant*), and inconsistent in the classic approach while the Islamic conception can build on a closed and static (*space and time invariant*), consistent, and complete set of axioms which can be subject to computation altogether.

Additionally, the aspect of knowledge acquisition from the fact base can be pre-differentiated with maximal-approximations by the set of static axioms.

With this at hand there should be powerful, rational arguments to finally define the limits of secularization but also the limits of any Islamic conception:

17. CONCLUSION

To conclude we politicize the two antagonists (secular principle versus Islamic principle) in the strict framework of our developed, covariant analytical scale.

For this purpose we reduce the complexity of common secular arguments to the ones with analytical relevance:

1. *Shariah* is not the same as the revealed word of God, but the result of an interpretation by people, especially by *ulama*. This knowledge is subject to change and its necessary increase should not be limited by taboos.
2. There is always a pluralism of interpretations. Texts are not applicable to themselves.
3. The Islamic civilization has reached its peak in the Middle Ages and kicked-off the Western Renaissance. This historical fact cannot be celebrated anymore. The Islamic intelligence must ask itself critically, why such a perfect order could fall into decline and why the grandiose lyrics have not been better applied, if applied at all? And why should texts remain valid that have attracted such a decadence to it?
4. The contemporary Islamic thought lacks transparency with regard to a political theory of the state, government and democracy. Without that, any politicization of religion is misleading. Their primacy contradicts the real history of Islam while the dictators of the Muslim world usurp and use their claim for truth of religion to strengthen military and mullah regimes. Particularly serious is the silence of Islamic scholars on the question of how to legitimate political leadership and power for the dictatorial regime and the spiritual collectivism have ruined the Muslim societies.
5. The time anachronistic conception of any static, orthodox doctrine ignores the dynamic rhythm of economic- and social systems. Cyclical thinking prevents a political pragmatism on the principle of trial and error, which takes into account the risk of error and the possibilities for correction by human action.
6. The retrogressive utopia of pure doctrine (*usuliya*) denies the reference of fundamentalists to themselves by ignoring profane space and time dependencies.
7. Overdue is an unsparing critique of the already very clearly visible failure of radical Islamic movements and power blocks all over the world, namely in Iran, Sudan, Pakistan, Tunisia and Egypt. It also lacks the sober assessment of trials of Islamic banking and other Islamic reform efforts to establish an autonomous, interest free economic cycle. In fact, these initiatives have been doomed since their interception by the pension capitalism of OPEC.
8. It still lacks more than a rhetorical response to the major socio-economic problems of almost all Islamic countries.
9. It ultimately lacks a realistic vision of how the Islamic region may balance the current world (dis)order." [178]

We now further streamline the common secular concerns to five questions which are equally important for non-secular Muslims, secular Muslims, and non-Muslims:

(A)

(1) What is "*Shariah*"?
(2) What is "*al ijtihad*"? and following from this:
(3) What is the status of "*al ijtihad*" relative to the "*Shariah*"?

(B)

(1) What is the essence of the secular principle? and following from this:
(2) What is "democracy"?

***Shariah* has a dual status**

The *Shariah* (Quran and *Sunnah*) is an axiomatic system with static, constant rules.
From the fact that such a *space- and time invariant* system has no heuristic value *per se*, but only through intellectual reflection from outside follows the imperative of rationally guided reflection (*al ijtihad*) which provides with the necessary space- and time dynamics, i.e., with *change*.
This imperative stresses methodological aspects which in turn are defined by the formal properties of the axiomatic system itself (*al qiyas*):
For any result of *al ijtihad* we have to assign the predicate "hypothetical" while the predicate "true" is exclusively reserved to the base of *al ijtihad*, i.e., to the axioms of *Shariah* without any interpretation and we can even go beyond and claim: Without any perception!
The interaction of axioms on one hand and hypothesis on the other hand calls for a methodological approach of systems theory:
The hypothetical anticipation of worldly facts and their mapping to an axiomatic system leads to a methodological predicate which we have called "maximal-approximate". The maximal-approximations in turn are only guaranteed by a semantically adequate axiomatic pre-differentiation.
It is this methodology which implies the possible dynamics of an axiomatic-hypothetical interaction if the conditions for a complete and transparent computation would be met. [179]

The secular principle is completely hypothetical

It is now a well-substantiated fact to argue that the secular principle is completely hypothetical:
The system-theoretical attribute follows directly from the purely intuitive or cognitive practice to develop and update the hypothetical basis.
And even if hypothetical systems achieve a temporary coherence between hypotheses and empirical facts, fundamental epistemological and syntactic limits will always persist.
What remains is the constant attempt to optimize, update, and replace the hypotheses which in turn is motivated by the existing critical insight, that hypotheses are always suboptimal.
The system-theoretical attribute for secular "trial and error" shall be resumed as purely hypothetical-deductive system:

1. No ontology ==>
2. Hypothetical anticipation of worldly facts ==>
3. Hypothetical status of the deduction ==>
4. Formation of hypotheses ==>
5. ... ==> 2 ... ==> 3 ... etc ... [180]

Democracy

In this background, the analysis of the term "democracy" can be perform without any complexity:

No matter which democratic theory we choose, whether we consider the absolute sovereignty of the people, which might individually be considered attractive by suggesting individual legislative, judicial and executive abilities, or whether we consider a limited sovereignty of people in connection with free institutions and closed entities such as central banks, which in turn are not subject of a popular vote, and there is a representation mode X, which ensures some kind of practicality of a majority vote, any of those democracy theories and practices always refer to a hypothetical constitution and institutions Y, and a purely hypothetical opinion. [181]

The more important attributes which are often (if not always) linked to "democracy" are transparency, accountability, equality, and legal security. These attributes shall be a consequence of the Islamic principle subject to the following, concluding part:

Politics and Religion

The consideration of the "Western" definition of "politics" leads us to three main meanings:

The term subsumes an institutional dimension (polity) which governs "social actions of individuals, groups, organizations, political parties, social movements, mass media, parliaments and governments, [...] by the constitution and laws ..." [182]

The second component is normative (policy) where state objectives are used with material and ideal values for the organization of society. [183]

The third aspect concerns the procedural level (politics) which describes the different processes of political decision-making. [184]

It is clear that political structures and processes "are always at the same time social" [185] and therefore "human and civil rights, work and leisure, social security and welfare, industry, agriculture, science and technology, infrastructure, constitution and law, culture and education, environmental protection and other fields..." [186] are by definition covered by policies.

In this sense, the Arabic term policy (*sawahsa*) refers to a supervisory body of the secular dimension (*daula*).

The Arabic term "religion" (*din*), derives its meaning from the root "*dayana*", which means devotion, guilt, divine purpose and divine judgment.

