

Can religion handle cultural changes, as mathematics did it for physics?

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Of course, the question needs clarification and qualification. It actually stands for two questions: What points of view can one think of that make cultural changes *comprehensible* (to an individual or to a whole community) in the way mathematics made — and still makes — comprehensible conceptual changes in physics? Could *in particular religion*, or rather something that is based on religion as we know it, fulfill this function?

Many observers will agree that contemporary Western culture is undergoing unprecedented and profound changes. These are, in a certain sense, not unlike those changes physics — in the way it saw material reality — was undergoing at the beginning of the twentieth century. At that time mathematics played an important role as the mediator (and safeguard of plausibility) of different views and explanations: Einstein (and Planck, Bohr etc.) could ‘communicate with Newton’ in the language of mathematics that had remained stable in principle. Here, of course, the emphasis must be on “in principle”.

In distinction to the situation in physics, this time not only cognitive aspects but mainly normative — and perhaps also aesthetic — aspects of how people face the world, are being challenged. So whatever one thinks of Thomas Kuhn’s concept of paradigm shift when applied to philosophy of science, Western culture is indeed facing such an unprecedented paradigm shift. And, as a consequence, non-Western cultures as well.

The contributing factors leading to this crisis of Western culture can roughly be grouped as follows:

(A) *External* (to the West), given by population explosion and the ensuing demographic changes leading to the rapidly decreasing proportion of population of direct European descent; globally as well as in regions that can still be regarded as predominantly Western, such as (Western) Europe, (North) America and Australia.

(B) *Internal* (to the West), more or less directly connected with scientific and technological progress. These can be subdivided into

- (i) ecological limitation to unchecked material progress (and population increases);
- (ii) computers, and the associated information explosion, leading to inevitable globalisation — not only economic but also cultural;
- (iii) recent advances in biocomputing (e.g. towards a fusion of brain and computer) and genetic technology, many aspects of which, if implemented, will have an as yet unimaginable impact on the very carriers of any culture.

The most disturbing is the last subgroup as it is hard to foresee the consequences of genetic engineering. It represents a looming danger to any civilisation: a fatal interference with the ‘hardware’ without which the ‘software’, i.e. culture, cannot ‘run’. Not to mention another

danger, although better understood in its possible consequences, it is at least as fatal: that of a nuclear catastrophe triggered perhaps by some terrorist or civil war sparkle. This, of course, is not to deny the usefulness of a responsibly utilised nuclear energy. The same is true about the advantages of future achievements in biocomputing and genetic technology.

There is one more contributing factor, secondary in the sense that it is a direct outgrowth of Western — and only Western — culture: cultural self-denial, a negativist approach to one's own tradition and history, manifested at the most abstract levels by epistemological negativism or relativism (not to be confused with cultural relativism, which is a related but still different thing).¹ It is this factor that represents an immediate danger to Western culture. And it is the unintended (or perhaps even intended) consequences of this negativism that make it imperative to try to understand, and face without trepidation, at least on the psychological level, the transformations the West is being pushed through. The present paper would like to contribute to this understanding by comparing the situation with that of physics at the beginning of the last century.

Let me begin with a personal motivation that brought me to this topic. Many years ago, as an undergraduate student of mathematics in Prague, I was puzzled and disturbed when first trying to understand the consequences — as I saw them — of Einstein's (special) theory of relativity. The whole world seemed to come down, everything in that theory seemed to be against common sense or even logic.² It was not until I came across a book that properly explained the mathematics behind the theory that I realised, that what I held to be common sense was simply the setup of Newtonian physics that needed to be abandoned, or rather extended, not common sense (though common sense at this level became somehow irrelevant). And certainly not mathematics which remained the clear *symbolic* frame of reference compatible with both the old and the new physics.

I was reminded of this state of mind of my early years when in my later years I once again became puzzled and disturbed. This time it was the incomprehensible, even suicidal, direction our Western culture seemed to be taking. Then I remembered Clifford Geertz's writings about the *symbolic* character of culture, and — at its centre — religion. And it occurred to me that Einstein's famous aphorisma: "As far as the laws of mathematics refer to reality, they are not certain; as far as they are certain, they do not refer to reality" could also be paralleled by: "As far as religious symbols (and norms) refer to observable reality (and rules that can be enforced) they are not certain; as far as they are certain they do not refer to observable reality (and rules that can be enforced)."

¹ Bassam Tibi, who describes himself as "a non-European living in Europe", a professor of international relations at Göttingen where he lectures in islamology, speaks of "Self-denial (Selbstverleugnung) up to renouncing (Aufgabe) one's own identity which leads to self-hatred, and provokes pity but also contempt." (c.f. [TI], p. 34).

² For instance: How could there be an absolute speed (of light)? If one point moves with respect to a fixed observer with speed c in one direction, and another point with the same speed c in the opposite direction, then surely the realtive speed of the one point with respect to the other must be $2c$!

Unless otherwise stated we shall consider cultures in association with whole *civilisations*, mainly contemporary, of which one usually identifies about seven or eight: Sinic, Japanese, Hindu, Islamic, Orthodox, Western, Latin American and possibly African, (see e. g. [HU], p. 45-47). One could add that because of their underlying religion, Orthodox, Western and Latin American civilisations can be grouped into Western civilisation in the broader sense.

A clarification of basic terms is now overdue. To start with, we shall use the term *culture* essentially in the sense of Clifford Geertz's anthropological definition as "an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic form by means of which men communicate, perpetuate, and develop their knowledge about and attitudes towards life". ([GE1], p. 3; also [GE3], p. 89). He also argues that "thought does not consist of mysterious processes located in what Gilbert Ryle has called a secret grotto in the head but of a traffic in significant symbols ... upon which men have impressed meaning. ... The meanings that symbols, the material vehicles of thought, embody are often elusive, vague, fluctuating, and convoluted, but they are, in principle, capable of being discovered through systematic empirical investigation. ... It is through culture patterns, ordered clusters of significant symbols, that man makes sense of the events through which he lives. The study of culture, the accumulated totality of such patterns, is thus the study of the machinery individuals and groups of individuals employ to orient themselves in world otherwise opaque." ([GE3], pp. 362-3). Here the term *symbol* is understood by Geertz as "any object, act, event, quality, or relation which serves as a vehicle for a conception — the conception is the symbol's 'meaning'. ([GE1], p. 5; also [GE3], p. 91).

Below we shall consider symbols of another kind: mathematical concepts and relations used as building blocks for mathematical models of (some part of) physical reality. They are not to be confused with what is popularly called mathematical symbols, which are just characters (signs) denoting some mathematical concepts or relations. Both in Geertz's definition, and in our reference to mathematical models, we have something familiar (either from everyday life or from the formal world of mathematics) pointing to something not attainable, comprehensible, manageable directly.

Geertz sees religion as the most important of such patterns of meanings that constitute a cultural system. His by now classical definition regards religion as "a system of symbols which acts to establish powerful, pervasive, and long-lasting moods and motivations in men by formulating conceptions of a general order of existence and clothing these conceptions with such an aura of factuality that the moods and motivations seem uniquely realistic." ([GE1], p. 4 also [GE3], p. 90).³ He associates with it what he calls the religious perspective, "a particular

³ The likewise classical sociological/anthropological description of Luckmann does not contradict Geertz's and is more explicit. He calls the "transcendence of biological nature by the human organism a religious phenomenon" which "rests upon the functional relation of Self and society". This he explains as follows: "Detachment from immediate experience originates in the confrontations with fellow men in the face-to-face situation. It leads to the individuation of consciousness and permits the construction of interpretive schemes, ultimately, of systems of meaning. Detachment from immediate experience finds its complement in the interpretation of past, present and future into a socially defined morally relevant biography. This integration develops in continuous social relations and leads to the formation of conscience. This individuation of the two complementary aspects of Self occurs in social processes. The organism — in isolation nothing but a separate pole of 'meaningless' subjective processes — becomes a Self by embarking with others upon the construction of an 'objective' and moral universe of meaning." ([LU], pp. 48-49).

way of looking at life, a particular manner of construing the world” ([GE1], p. 26; also [GE3], p. 111), and considers its special position among other such perspectives, or meaning systems, as common sense, ideology, science, art. One might add here various philosophical perspectives. Science — natural sciences as well as social sciences — would not be considered as a part but only as a product of (Western) culture. Though both are ‘cultural products’, there is a difference expressed by Geertz in saying that social sciences are more “culturally entrenched” than the “culturally disengaged” natural sciences, as much as he dislikes that fact ([GE4], p. 149). Another such ‘product’ is probably philosophy, at least in the classical (Western) meaning of the word, although it is usually regarded as standing ‘above’ both natural and social sciences.

Of special interest to us is science, which shares with religion the cognitive aspect, and ideology, which shares mainly the normative aspect. The difference, according to Geertz, is “to be sought in the sorts of symbolic strategy for encompassing situations that they represent. Science names the structure of situations in such a way that the attitude contained toward them is one of disinterestedness. Its style is restrained, spare, resolutely analytic (whereas) ideology names the structure of situations in such a way that attitude toward them is one of commitment ...: By objectifying moral sentiment through the same devices that science shuns, it seeks to motivate action. ... Where science is the diagnostic, critical, dimension of culture, ideology is the justificatory, the apologetic one — it refers to that part of culture which is actively concerned with the establishment and defense of patterns of belief and values.” ([GE2], pp. 71-2; also [GE3], pp. 230-1).

Here Geertz has apparently social science in mind, but natural science is perhaps even more “disinterested, restrained and analytic” and its task is indeed solely cognitive with no normative elements that would “motivate action”. That is, unless its goals become confused with those of an ideologist, political activist; a temptation that seems to be more that of a social scientist.