In addition, however, we also find the terms "*scharah*" (path, standard, guideline) and "*milat*" (method) in semantic correlation with the concept of religion, so that a discrete definition is not possible without contextual references. [187]

In relation to the Christian concept of religion (from the Latin *religare* = bind, tie, *religere* = observe carefully) [188], we can in fact assume a semantic equivalence (Quran (42:13)):

42:13 He has ordained for you of religion what He enjoined upon Noah and that which We have revealed to you, [O Muhammad], and what We enjoined upon Abraham and Moses and Jesus – to establish the religion and not be divided therein. Difficult for those who associate others with Allah is that to which you invite them. Allah chooses for Himself whom He wills and guides to Himself whoever turns back [to Him].

Thus, the question whether the above-defined areas of politics have to be separated from the norms of religion should be answered carefully:
Applying an Islamic scale, the question is itself normative and can therefore only be answered axiomatically, that is, it has to be negated [189].
The negation of the secular-principle has ever since been rejected by "secularist" as an irrational argument because it was based on *Shariah*. Nevertheless, the here presented analytical investigation shall reasonably attenuate any argument of rejection and provide with heuristic perspectives instead.
Together with broadly built-up internet infrastructure, a re-algorithmization of *Shariah* not only includes the possibility for access by the people, but with:

1. *Transparency and accountability*, i.e., a full comparison of all and any Islamic Law School, historic and/or contemporary, on the axiomatic level, i.e., which axioms were considered and why?
2. *Completeness and consistency,* i.e., a mere mechanical procedure (algorithm) generates the full transitive shell of the whole *corpus juris* (*Shariah*) without neglecting or "forgetting" any axiom.
3. *Legal security and equality*, i.e., any verdict, any judgment, any decree (*fatwa*) must account for the axioms which are completely transparent for the whole world, for Muslims and non-Muslims alike.

In this background it will surely not be as easy as nowadays to justify quasi-legally:

1. Privatization of political power and resources
2. Islamic nation building (other than a single nation)
3. Suicide attacks
4. Development of, threat with, and not to mention use of weapons of mass destruction
5. etc.

Based on a complete algorithmic query on the Islamic axiomatic system, one could even go further and ask if it is legitimate to deploy any weapon which leaves no more room for "mercy" (*Rahma*), including mid- and long-range firearms, not to mention any ballistic system such as missiles or bombers etc.
Instead of scarifying the prophets on the altar of warfare, it may be time to reconsider the concept of *exile* (*hijjrah*) which is materialized as the Islamic calendar as explicit part of the axioms of *Shariah*. [190]
If however we spare the Islamic axiomatic principle from our assessment, we can of course argue that among others, a secularization of politics is much more progressive for Muslims and the Western world.
But any rational approach has to provide with a stringent and sufficiently far-sighted perspective where classical opinions of secularists have failed with, namely a logical and epistemological compelling reason for a recursion on mere hypothetical assumptions.

18. ACKNOWLEDGEMENT

This investigation was only possible with the support and exceptional broad-mindedness of *Claus Leggewie*.

19. REFERENCES

[1] More specifically, the axiomatic set theory. The classes of formalized areas are: propositional logic, predicate logic with quantifier (incl. syllogistic), predicate logic with identity and identity theory.

[2] cf. **Whitehead**, Alfred North; **Russell**, Bertrand, *Principia Mathematica,* Cambridge University Press, 2nd edition, 1963

[3] cf. **Frege**, Gottlob, *Funktion, Begriff, Bedeutung,* Vandenhoeck & Ruprecht, Göttingen, 1975, reprint, ed. **Dittes**, Günther

[4] "Western" is hereinafter referred to as connotation for "non-Islamic".

[5] cf. **Gerhardt**, C.J. (Eds.), *Die philosophischen Schriften von G. W. Leibniz,* Vol **7**, 1890

[6] cf. also **Wittgenstein**, Ludwig, *Tractatus Logico-Phliosophicus* in: *Ostwalds "Annalen der Naturphilosophie",* 1921, **Tarski**, Alfred, *Der Wahrheitsbegriff in den formalisierten Sprachen*, Studia Philosophica, Bd. **I**, 1935, **Carnap**, Rudolf, *Logische Syntax der Sprache*, Springer, Wien (A), 1934/36 (Wiener Kreis), etc. ...

[7] cf. **Gerhardt**, C.J. (Eds.), *Die philosophischen Schriften von G. W. Leibniz,* Vol **7**, 1890, pp. 187, in: (*Goedel's* translation in: **Whitehead**, Alfred North; **Russell**, Bertrand, *Principia Mathematica,* pp. XXVIII)

[8] cf. **Smullyan**, R.M., *Theory of Formal Systems,* Princeton University Press, Princeton, New Jersey (USA), Annals of Mathematics Studies, N° **47**, 1961, pp. 2-5

[9] cf. **Péter** Rózsa, *Rekursive Funktionen,* 2nd Ed, Akademie-Verlag, Berlin, 1957, pp. 218

[10] cf. **Hilbert**, David, *Grundlagen der Geometrie,* Leipzig, Berlin, 1899, **Hilbert**, David; **Bernays**, P., *Grundlagen der Mathematik I,* Springer, Berlin, Heidelberg, 1934, pp. 32, and summarized: **Hilbert** David, *Neubegründung der Mathematik,* in: *Abhandlungen aus dem math. Seminar der Hamburgischen Universität 1,* 1922, pp. 157-177

[11] **Ebbinghaus**, Heinz-Dieter; **Flum**, Jörg, **Thomas**, Wolfgang, *Einführung in die mathematische Logik,* Bibliographisches Institut (B·I·) Wissenschaftsverlag, Mannheim, Leipzig, Vienna (A), Zurich (CH), 1992, p. 3 and 133

[12] cf. **Stegmüller**, Wolfgang, *Das Wahrheitsproblem und die Idee der Semantik, Eine Einführung in die Theorien von A. Tarski und R. Carnap*, Springer, Wien (A), 1957, **Schütte**, Kurt, *Beweistheorie*, Springer, Berlin, 1960, **Tarski**, Alfred, *Der Wahrheitsbegriff in den formalisierten Sprachen*, **Carnap**, Rudolf, *Logische Syntax der Sprache*

[13] cf. **Turing**, Allan M., *On Computable Numbers, With an Application to the decision problem,* in: *Proceedings of the London Mathematical Society* N° **42**, 1936/37, and N° **43**, 1937, and **Tarski**, Alfred, *Introduction to Logic and to the Methodology of the Deductive Sciences*, Oxford University Press, fourth edition edited by Jan Tarski, 1994, pp. 125-128

[14] cf. **Stegmüller**, Wolfgang, *Unvollständigkeit und Unentscheidbarkeit: Die metamathematischen Resultate von Gödel, Church, Kleene, Rosser und ihre Erkenntnistheoretische Bedeutung*, Springer, Wien (A), New York (USA), 1973, and **Tarski**, Alfred, *Einführung in die mathematische Logik*, pp. 143-147