Religion itself can degenerate into quasi-science, when it does not see properly the symbolic, meaning-conveying nature of its cognitive task, or into quasi-ideology when it misreads the nature of its normative, ethical function. Both degenerations have been known to haunt Western religions, in particular Christianity. Because, on one hand, “the religious perspective differs from the scientific perspective in that it questions the realities of everyday life, not out of institutionalised skepticism ..., but in terms of what it considers wider non hypothetical truths.” ([GE1], p. 27; also [GE3], p. 112). On the other hand, in the words of Andrew Greeley when interpreting Geertz: “Religious symbols may create a context in which humans can work for a better social order, but the symbols do not and cannot dictate specific social policies and strategies. To identify strategies or programs with religious symbols is both naïveté and idolatry. It is naïve because religious symbols have nothing to say about concrete issues of international economics, and it is idolatrous because such identification absolutizes the relative — and every program of strategy is relative... But if religious symbols do not provide practical programs, if they are no substitute for political, economic and social competence and sophistication, they do provide the motivation, the goals and the ideals for social reconstruction.” ([GR1], p. 128).

Much has been said and written about the relation between science and (the cognitive function of) religion. What is important from our point of view has perhaps best been summarized again by Greeley: “The very fact that science has reduced the area of bafflement, and now explains satisfactorily the problems with which religion used to deal, requires that the symbols be translated in abstract and rational concepts ... even though the scientific bafflement may have declined, bafflement over the human condition continues as strong as ever — and stronger, because now it is more explicit.” ([GR2], p. 69).

This brings us to the concept of *model*, understood by Geertz as “a set of symbols whose relations to one another model relations among entities, processes or what-have-you in physical, organic, social or psychological systems by ‘paralleling’, ‘imitating’, or ‘simulating’ them”. Thus a model, even more than a symbol on its own, can be seen as a pointer towards something unattainable and unmanageable directly. Geertz continues “The term ‘model’ has, however, two senses — an *of* sense and a *for* sense ... In the first what is stressed is the manipulation of symbol structures so as to bring them more or less closely, into parallel with the pre-established non-symbolic system. ... The theory ... is a model *of* reality. In the second what is stressed is the manipulation of the non-symbolic systems in terms of the relationships expressed in the symbolic. ... Here the theory is a model *for* reality.” ([GE1], p.7; also [GE3], p. 93). In other words, models *of* reality have a mainly cognitive purpose, to ‘understand’ reality, whereas models *for* have a mainly applications oriented purpose, to ‘act upon’ or ‘manipulate’ reality. And he adds that models that represent “cultural patterns have an intrinsic double aspect: they give meaning, i.e. objective conceptual form, to social and psychological reality both by shaping themselves to it and by shaping it to themselves.” ([GE1], p.8; also [GE3], p. 93). Thus also “the importance of religion lies in its capacity to serve, for an individual or for a group, as a source of general, yet distinctive, conceptions of the world, the self, and the relations between them, on the one hand — its model *of* aspect — and of rooted, no less distinctive ‘mental’ dispositions — its model *for* aspect — on the other. From these cultural functions flow, in turn, its social and psychological ones.” ([GE1], p. 40; also [GE3], p. 123).

A mathematical model of some physical situation or conception is a relatively well understood vehicle in the epistemology of (natural) science, notably physics. The concept agrees in broad terms with Geertz’s general definition. Including the distinction between a mathematical model *of* physical reality, that fulfills a predominantly *cognitive* function (e.g. a pseudo-Riemannian four-dimensional manifold as a model of space-time) and a mathematical model *for* a particular physical situation that serves a predominantly *practical* purpose, needed to apply some mathematical methods or techniques to solve a particular, e.g. engineering, problem. As in the case of cultural patterns, most mathematical models will display this “intrinsic double aspect”, a theoretical as well as a practical, i. e. they serve both to depict reality, and to act upon it.

Some time ago I proposed the term *adequacy measure of a mathematical model*, actually two of them, a *practical* and a *theoretical* one (c.f. [VI]). In the first case it is the requirements of simplicity that prevail, in the second case that of universality; the first one ‘measures’ practical usefulness, the second one ‘closeness to reality’. Thus the first measure would reflect the

Geertz's model *for* aspect, whereas the second one would correspond to that of a model *of*. For instance, for phenomena covered by everyday engineering practice, Newtonian (as opposed to relativistic or quantum) mechanical models are the most adequate, their high practical adequacy outstrips their not so high theoretical adequacy. The situation changes when phenomena enter into consideration for which the theoretical inadequacy of the classical model cannot be neglected (because e.g. the numerical predictions of the classical model differ substantially from those of a theoretically more adequate one): then the classical model has to give way to e. g. a quantum theory model. A similar situation arises when depicting a portion of the surface of the Earth for mapping purposes as either part of a plane or that of a rotational ellipsoid: for local regions the practical adequacy of the first one prevails over its theoretical inadequacy.⁴