[15] "A deductive theory is said to be *consistent* or *non-contradictory* if no two asserted statements of this theory contradict each other, or, in other words, if of any two contradictory sentences (cf. Section 7) at least one cannot be proved. A theory is called *complete*, on the other hand, if of any two contradictory sentences which are formulated by employing exclusively the terms of the theory under consideration (and of the theories preceding it), at least one sentence can be proved within this theory. Now, if a sentence is such that its negation can be proved in a given theory, one usually says that it can be *disproved* in that theory. With the help of this terminology we can say, that a deductive theory is consistent if no sentence can be both, proved and disproved within it; a theory is complete if every sentence which is formulated by employing the terms of this theory can be proved or disproved within it. Both terms "consistent" and "complete" are commonly applied not only to the theory itself, but also to the axiom system upon which the theory is based." (**Tarski**, Alfred, *Alfred, Einführung in die mathematische Logik*, p. 144)

[16] cf. [15] and **Péter** Rózsa, *Rekursive Funktionen,* pp. 218

[17] **Stegmüller**, Wolfgang, *Stegmüller, Wolfgang, Unvollständigkeit und Unentscheidbarkeit: Die metamathematischen Resultate von Gödel, Church, Kleene, Rosser und ihre Erkenntnistheoretische Bedeutung,* p. 1

[18] cf. **Goedel**, Kurt, *Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme I,* Monatshefte für Mathematik und Physik N° **38**, 1931, pp. 173-198

[19] By "purely syntactic" this crucial aspect is meant: The terms within a formal system (in *Goedel's* proposition the arithmetic) such as "proof" or "proves" are not initially formulated in the symbolism of arithmetic. Therefore, they are semantically imprecise.
Goedel has done the "hard work" to design a dictionary that associates to this "semantic" blurring unique numbers (arithmetic symbols). Since then, this method is called "*Goedelization*" which is a direct application of the previously developed "*diagonal method*" by *Georg Cantor* (1845-1918) for countability of infinite sets (in: **Cantor**, Georg, *Beiträge zur Begründung der transfiniten Mengenlehre, in: Mathematische Annalen,* N° **46**, 1895, pp. 481-512, and ibid, 1897, N° **49**, pp. 207-246

[20] cf. **Ebbinghaus**, Heinz-Dieter; **Flum**, Jörg; **Thomas**, Wolfgang, *Einführung in die mathematische Logik,* pp. 209-217

[21] "Non-algorithmic" within the meaning of *Penrose* means "... To be sure that such a systematization correctly does what it is supposed to do, we shall need to employ insights from outside the system just as we did in order to see that $P_k(k)$ was a true proposition in the first place. It is these

insights that cannot be systematized and, indeed, must lie outside any algorithmic action!"(1) and "the notion of mathematical truth goes beyond the whole concept of formalism. There is something absolute and "God-given' about mathematical truth"(2) (**Penrose**, Roger, *The Emperor's New Mind,* Oxford University Press, London, New York, 1990 (1) p. 61 and (2) p. 62

[22] cf. **Penrose**, Roger, *The Emperor's New Mind*, and **Føllesdal**, Dagfinn; **Walløe**, Lars; **Elster**, Jon, *Rationale Argumentation - Ein Grundkurs in Argumentations- und Wissenschaftstheorie*, Walter de Gruyter, Berlin, New York (USA), 1988 pp. 263-264, and also **Stegmüller**, Wolfgang, *Stegmüller, Wolfgang, Unvollständigkeit und Unentscheidbarkeit: Die metamathematischen Resultate von Gödel, Church, Kleene, Rosser und ihre Erkenntnistheoretische Bedeutung,* as well as **Eley**, Lothar, *Philosophie der Logik*, in: *Erträge der Forschung* Bd. 230, Wissenschaftliche Buchgesellschaft, Darmstadt, 1985, pp. 229-231

[23] **Aristotle**, *Analytica Priora,* Book I, Chapter 25, 86a 33-35

[24] **Thaer**, Clemens, *Die Elemente Euklids,* Leipzig, 1933, pp. 3), *Euclid* again differentiated between axioms and postulates, which is negligible in our context

[25] cf. **Stoll**, Robert R., *Sets, Logic, and Axiomatic Theories,* Freeman and Company, San Francisco (USA), London (UK), 1961, pp. 122-127

[26] "Science is not a system of certain, or well-established, statements; nor is it a system which steadily advances towards a state of finality. Our science is not knowledge (episteme): it can never claim to have attained truth, or even a substitute for it, such as probability. [...] The old scientific ideal of episteme — of absolutely certain, demonstrable knowledge — has proved to be an idol. The demand for scientific objectivity makes it inevitable that every scientific statement must remain tentative for ever. It may indeed be corroborated, but every corroboration is relative to other statements which, again, are tentative. Only in our subjective experiences of conviction, in our subjective faith, can we be 'absolutely certain'.[5] [...] Science never pursues the illusory aim of making its answers final, or even probable. Its advance is, rather, towards an infinite yet attainable aim: that of ever discovering new, deeper, and more general problems, and of subjecting our ever tentative answers to ever renewed and ever more rigorous tests." (**Popper**, Karl R., *The Logic of Scientific Discovery,* Taylor & Francis e-Library, Routledge, London, 2005, pp. 278-281)

[27] cf. **Kuhn**, Thomas S., *Structure of Scientific Revolutions,* Suhrkamp, The University of Chicago Press, 2nd Edition, 1970, **Føllesdal**, Dagfinn; **Walløe**, Lars; **Elster**, Jon, *Rationale Argumentation,* pp. 68-70, and **Popper**, Karl R., *The Logic of Scientific Discovery,* pp. 276-281

[28] **Popper**, Karl R., *Objektive Erkenntnis: Ein evolutionärer Entwurf,* 4th Edition, Hoffmann and Campe, Hamburg, 1984, p. 149

[29] cf. **Popper**, Karl R., *Das Elend des Historizismus,* Mohr, Tübingen, 1987, p. 51

[30] **Popper**, Karl R., *Die offene Gesellschaft und ihre Feinde, I: Der Zauber Platons,* 6th Edition, UTB, Bern (CH), 1980, pp. 214

[31] cf. **Popper**, Karl R., *Das Elend des Historizismus,* p. 56

[32] cf. **Popper**, Karl R., *An argument for Indeterminism, Quantum Theory and the Schism in Physics,* in: **Bartley v.**, William W. (ed.), *From the Postscript to the Logic of Scientific Discovery,* Hutchinson, London, 1982/83, and **Popper**, Karl R., *The Logic of Scientific Discovery,* pp. 206-247

[33] cf. **Heisenberg**, Werner, *Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik*, in: Zeitschrift für Physik, N° **43**, 1927, pp. 172-198

[34] Here in the version of *Paul Adrien Maurice Dirac*

[35] "The quantum theory of measurement thus leads to the statement that the very attempt to realize the reproduction of probabilities, makes an objectification of measurements impossible. In other words, in this theory the elements defining the measurement term are not compatible with each other. The fact of non-objectivity enforces the use of probabilities, their reproduction is ensured in the measurement process due to the nonlinear dynamics first. But again, due to the linearity the non-objectivity remains!" (**Busch**, Paul; **Mittelstaedt**, Peter, in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* Mannheim, Leipzig, Vienna (A), Zürich (CH), B·I Wissenschaftsverlag, 1994, p. 126), cf. also **Wheeler**, John Archibald, *The delayed of choice experiment and the dialogue between Bohr and Einstein,* in: **Kanitscheider**, Bernulf (ed.), *Moderne Naturphilosophie,* Könighausen & Neumann, Würzburg, 1984, pp. 203-222, and **Penrose**, Roger, *The Emperor's New Mind,* pp. 119-154

[36] To illustrate the enormous uncertainties we may assume an electron precisely fixed on a nanometer (10^{-9} meters). Its momentum would be so vague that in the next second its location would reside 100km away from the previously measured location.

[37] cf. **Friedrich**, Harald, in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* pp. 208-219, **Kanitscheider**, Bernulf, *Das Weltbild Albert Einsteins,* CH Beck, München, 1988, pp. 75-91, also **Wheeler**, John Archibald, *The delayed of choice experiment and the dialogue between Bohr and Einstein,* in: **Kanitscheider**, Bernulf (ed.), *Moderne Naturphilosophie*, p. 209-222

[38] cf. **Bohr**, Niels, *The quantum postulate and the recent development of atomic theory,* Lecture at the centenary of *A. Volta* in Como (I) on 16.09.1927, in: Nature, N° **121**, London (UK), 1928, pp. 580-590, reprint in **Bohr**, Niels, *Atomic Theory and the Description of Nature,* Cambridge University Press, Cambridge (UK), 1934, pp. 52-91

[39] Here, the so-called *double-split experiment*: cf. **Aspect**, A., **Grangier**, Ph., **Roger**, G., *Experimental Realization of the Einstein-Podolsky-Rosen thought experiment: A New Violation of Bell's Inequalities,* Physical

Review Letters, N° **49**, 1982, pp. 91-94, also **Wheeler**, John Archibald, *The delayed of choice experiment and the dialogue between Bohr and Einstein,* in: **Kanitscheider**, Bernulf (ed.), *Moderne Naturphilosophie* p. 209-222

[40] cf. *Albert Einstein's* dictum of 1951 in a letter to *Michele Besso*: "All these years of conscious brooding have brought me no nearer to the answer to the question, 'What are light quanta?' Nowadays every lump thinks he knows it, but he is mistaken.", in: **Speziali**, P. (ed.), *Einstein, A. Besso, Michele: Correspondence 1903-1955,* Paris (F), 1972, p. 453, and **Einstein**, A., **Podolsky**, B., **Rosen**, N., *Can quantum-mechanical description of physical reality be considered complete?,* Physical Review, N° **47**, pp. 777-780

[41] cf. **Wheeler**, John Archibald, *The experiment of delayed decision-making and dialogue between Bohr and Einstein,* in: **Kanitscheider**, Bernulf (ed.), *Modern Natural Philosophy,* p. 209

[42] cf. **Stöckler**, Manfred, *Thesen zum Dualismus zwischen Welle und Teilchen,* in: **Kanitscheider**, Bernulf (ed.), *Moderne Naturphilosophie*, p. 231-233 and **Daghbouche**, Karim, *The Ontological Principle*, J. Acad. (N.Y. N.Y.), Vol. **2** N° **4**, 2012: 160-163

[43] cf. **Weizsäcker v.**, Carl Friedrich, *Zum Weltbild der Physik,* Hirzel, Stuttgart, 1951, pp. 86-90, **Dürr**, Hans-Peter, *Geist und Natur. Über den Widerspruch zwischen naturwissenschaftlicher Erkenntnis und philosophischer Welterfahrung,* in: **Dürr**, Hans-Peter; **Zimmerli**, Walter Ch. (both Eds.), *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* Scherz, Bern (CH), München, Wien (A), 1989, pp. 28-46, **Bush**, Paul; **Mittelstaedt**, Peter, in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* pp. 114-129

[44] "In the mesocosm, the forms of our intuition and our immediate experiences are shaped." (**Vollmer**, Gerhard, *Was können wir wissen?, Volume I, Die Natur der Erkenntnis,* Hirzel, Stuttgart, 1985, p. 42)

[45] **Brenig**, William, in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* p. 154

[46] cf. **Thomas**, Harry; **Leiber**, Theodore, in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* p. 157, and **Fredkin**, Edward, **Toffoli**, Tommanso, *Conservative Logic,* in: International Journal of Theoretical Physics, N° **21**, 1982, pp. 219-253,

[47] cf. **Haken**, Hermann**; Wunderlin**, Arne in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* p. 246-248

[48] cf. **Martienssen**, Werner, Department of Physics, University of Frankfurt and Frankfurt-Darmstadt collaborative research center "Non-linear dynamics, "*Gesetz und Zufall in der Natur*", in: **Gerok**, Wolfgang, *Ordnung und Chaos in der unbelebten und belebten Natur,* Hirzel, Stuttgart, 1990, pp. 77-99

[49] cf. **Martienssen**, Werner, Department of Physics, University of Frankfurt and Frankfurt-Darmstadt collaborative research center "Non-linear dynamics, "*Gesetz und Zufall in der Natur*", in: **Gerok**, Wolfgang, *Ordnung und Chaos in der unbelebten und belebten Natur,* p. 77 -99

[50] **Burgness**, Tyrrell, at the *Northeast Polytechnic* in the UK

[51] **Weidlich**, Wolfgang, in: **Mainzer**, Klaus; **Schirmacher**, Walter, *Quanten, Chaos und Dämonen: erkenntnistheoretische Aspekte der modernen Physik,* p. 255

[52] cf. also **Frank**, Philipp; **Kox**, Anne J. (ed.), *Das Kausalgesetz und seine Grenzen,* Frankfurt, Suhrkamp, 1988

[53] "Every rational action must have a goal. It is rational just to the extent to which it sets its goal consciously and pursues it consistently and sets its resources according to this goal. The choice of a target is therefore the first task that we must solve if we want to act rationally" (**Popper**, Karl R., *Die offene Gesellschaft und ihre Feinde, I: Der Zauber Platons,* p. 214)