Perhaps one could speak also of two adequacy measures of some cultural models. In Geertz's words: "Cultural analysis is (or should be) guessing at meanings, asserting the guesses, and drawing explanatory conclusions from the better guesses..." ([GE3], p. 20). This seems to correspond to what in the mathematics-physics context one would require of a useful mathematical model: to model physical concepts (guessing at meanings), keeping in mind their theoretical adequacy (assessing the guesses) as well as practical adequacy (drawing explanatory conclusions). In particular, one could speak of adequacy measures of models associated with religion, where the measure of practical adequacy would probably have to go even further, beyond pure "explanatory conclusions", by referring to the normative, commitment-inducing, function of religion. Geertz could have this practical adequacy in mind when he says that "the force of a religion in supporting social values rests ... on the ability of its symbols to formulate a world-view in which those values as well as the forces opposing their realization are fundamental ingredients. ... A religion will be effective precisely to the extent that its symbols are effective." ([GE3], p. 131) Of course, this does not mean that the system of given religious symbols should be corrupted, or bent, in order for a particular interpretation to be 'effective'. The same as one would not bend the laws of mathematics in order to make a particular mathematical model's predictions agree with experimental data.

The usefulness and fruitfulness of mathematics in describing the physical world, mainly through mathematical models, is beyond doubt. Perhaps the ultimate homage to this function of mathematics was paid by Einstein: "It is my conviction that pure mathematical construction enables us to discover the concepts and the laws connecting them, which gives us the key to the understanding of nature ... In a certain sense, therefore, I hold it true that pure thought can grasp reality as the ancients dreamed." (as quoted in [KA], p. 327). And only recently, Stephen Hawking, the wheelchair-bound Cambridge professor, often referred to as the 'Einstein of our times' in his interview with the magazine FOCUS is reported to have said: "We already had to change our basic concepts (in physics) so often that we do not ask anymore whether a theory

⁴ There are other models in science that are visual rather than mathematical (compare an elementary particle modeled as a tiny ball with its mathematical model as a Hilbert space with an irreducible representation of the Lorentz group). Ian C. Barbour (c. f. [BA]) calls visual models — which are thus models *of* — theoretical models, and reduces mathematical models to their practical, non-cognitive function only. He considers these theoretical models parallelly with models in religion, sort of reduced to its cognitive component. However, for our purposes, we shall keep to the above concept of a mathematical model either *of* or *for*, i. e. with both its aspects or adequacy measures, and somehow ignore visual models although they offer easy parallels with models in religion which indeed are often very 'visual'.

reflects reality but solely whether one can deduce from it a good mathematical model of observations.”⁵

These things can be taken for granted without having to ask philosophical questions about the very nature of mathematics, which — to put it simply — all amounts to the dilemma whether a mathematician’s work is one of *discovery* or one of *invention*, whether a mathematician is rather like an explorer of a given, but unknown, territory, or rather like a creative artist. All the usually quoted approaches to the philosophy of mathematics — Platonic, logistic, formalist or intuitionist — evolve around this dilemma. The important thing is that you do not have to decide whether you are a Platonist⁶ or what, in order to ‘do mathematics’ or explore and use mathematical models for cognitive or practical purposes. Because of the likewise symbolic character of religious concepts, there might be a parallel position with religion: you can ‘use’ its symbolic patterns (in a certain sense that would need to be specified), both cognitive and normative, without having to decide about the actual existence (and nature) of what they are supposed to point to, be it an Ultimate Reality, or an Ultimate Lawmaker, or what.

As indicated in the introduction, mathematics proved to be indispensable when evaluating the dramatic changes in physics at the beginning of the twentieth century, and it is perhaps even more so today, when physics faces new upheavals in the understanding of its basic concepts. One can hardly speak of these matters without mentioning the historian Thomas S. Kuhn who in his ground breaking dissertation [KH] introduced the terms “paradigm” and “paradigm shift” to explain changes in the way science, in particular physics, sees the world. It is rather an irony that these new concepts and views, much better characterise dramatic changes in the development of social sciences: terms like paradigm, paradigm shift, became household items exactly in works treating topics from humanities. In physics, however, as already mentioned, even the most dramatic changes are ‘quantifiable’: the passage from Newton to Einstein or Planck happened with the not very much changing mathematics in the background. Mathematics could explain, or at least manipulate, both the old and the new theories or ‘paradigms’.⁷

Thus Kuhn, as a science historian, offers interesting new insights as far as social and psychological aspects of the scientists’ work are concerned, but not so when he expands these insights to epistemology, to a theory about the actual process of knowing and managing physical reality. A process that has to be taken as independent of the dispositions or moods of

⁵ In den grundlegenden Theorien mussten wir unsere Konzepte schon so oft ändern, dass wir jetzt nicht mehr fragen, ob eine Theorie die Wirklichkeit wiedergibt, sondern nur, ob sich aus ihr ein gutes mathematisches Modell der Beobachtungen ableiten lässt. [FOCUS, 3rd Sept. 2001]

⁶ Like Kurt Gödel, Roger Penrose, Benoit Mandelbrot and many other leading contemporary mathematicians.