[54] "It may be better, therefore, to describe that trend — the advance towards theories of an ever higher level of universality — as 'quasi-inductive'. The quasi-inductive process should be envisaged as follows. Theories of some level of universality are proposed, and deductively tested; after that, theories of a higher level of universality are proposed, and in their turn tested with the help of those of the previous levels of universality, and so on" (**Popper**, Karl R., *The Logic of Scientific Discovery,* p. 276)

[55] This problem is well known as "*Hume's problem of induction*" taking on above question. According to *Popper,* however, the problem of induction is non-existent since each type of cognition has its corresponding "organic conditions" so that eventually pure deduction takes place (cf. **Popper**, Karl R., *Objektive Erkenntnis: Ein evolutionärer Entwurf,* and **Popper**, Karl R., *The Logic of Scientific Discovery,* pp. 3-9)

[56] **Wikiquote contributors**, "*Secularism*", Wikiquote*,* http://en.wikiquote.org/w/index.php?title=Secularism&oldid=1029965 (accessed June 7, 2013)

[57] cf. [56] and: **Wikipedia contributors**, "*Secularization*" Wikipedia*, The Free Encyclopedia,* http://en.wikipedia.org/w/index.php?title=Secularization&oldid=564850459 (accessed June 7, 2013)

[58] cf. [57]

[59] cf. **Wikipedia contributors**, "*Secularization*" Wikipedia*, The Free Encyclopedia,* http://en.wikipedia.org/w/index.php?title=Secularization&oldid=564850459 (accessed June 7, 2013)

[60] **Luhmann**, Niklas, *Funktion der Religion,* Suhrkamp, Frankfurt a.M., 1977, p. 255

[61] **Luhmann**, Niklas, *Funktion der Religion,* p. 243

[62] **Luhmann**, Niklas, *Funktion der Religion,* p. 244

[63] cf. **Luhmann**, Niklas, *Funktion der Religion,* p. 244

[64] **Luckmann**, Thomas, *Die unsichtbare Religion,* Suhrkamp, Frankfurt a.M., 1991, pp. 74-75

[65] cf. **Dobbelaere**, Karel, *Secularization: a multi-dimensional concept,* in: SAGE Publications, volume **29**, N° **2**, London (UK), 1981, pp. 27, and **Luckmann**, Thomas, *Die unsichtbare Religion,* p. 179, in the Supplement in respect of p. 132: "The privatization of religion is the core of the comprehensive privatization of life in modern societies. Privatization of life is one of the consequences - one could almost say: A "logical" consequence – of the high degree of functional differentiation of the social structure."

[66] **Dobbelaere**, Karel, *Secularization: a multi-dimensional concept,* p. 14

[67] **Tibi**, Bassam, *The Crisis of Modern Islam*, The University of Utha Press, München, 1988, p. 131

[68] **Tibi**, Bassam, *The Crisis of Modern Islam,* p. 131

[69] **Tibi**, Bassam, *The Crisis of Modern Islam,* p. 138

[70] **Tibi**, Bassam, *The Crisis of Modern Islam,* p. 146

[71] **Zakariya**, Fuad, in: **Luders**, Michael (ed.), *Der Islam im Aufbruch?, Perspektiven der arabischen Welt,* Piper, München, 1992, p. 242

[72] cf. **Luhmann**, Niklas, *Funktion der Religion,* pp. 233-255

[73] **Luhmann**, Niklas, *Funktion der Religion,* p. 233

[74] From "*al schar'ah*" = "way, directive, standard" ==> "*al Shari'ah*" = "prescribed path, policy, standards" = "religious law"

[75] cf. [76] (2)

[76] (1) "***Ahkam al Quran***" = The regulations that have been taken directly from the Quranic text and (2) "***Al Sunnah al fi'liyyah***" = The totality of statements of the Prophet (ass)* which include provisions for Muslims
* "ass" = "*alaihi salatu wa al salam*" = "God's peace and blessings be upon him"

[77] "*usul al fiqh*"

[78] "*al fiqh*" derived from the verb "*faqaha*" = "understand" ==> "*fiqh*" = "understanding" ==> "The understanding of the laws of Islam, the legal sciences of Islam"

[79] "*Al madhahib*" (sing. "*madhhab al*") = (lit. "embarked way" ==> "law schools") ==> "*al madhahib al arba'ah*" = "The four major law schools of Islam"

[80] The abbreviation "H." refers to an Islamic date after the emigration of *Muhammad* (ass) from *Makkah* to *Madinah* (*Hijjrah*). 0 H. corresponds to July 622 AD.

[81] **Ramadan**, Said, *Das islamische Recht: Theorie und Praxis,* Harrassowitz, Wiesbaden, 1980, p. 80

[82] cf. ***Quran*** (20:113), (26:192-195)

[83] cf. **Ramadan**, Said, *Das islamische Recht: Theorie und Praxis,* pp. 40-41

[84] cf. **al-Ghazali**, Abu Hamid *al-Mustasfâ,* Būlāq (Egypt), Amiriyya Press, 1905-07, pp. 49 ff, and **Hammad**, Ahmad Zaki, *Ghazali's juristic treatment of the Shari'ah rules*

in al-Mustasfa, in: **The American Journal of Islamic Social Sciences**, Vol **4**, N° **2**, The International Institute of Islamic Thought (IIIT), Herndon, Virginia (USA), 1987, pp. 159-177

[85] cf. [8]

[86] cf. [15] and **Rózsa** Péter, *Rekursive Funktionen,* pp. 218

[87] cf. **Daghbouche**, Karim, *The Ontological Principle*, J. Acad. (N.Y. N.Y.), Vol. **2** N° **4**, 2012: 160-163

[88] *Goedel* considered a sufficiently powerful system of arithmetic which implied the complete axiomatization of set theory, thus all of mathematics

[89] Otherwise, we could just formulate a *Goedel statement* and then declare it to be an axiom. In this regard there would be more *incompleteness* but on account of a very poor proof term.

[90] cf. **Stegmüller**, Wolfgang, *Unvollständigkeit und Unentscheidbarkeit: Die metamathematischen Resultate von Gödel, Church, Kleene, Rosser und ihre Erkenntnistheoretische Bedeutung*

[91] cf. ***Quran*** (10:64)

[92] cf. **Daghbouche**, Karim, *The Ontological Principle*, J. Acad. (N.Y. N.Y.), Vol. **2** N° **4**, 2012: 160-163

[93] cf. **Heisenberg**, Werner, **Bohr**, Niels, *Die Kopenhagener Deutung der Quantentheorie, in: Dokumente der Naturwissenschaft- Abteilung Physik,* Vol **4**, Battermann, Stuttgart, 1963, and **Bohr**, Niels, *Atomphysik und menschliche Erkenntnis II, Aufsätze und Vorträge aus den Jahren 1958-1962,* in: *Die Wissenschaft,* Vol **123**, Vieweg, Braunschweig, 1966, pp. 1-8, and **Baumann**, Kurt; **Sexl**, U., *Die Deutungen der Quantentheorie,* Vieweg, Braunschweig, Wiesbaden, 1984

[94] **Bohr**, Niels, Collected Works **6**, Foundations of Quantum Physics I (1926–1932), Edited by Jørgen Kalckar, pp 297-298

[95] cf. also ***Quran*** (2:154)

[96] "*Hadith*" (pl. *aHadith*), from the root "*hadatha*" = "submit news" is a technical term synonymous with "news about the *Prophet Muhammad* (ass)". The *Hadith* is the part of the *Sunnah* which is present today in written form as collected works.