⁷ To illustrate his concept of paradigm shift Kuhn devotes quite a lot of space to the topic Newton-Einstein, and mentions somehow on the same level also the phlogiston vs. the modern oxidation theories without making it explicit where the difference between the superseded phlogiston theory and the ‘superseded’ Newton’s model lies. This difference, of course, is given by the fact that in the first case there is no unifying symbolism by means of which one could express the relation between the old, phlogiston, and the new, Lavoisier’s, theories, whereas in the second case, as we have seen, this mediator is mathematics. So while the phlogiston (‘visual’ rather than mathematical) model had to be discarded because it became not only cognitively but also practically useless (both adequacy measures became practically zero in any situation), mathematics turned out to be the guarantor of a continuing usefulness of various models based on Newtonian physics because of their nontrivial practical adequacy measure (they can still serve as models *for* though not much as models *of*).

the scientist and his/her social surroundings in order to give any purposeful meaning to scientific research and activity. Kuhn seems to camouflage too much the rational essence of the scientist's search for 'truth' with his/her social conditioning and circumstances. This concept of truth, whatever different meanings it may have for different philosophers, is for the scientist (physicist) indispensable because it gives meaning to his/her exploratory endeavour. And it is mathematics, and its modeling of the physical reality, that reflects this truth, or part of it, and is confirmed by sophisticated experiments, when phenomena enter into consideration that cannot be treated by common sense or visual models.

So much about the all-importance and exclusivity of mathematics as the provider of cognitive or epistemological frames of reference in times of ground breaking changes in physics. Today, when renewed attempts are being made to unify the existing gravitation and quantum theories, our picture of the physical world is again on the threshold of drastic changes. However, these new insights are not likely to be seen as world shattering as were those at the beginning of the last century. This is exactly because the mediating and supervising role of mathematics has by now been widely understood and accepted. So paradigm shift or not, mathematics, by being able to provide mathematical models of the various competing theories, including the 'old ones', makes the changes less unsettling, less 'revolutionary' in the cognitive meaning of the word.

Can a similar mediating role be found for some overlapping, symbolic system that would make paradigm shifts in cultures more comprehensible, and — at least psychologically — manageable? In particular, the paradigm shift — probably crisis would be a better word for it — that Western culture is presently passing through. A paradigm shift that must necessarily affect other cultures as well. The answer is yes, and probably no. Yes, such systems can be thought of; no, a super-system of meanings that would be illuminating (or even binding) for every carrier of (Western) culture — like mathematics is for every physicist — is not likely to be feasible. Among possible candidates for such a function it is religion that I wish to propose. Religion in a certain 'meta-sense' that will have to be further explored. We shall look at other candidates in a moment, but let us start with religion.

We have already compared mathematics and religion, mathematical models of physical reality underpinned by observational data, and religious models of the human condition underpinned by personal and social experience. We have already found some parallels, (without trying to explain them), so let us point out the essential differences.

Science, more precisely its flourishing in recent centuries bringing about its universal appeal, is certainly an outgrowth of Western culture. Mathematics can be seen as an offshoot of a part of science to which it is, however, *no more reducible*. Perhaps the distinction between *pure* and *applied* mathematics could be seen as the first one being that part — or rather feature — of mathematics which is definitely 'above' science, whereas the second one is firmly tied to the — conceptual as well as historical — roots of mathematics in (experimental) science.⁸

⁸ This at least has been the situation in the last century, though recently the distinction between pure mathematics and theoretical physics has become more blurred. This time it is not so much pure mathematics that is seen as the handmaid of physics and its observations, but rather the other way around: the 'ontologically plausible' pictures of the physical world seem to move closer to pure mathematics, the internal self-consistency of ma-

On the other hand, religion — even Christianity, Judaism and Islam — is still too much anthropologically conditioned, it is still very much a part of ‘its’ culture. Not unlike mathematics in times of Newton when it was seen as part of physics. It was inevitable that Cantor, and certainly Lobachevskii, had to come before Einstein, i.e. *mathematics had to raise itself from its a priori boundedness with physics before it could act as a catalyst for new physics* at the turn of the centuries, before Einstein could reach for it, and use it to formulate and formalize his new insights.

This is the first difference between mathematics as a ‘mitigator’ of changes in physics, and religion as a would be mitigator: religion as we know it, even its most ‘sophisticated’ variants, is still too much submerged in its traditional, emotional, ideological and institutional roots. Which is not to say that it could survive if it ignored or lost contact with these roots. So whatever this ‘pure religion’ might be, it cannot be construed as totally suspended in ‘culture-free air’, as having severed its historical, conceptual and institutional roots. “Any attempt to speak without speaking any particular language is not more hopeless than the attempt to have a religion that is no religion in particular.” as Santayana, quoted in [GE1], warns us.

Secondly, as already mentioned, the role of mathematics in mediating our understanding of the world around ourselves is purely cognitive, whereas religion always has also a *normative* component, defining values and expecting commitment.

The third, and most important, difference lies, of course, in the fact that there is only one mathematics but many religions. Even one particular civilisation, especially in its ‘advanced stage’ (c.f. the West), can provide the nourishing soil for the roots of more than one religion. In spite of the fact that civilisations are usually associated with one ‘defining’ religion.⁹

Therefore there can be only a very limited similarity between the role of mathematics in understanding physics, and the role of religion in ‘understanding’ cultural paradigm shifts. More explicitly, mathematics could handle the new situation on

- (a) the *personal* level, making it comprehensible to (mathematically educated) individuals, as well as on
- (b) a level *generally* accepted by all specialists, at the same time serving as
- (c) an *objectively* valid or adequate means to describe physical reality in the sense that it could lead to experimentally verifiable predictions.

On the other hand, if such a function could at all be ascribed to religion, then only on

- (a) the *personal* level, as psychological mitigator making the changes more ‘comprehensible’ to an individual believer, to a *somewhat lesser extent* on
- (b) a level *generally* acceptable to the community of adherents of the particular religion, and

^{8(etc)} mathematical models taking precedence over agreement with observations which become less and less realisable (c.f. Stephen Hawking’s “Theory of everything” or his recent interview in FOCUS of 3rd Sept, 2001). These, however, are very abstract, and as yet not very much thought through philosophy of science propositions. So we shall ignore them.

⁹ “Religion is a central defining characteristic of civilisations ... Of Weber's five "world religions", four — Christianity, Islam, Hinduism and Confucianism — are associated with major civilisations. The fifth, Buddhism, is not.” ([HU], pp. 45-47).

practically *not at all* as

- (c) an *objectively* valid system of symbols that could adequately explain, or even predict, social and cultural events and changes as it is the case of mathematics with respect to physics.

So one has — in distinction to the relation of mathematics to physics — a whole set of (competing or complementing each other) systems whence the symbols for models of the human condition can be taken. In spite of the questionable applicability of this similarity at the second, communal, level we shall concentrate on it, ignoring the case of a ‘private religion’, if such a thing exists at all.

The preceding definitions and observations apply to all major religions, including the Eastern ones like Hinduism, Buddhism etc. And to a certain extent also to ‘primitive’ ones. However, from now on, let us limit ourselves to Western religions only, for roughly two reasons.

At one hand, the focus, and probably also the trigger, of the upheavals is in the West. And hopefully also the solution. “The central problem is one of thought, and its locus like before lies not in the East but in the West itself; even if the Western mind is suffering from a paralysis ultimately residing in the spirit or the will, the problem remains to be worked out in the intellectual realm. ... Countries outside the West have always responded to the doctrinal innovation of the West, and they may do so again.¹⁰”([TR], vol. II, p. 178). In spite of the drastically changed international situation since 1972, when these lines were written, they might still prove to be valid. Of course, with the addendum, that self-denial is no ‘doctrinal innovation’ to respond to.

At the other hand, mathematics, which inspired the main idea of this paper, in its advanced stage is a product of Western civilisation, and its direct predecessors. Of course, mathematics is present in every civilisation (like e.g. religion), at least in its primitive form (numerical and geometric awareness). However, the stage at which mathematics has become the contents of mathematical models that effectively describe physical reality, whether in their Newtonian or post-Newtonian versions, has only been reached within Western civilisation (in the broader sense), the Arabic/Islamic contributions notwithstanding. Any other and/or more advanced mathematics will not emerge from a culturally parallel world but only as a continuation and expansion of the present one: At least on this planet the sequence Euclid-Newton-Cantor-Gödel will possibly be continued at a higher level, not bypassed by an alternative development.

So it should not be too much of a restriction or ‘Western arrogance’, if we limit our search for mediators of cultural changes to outgrowths — symbolic meaning and value systems — of the West; and if religion is the one to serve this purpose, to Christianity (sufficiently advanced to

¹⁰ Treadgold pointedly observes: “The attack on Western imperialism ... originated in the West, not outside it; the aggressive adoption of nationalism with anti-Western or xenophobic overtones in many parts of the world reflects the acceptance of Western ideas, not action based on indigeneous ones; the exclusion of Christianity from serious consideration by intellectuals in developing countries is a result of such exclusion within the Western intellectual community; the contempt for the values of their own peoples exhibited by many non-Western intellectuals was faithfully learned in the West and imitated.” ([TR], p. vol. II., p. 194)

transcend its cultural roots) that Huntington, and many others, see as the defining religion of the West. And Judaism, that stood at its cradle and became after Enlightenment the co-shaper of West's identity. As well as Islam, if for no other reason than for its rapidly, so far mainly demographically, increasing presence in Europe, Northern America and Australia. Of course, historically Islam cannot be regarded as a defining (only contributing) religion of the West.