[97] **International Islamic Federation of Student Organizations**, *an-Nawawi's Forty Hadith,* IIFSO, Salimiah (Kuwait), 19?, p. 90

[98] **Sunan Abu-Dawud**, **Book 24**: The Office of the Judge (Kitab Al-Aqdiyah) Book **24**, Number 3585: Narrated by *Mu'adh ibn Jabal*

[99] "*al ijtihad*" derived from the verb "*idschtihada*" = "making an effort" ==> "*al ijtihad*" = "the effort"

[100] cf. **Ramadan**, Said, *Das islamische Recht: Theorie und Praxis,* pp. 67-70

[101] "*ayat*" = "verses of the *Quran*" (sing. *ayah*)

[102] cf. **Al-Shafi'i**, *al-Risalah,* pp. 487-503, in: **Ramadan**, Said, *Das islamische Recht: Theorie und Praxis,* pp. 77-79

[103] **Sahih Muslim** by Imam Muslim, translation by Abdul Hamid Siddiqui, Volume: *The Book of Drinks* (Kitab Al-Ashriba)

[104] it is for this reason that pragmatic aspects are examined heuristically with regard to Information Technology!

[105] cf. [104]

[106] this will be clarified in the epistemological classification

[107] cf. [104]

[108] **Tarski**, Alfred, *Introduction to Logic and to the Methodology of the Deductive Sciences*, pp. 112, where morphological characteristics of the *Shariah* can be used to neutralize certain purely mathematical constraints

[109] **At-Tirmidhi**, rated sahih, cf. also *Hadith* N° 19, in: **International Islamic Federation of Student Organizations**, *an-Nawawi's Forty Hadith,* p. 56

[110] cf. **Daghbouche**, Karim, *The Ontological Principle*, J. Acad. (N.Y. N.Y.), Vol. **2** N° **4**, 2012: 160-163

[111] *Popper* explicitly highlights the exosomatic product of the spider

[112] **Witt**, P.N. et al., *Spider web-building in outer space: evaluation of records from the Skylab spider experiment*, J. Arachnol. **4**: 115-124

[113] cf. **Witt**, P.N. et al., *Spider web-building in outer space: evaluation of records from the Skylab spider experiment*, J. Arachnol. **4**: 115-124

[114] cf. **Witt**, P.N. et al., *Spider web-building in outer space: evaluation of records from the Skylab spider experiment*, J. Arachnol. **4**: 115-124

[115] **Al-Shafi'i**, *al-Risalah,* p. 487-503, in: **Ramadan**, Said, *Das islamische Recht: Theorie und Praxis,* pp. 77-79

[116] cf. **Daghbouche**, Karim, *The Ontological Principle*, J. Acad. (N.Y. N.Y.), Vol. **2** N° **4**, 2012: 160-163

[117] cf. section: Formal Treaties

[118] cf. also ***Quran*** (6:95-99), (16:72), (30:19-27), ...

[119] cf. also ***Quran*** (2:111), (2:213), (4:174-175), (6:104), (6:149), (11:17)

[120] cf. ***Quran*** (5:3), (2:2)

[121] cf. ***Quran*** (6:149), (22:72), (2:23-24), (10:37-38)

[122] cf. ***Quran*** (10:64)

[123] "Regardless of how one chooses the axioms and rules of inference, there are set-theoretic sentences such that neither it nor its negation can be proved from the axioms themselves. The order is important here: the incompleteness theorem does not say that there are true set-theoretic sentences that cannot be proved in any axiomatic system. That would be wrong, of course. For provided that one takes an arbitrary set, then one can indeed choose this as an axiom of a system - and then it is already proven for the system in question. We must choose the axioms and rules of inference *first*. Then Goedel's theorem states that regardless of how we always choose this, there are true set-theoretic sentences that are not provable from these. Because of the close relationship between mathematics and set theory, the same applies even

for mathematics at all" in: **Føllesdal**, Dagfinn; **Walløe**, Lars; **Elster**, Jon, *Rationale Argumentation,* p. 264

[124] cf. in *Goedel's* context [88]

[125] cf. section Formal Treaties

[126] cf. in a negated sense ***Quran*** (6:95-99), (16:72), (30:19-27), …

[127] cf. ***Quran*** (4:82)

[128] cf. **Wahab Abdel** Al-Nasr Allah Lidin M., *Simple Expert System for the IBM PC* in: **Dehlewi**, Fouaad, College of Engineering, Electrical Engineering Department, King Abdulaziz University, Jeddah (Saudi Arabia), 1986, unpublished, and **Abdelwahah**, Elnaserledinellah, *Limited Close, the story of the three wise men,* in: **Menzel**, W., Institute for Logic, Complexity and Deduction Systems, Faculty of computer science, University of Karlsruhe, 1991, unpublished

[129] One of these two cognitive processes must be assumed as mere "intuition" to perceive *revelation* is not possible with the exception of the Prophets: cf. ***Quran*** (2:30-33) The story *of Adam* and (26:192-195) *Muhammad* (ass) revelations.