Thus Christianity, but also Judaism and Islam, could be a *point of departure* in our speculation — because this is all that it can amount to — about possible (psychological) mitigators of cultural changes. Mitigators that could eventually fulfill a less subjective role: to serve as suitable symbolic 'coordinate systems' with respect to which paradigm changes can be 'measured and evaluated'.

Let us now look at some possible candidates that are not directly related to religion.

Systems based on *science* (natural or social) are no good candidates for such a departure. Firstly because they either have only a cognitive and no normative dimension, or they separate them both, and induce no commitment which is the main characteristic of religion. Again in Geertz's words "The need for a metaphysical grounding for values seems to vary quite widely ... but the tendency to desire some sort of factual basis for one's commitments seems practically universal ... Religion by fusing ethos and world view, gives to a set of social values what they perhaps most need to be coercive: an appearance of objectivity. In sacred rituals and myths values are portrayed not as subjective human preferences but as the imposed condition for life implicit in a world with a particular structure." ([GE3], p.131).

Secondly, such systems depend too much on observations which must serve as a corrective agent for the symbolic meaning system that we are looking for. So they could not constitute a superior system itself, not even its cognitive part. Science can only serve as an important, perhaps the most important, supporting pillar of something transcendent to it. Natural science is too little entrenched in culture, whereas human or social science is too much entrenched. A more suitable system, capable of providing cognitive and normative meanings transcending them both, would be one that originates from (an existing) religion, which is both sufficiently entrenched in culture to appeal to individuals as well as to communities, and sufficiently capable of giving a symbolic and ultimate meaning to natural as well as human sciences.

These restrictions apply in particular to various respectable e.g. political systems like John Rawls' Theory of Justice ([RA]), or biology inspired systems (e.g. [CA], [WI], c.f. below) or even those inspired by mathematics (e.g. [RU]). They all either lack inspiration for commitment — without which culture would be rather sterile — or justification for such commitment. As Hans Küng puts it, "There is one thing that a man without religion cannot do, even if he himself actually accepted unconditional ethical norms: namely, justify the unconditionality and universality of ethical obligations"¹¹ ([KG], p.75). This could indeed be seen as a footnote to many a legal or political theories.

Clearly, without models *for*, i.e. those able to contribute to the solution of practical problems,

¹¹ Eines kann der Mensch ohne Religion nicht, selbst wenn er faktisch für sich unbedingte sittliche Normen annehmen sollte: die Unbedingtheit und Universalität ethischer Verpflichtung begründen.

the usefulness of (pure) mathematics for physics, including its cognitive significance, would be very doubtful. The same is true for cultural models where the sciences, especially the social ones, provide this safeguard, methods to analyse and to apply the rather general ontological and ethical insights that a more abstract meaning system would be offering. And to decide about the plausibility of its cognitive symbols and practical applicability of its symbolic ethical norms. Without these requirements, which can only be verified by reason working through science, the ‘usefulness’ of the symbols of a higher meaning system would be very doubtful, in spite of its eventual mitigating effects. But this correcting function of scientific theories and systems should not be confused with the meaning providing function of a symbolic system that transcends science. And if this symbolic system is religion-based, also the commitment inducing function as well as what is simply referred to as giving purpose to one’s (individual as well as communitarian) life.

There is also a temptation, coming mainly from social sciences but often also from theologians, that is worth mentioning: The same as new insights in physics required a mathematical reinterpretation of some physical concepts — and not a change of mathematical concepts and rules themselves — so also new achievements of (social or natural) sciences should require most a *reinterpretation*¹², not a ‘knee-jerk’ change, of the symbols of this higher system of meanings. In other words, one should not confuse the function of the provider (that we are looking for) with that of the verifier (which are various systems based on scientific methods and achievements). One should not confuse the task of the composer with that of the performer.

Of special interest are systems, in a certain sense reciprocating Hawking’s ‘theories of everything’, that are a kind of a mixture of the scientific and religious perspectives. Of interest here is Hans Küng’s “Projekt Weltethos” ([KG]) built on religion, or rather religions, with an emphasis on their ethical function, as not only the provider but also justifier of norms, illuminated with some insights taken from social sciences. However, in his endeavour to be as universal as possible, he chose as his point of departure humanism rather than an existing religion, of which Christianity is his domicile. Similar examples are Fritjof Capra’s “Web of life” (c. f. [CA]) or perhaps Edward Wilson’s “Consilience” (c.f. [WI]). Here it is insights from natural science that are used to illuminate the quasi-religious commitment. The arguments raised before apply more or less to these systems as well, nevertheless, they can be viewed as being somewhere halfway between the scientific and religious perspectives.