[130] **Popper**, Karl R., *Objektive Erkenntnis: Ein evolutionärer Entwurf,* pp. 73

[131] **Imam Malik's Muwatta**: http://ahadith.co.uk/permalink-hadith-6804, http://ahadith.co.uk/permalink-hadith-6809

[132] cf. **Alwani**, Taha Jaabir al; **Khalîl**, Imad al Din, *The Quran and the Sunnah: The Time-Space Factor,* International Institute of Islamic Thought (IIIT), Herndon, Virginia (USA), London (UK), 1991, **Alwani**, Taha Jaabir al *ijtihad,* International Institute of Islamic Thought (IIIT), Herndon, Virginia (USA), London (UK), 1993

[133] **Barr**, A., **Feigenbaum**, EA *The Handbook of Artificial Intelligence,* Vol 1, Morgan Kaufmann, Los Altos, Calif. (USA), 1981, cf. also **Rich**, E., *Artificial Intelligence,* McGraw-Hill, New York (USA), 1983, **Winston**, PH, **Horn**, KP, *Lisp,* 2nd edition, Addison-Wesley, Reading, Mass. (USA), 1984, and **Charniak**, E., **McDermott**, D., *Introduction to artificial intelligence,* Addison-Wesley, Reading, Mass. (USA), 1985

[134] *Marvin* ***Minsky*** of the Massachusetts Institute of Technology (MIT) has reportedly said: "If we are lucky, they might decide to keep us as pets": **Searl**, John R., *Geist, Hirn und Wissenschaft,,* Suhrkamp, Frankfurt a.M., 1992, p. 29)

[135] "*Liber Algorizmi*" = "*Book of Algorizmus*": The oldest copy is now kept as a handy Latin translation at the Vienna Court Library, a second in Heidelberg (cf.: **Hunke**, Sigrid, *Allahs Sonne über dem Abendland. Unser arabisches Erbe,* Fischer, Frankfurt a.M., 1991, p. 47)

[136] cf. **Vernet**, Juan, in: *Das Vermächtnis des Islam,* Vol. **2**, Artemis, Zurich (CH), München, 1980, p. 244, and **Hunke**, Sigrid, *Allahs Sonne über dem Abendland,* p. 47

[137] cf. **Turing**, Allan M., *On Computable Numbers, With an Application to the decision problem,* in: *Proceedings of the London Mathematical Society* N° **42**, 1936/37, and N° **43**, 1937

[138] cf. **Hollingam**, Jack, *Expert Systems, Commercial Exploitation of Artificial Intelligence,* IFS Ltd.., UK, Springer, Berlin, Heidelberg, New York (USA), London (UK), Paris (F), Tokyo (Japan), 1990, pp. 13

[139] cf. **Jackson**, Peter, *Introduction to Expert Systems,* Addison-Wesley, Reading, Mass. (USA), 1986, p. 1 and **Preran**, David S., *Developing and Managing Expert Systems, Proven Techniques for Buisness and Industry,* Addison-Wesley, Reading, Mass. (USA), 1990, pp. 342-343

[140] cf. **Jackson**, Peter, *Introduction to Expert Systems,* pp. 11-12

[141] cf. [21], and **Jackson**, Peter, *Introduction to Expert Systems,* pp. 8-10

[142] cf. **Hollingam**, Jack, *Expert Systems, Commercial Exploitation of Artificial Intelligence,* p.13

[143] cf. **Jackson**, Peter, *Introduction to Expert Systems,* pp. 8-10

[144] **Hollingam**, Jack, *Expert Systems, Commercial Exploitation of Artificial Intelligence,* pp. 8, Figure 1.3.

[145] cf. **Hollingam**, Jack, *Expert Systems, Commercial Exploitation of Artificial Intelligence,* pp. 8-9

[146] cf. **Hollingam**, Jack, *Expert Systems, Commercial Exploitation of Artificial Intelligence,* pp. 11, and **Jackson**, Peter, *Introduction to Expert Systems,* pp. 226-227

[147] cf. **Jackson**, Peter, *Introduction to Expert Systems,* pp. 85, 99, 217, and 243

[148] cf. **Hintikka**, Jaakko, *Knowledge and Belief, An Introduction to the Logic of the Two Notions,* Cornell University Press, Ithaca (FL), London (UK), 1961, and **Jackson**, Peter, *Introduction to Expert Systems,* p. 237, 259

[149] cf. **Jackson**, Peter, *Introduction to Expert Systems,* pp. 243

[150] cf. **Jackson**, Peter, *Introduction to Expert Systems,* pp. 243

[151] cf. **Fitting**, Melvin, *Proof methods for modal logics and intuinistic,* Reidel, Podrecht (USA), 1983

[152] cf. **Jackson**, Peter, *Introduction to Expert Systems,* pp. 8-10

[153] cf. **Michalski**, R.S., **Larson**, J.B., *Selection of most representative workout examples and incremental generation of VL1 hypotheses,* Report N° **867**, Computer Science Department, University of Illinois (USA), 1978, **Michalski**, R.S.; **Chilausky**, RL, *Learning by being told and learning from examples,* International Journal of Policy Analysis and Information Systems, N° **4**, 1980, pp. 125-161, and **Bundy**, A., **Silver**, B., **Plummer**, D., *On analytic comparison of some rule-learning programs,* Artificial Intelligence, N° **27**, 1985, pp. 137-181

[154] cf. **Hintikka**, Jaakko, *Logic, language games and information,* Oxford University Press, Oxford (UK), 1973, and **Jackson**, Peter, *Introduction to Expert Systems,* pp. 226, 237

[155] cf. Decision N˚ 506 In: *Minutes of the Delegate Assembly elections with the MSV from 25.06.1994,* unpublished, view at: **Muslim Student Association in Germany** (MSV e.V.), Eichenstr. 41, 65933 Frankfurt a.M.

[156] cf. **Plato**, *Der Sophist,* 240d-262e-241a and 263b, Meiner, Hamburg, 1967, pp. 77-79, 149

[157] cf. **Aristotle**, *Metaphysik,* Book IV (1011 b 26), 1. Halbband: Bücher I (A) - VI (E), Meiner, Hamburg, 1978, p. 367

[158] "Et ainsi per reconnais très clairement certitude que la seul et de toute la verité science depand de la connaissance du vray Dieu seul..." **Descartes**, René in: **Adam** & **Tannery**, *Oeuvres de Descartes,* Paris (F), 1897-1910, p. 56, and cf. ibid p. 1ff

[159] cf. **Deleuze**, Gilles, *Spinoza und das Problem des Ausdrucks in der Philosophie,* Fink, München, 1993, pp. 115-137

[160] cf. **Leibniz**, Gottfried Wilhelm, *Hauptschriften zur Grundlegung der Philosophie,* Vol II, Meiner, Hamburg, 1966, pp. 435-456

[161] cf. **Hegel**, Georg Wilhelm Friedrich, *Phänomenologie des Geistes,* ff., and *Wissenschaft der Logik,* Meiner, Hamburg, 1966, pp. 439-477

[162] cf. **Kant**, Immanuel, *Kritik der reinen Vernunft, 1+2*, Publisher: **Weischedel**, William, Suhrkamp, Frankfurt a.M., 1988, *Die transzendentale Logik*, pp. 97-105, *Das Ideal der reinen Vernunft*, pp. 512-556

[163] "In fact, we may define truth, where such judgments are concerned, as consisting in the fact that there is a complex corresponding to the discursive thought which is the judgment." (**Whitehead**, Alfred North, **Russell**, Bertrand, *Principia Mathematica,* pp. 44)

[164] **Wittgenstein**, Ludwig, *Schriften,* Suhrkamp, Frankfurt a.M., 1963, pp. 11-83, and **Stenius**, Erik, *Wittgensteins Traktat,* Suhrkamp, Frankfurt a.M., 1969

[165] **Tarski**, Alfred, *The concept of truth in formalized languages,* pp. 261-405, and **Tarski**, Alfred, *Logic, Semantics, Metamathematics - papers from 1923 to 1938,* Clarendon Press, Oxford (UK), **VII** *The concept of truth in Formalized languages,* pp. 152-268

[166] cf. summary: **Kutschera**, Fv., *Grundfragen der Erkenntnistheorie,* de Gruyter, Berlin, New York (USA), 1982, § 1.3. and **Skirbekk**, G., *Wahrheitstheorien - Eine Auswahl aus den Diskussionen über Wahrheit im 20. Jahrhundert,* Suhrkamp, Frankfurt a.M., 1977

[167] cf. **Frege**, Gottlob, *Funktion, Begriff, Bedeutung*

[168] cf. **Carnap**, Rudolf, *Logische Syntax der Sprache*

[169] For providing a semantically closed systems we may look at the sentence: "The snow is white." This sentence is object language. In contrast, the sentence: "The sentence "The snow is white" is true." is already meta-

language and the sentence: "The sentence "The sentence snow is white "is true." is true" even meta-meta-language. So in order to "rescue" a trivial notion of truth, we have to scarify it for a language of "infinite order".

[170] **Stegmüller**, Wolfgang, *Das Wahrheitsproblem und die Idee der Semantik, Eine Einführung in die Theorien von A. Tarski und R. Carnap,* p. 174

[171] cf. **Wahab** Abdel Al-Nasr Allah Lidin M., *Simple Expert System for the IBM PC* in: **Dehlewi**, Fouaad, College of Engineering, Electrical Engineering Department, King Abdulaziz University, Jeddah (Saudi Arabia), 1986, unpublished, and **Abdelwahah**, Elnaserledinellah, *Limited Close, the story of the three wise men,* in: **Menzel**, W., Institute for Logic, Complexity and Deduction Systems, Faculty of Computer Science, University of Karlsruhe, 1991, unpublished

[172] cf. **van der Waerden**, Bartel L., *A History of Algebra From al-Khwarizmi to Emmy Noether,* Springer, Berlin, Heidelberg, New York (USA), Tokyo (Japan), 1985, p. 7

[173] **http://www.ahlalbait.com/Mission/db.html**

[174] **Eley**, Lothar, *Philosophie der Logik,* pp. 238-239

[175] **Sahih Muslim** by Imam Muslim, translation by Abdul Hamid Siddiqui,Volume: The Book of Drinks (Kitab Al-Ashriba)

[176] cf. ***Quran*** (2:173)

[177] cf. **Searl**, John R., *Geist, Hirn und Wissenschaft,* pp. 27-40 and ***Quran*** (2:31-33):
And He taught Adam the names – all of them. Then He showed them to the angels and said, "Inform Me of the names of these, if you are truthful."
2:32 They said, "Exalted are You; we have no knowledge except what You have taught us. Indeed, it is You who is the Knowing, the Wise."
2:33 He said, "O Adam, inform them of their names." And when he had informed them of their names, He said, "Did I not tell you that I know the unseen [aspects] of the heavens and the earth? And I know what you reveal and what you have concealed."

[178] cf. **Leggewie**, Claus, *Der Islam im Westen,* Rowohlt, Hamburg, 1993, pp. 188-195

[179] The fact that we have to express ourselves in the subjunctive at this point justifies the "Western" criticism of the Islamic world

[180] *Popper* describes this process more differentiated with the formula: P_1--->VT--->R--->P_2, wherein P_1 represents an initial problem and for this purpose VT represents a tentatively proposed theory. FE now describes the error elimination which leads to the new situation P_2. According to *Popper*, this process is non-cyclic so that P_1 is always different of P_2. cf. **Popper**, Karl R., *Objektive Erkenntnis: Ein evolutionärer Entwurf,* pp. 149-151

[181] cf. **Lindner**, C., *Kritik der Theorie der partizipatorischen Demokratie,* Westdt., Opladen, 1990, **Neusüß**, E. *Demokratie. Theorie und politische Praxis,* in: **Neumann**, F., *Politische Theorien und Ideologien,* Signal, Baden-Baden, 1977, **Rohrich**,

W., *Die repräsentative Demokratie. Ideen und Interessen,* Wiesbaden, 1981, **Steffanie**, W., *Parlamentarische und präsidentielle Demokratie. Strukturelle Aspekte westlicher Demokratie,* Wiesbaden, 1971

[182] **Drechsler**, Hanno (ed.); **Benzlers**, Susanne, *Gesellschaft und Staat: Lexikon der Politik,* 8th edition, Vahlen, München, 1992, p. 571

[183] cf. **Drechsler**, Hanno (ed.); **Benzlers**, Susanne, *Gesellschaft und Staat: Lexikon der Politik,* p. 571

[184] cf. **Drechsler**, Hanno (ed.); **Benzlers**, Susanne, *Gesellschaft und Staat: Lexikon der Politik,* p. 571

[185] **Drechsler**, Hanno (ed.); **Benzlers**, Susanne, *Gesellschaft und Staat: Lexikon der Politik,* p. 571

[186] **Drechsler**, Hanno (ed.); **Benzlers**, Susanne, *Gesellschaft und Staat: Lexikon der Politik,* p. 571

[187] cf. **Wehr**, Hans; **Cowan**, J. Milton (ed.), *A dictionary of modern written Arabic.,* 3rd edition, Spoken Language Services, Inc., Ithaca, New York, 1976; original: **Schregle**, Götz, *DEUTSCH-ARABISCHES WÖRTERBUCH,* Harrassowitz, Wiesbaden, 1977, p. 909 and p. 953

[188] cf. **Heiler**, Friedrich; **Goldhammer**, Kurt (ed.), *Die Religionen der Menschheit,* Reclam, Stuttgart, 1991, p. 17, and **Schmidt**, Heinrich, *Philosophisches Wörterbuch,* Kröner, Stuttgart, 1982, p. 583

[189] cf. ***Quran*** (4:59), (8:20), and in particular the *Sunnah* of *Madinah*, fully set forth in: **Hamidullah**, Muhammad - *FIRST WRITTEN CONSTITUTION IN THE WORLD, City state of Madinah at the time of Prophet Muhammad,* Apex Books Concern Luton (UK), Ashraf, Lahore (Pakistan), 1975, and based on both: **Asad**, Muhammad, *The Principles of State and Government in Islam,* DAR Al-Andalus, Gibraltar (GB), 1981

[190] Because of its axiomatic status within *Shariah* and contemporary relevance, the concept of an Islamic exile (*hijjrah*) requires dedicated studies