Another class of thinkable candidates would be *philosophical* systems. They are also rational constructions often claiming to explain ‘everything’. They have not only a cognitive function but also define values that in theory could motivate action. However, their appeal is mainly to individuals, their rational fabric too restrictive, making sense but not providing strong enough incentives for actual commitment. On the other hand, some kinds — so-called “perennial philosophies” — are very close to what Geertz calls religion. In other words, a coherent philosophical system can provide another important rational pillar for a transcendent symbolic

¹² Here the term (re-)interpretation is being used in both directions: as finding the assignment of a symbol to a meaning (as in the first case) as well as the assignment of a meaning to a given symbol (as in the second case).

system of meanings, although some forms of it seem to be more suited to act as the nucleus of such meaning systems than the purely descriptive ones based on science. To summarize, a philosophical system with its predominantly intellectual appeal is still less suited to be such a nucleus, than a classical religious system that gives more purpose to individual life, and at the same time an ‘explanation’ of the changes on a rational as well as emotional level.

This brings us back to (Western) religions. All religions revolve around the concept of God (or gods), with overwhelmingly personal or pantheistic characteristics. In the West the emphasis has been on the personal, and Jews were the first ones to emphasize not only personality but also the uniqueness of God. Their God, however, was still essentially a ‘tribal’ God, and it took Christianity to free Yahweh from this ethnic restriction. It took it centuries to reach what we now call Enlightenment, and the modern times that followed. In spite of Enlightenment’s historical roots directed against Christianity, mainly its institutional form, it is now compatible, or should be so — both as a world view and as a way of life — with the Christian outlook.¹³ It became an integral part of the West, and whatever its emotional beginnings, it can be seen as a product of not only the West, but also directly of Christianity. It is unprecedented and inimitable among other cultures, and it has a better chance of becoming a universally respected — though probably not accepted — system of meanings, than Christianity in its pre-Enlightenment stage. This is the *first* distinctive characteristic of Enlightenment: the stage at which the Christianity inspired West became culturally ‘mature’.

The *second* distinctive characteristic of Enlightenment is given by the fact that it marks the entry, or rather re-entry, of Judaism and the Jews into the cultural world created, or rather inherited, by Christianity. The ethical system that Christianity stands for is closely related to the Judaic one — one speaks actually of our Judeo-Christian ethical tradition — and after Enlightenment the Jewish contribution became also that of the cultural co-shaper of what we now call the West.

The *third* distinction of Enlightenment must be seen in the important role that some influential Islamic writers ascribe to it, even if they may interpret it differently from the way most Christian and post-Christian scholars might do. Bassam Tibi, the already quoted Göttingen professor of Arabic descent, defines his position as ¹⁴ “A plea for an identity of Europe based on Enlightenment ... I stand up for Enlightenment as Europe’s identity because it guarantees the rights of all men. Since Enlightenment determines man irrespective of his religious beliefs or ethnic affiliation as an individual, ... not as part of a collective. ... I would like to reconcile this Euro-identity with islamic identity through an Enlightenment-based interpretation of

¹³ The conflict between Enlightenment and Christianity can only be seen as a conflict where, and when, Christianity was reduced to its ideological, culture- and time-dependent form, or rather deformation. Something like the ‘conflict’ between an over-anxious father and his adolescent son. Or, more to our point, like the encounter between Newton and Einstein: the physicist Newton has to forsake his position where it conflicts with Einstein’s, but the mathematician Newton (discoverer of the infinitesimal calculus) stands above and beyond this conflict. Einstein could not even formulate his position without the mathematical language and concepts that humanity owes to Newton (and Leibniz) as well as other mathematicians.

¹⁴ (Ein) Plädoyer für die auklärische Identität Europas. ... Ich trete ein für die Aufklärung als Identität Europas, weil diese die Rechte aller Menschen gewährleistet. Denn Aufklärung bestimmt den Menschen unabhängig von religiösen Glauben und ethnischer Zugehörigkeit als ein Individuum ... und nicht als Teil eines Kollektivs. ... Ich möchte diese Euro-Identität mit meiner islamischen Identität durch eine aufklärerische Islam-Deutung versöhnen.

Islam.” ([TI], p. 21). His voice, and the voice of other liberal muslims, if nothing else, carries the weight of the inevitable, so it seems, spread of Islam throughout Europe.

What is important here, is that although Enlightenment can be interpreted differently from different religious ‘points of departure’, as a *symbol*, with a generally positive evaluation, it can be shared by all the three main religions of the West. Naturally, with the exclusion of the ‘fundamentalists’ in any of the three camps.

Returning for a moment to the Islamic point of view, Murad W. Hofmann, an ex-German diplomat and convert to Islam, complements, if not contradicts, Tibi’s view: “From the 18th century onwards, following the proclamation of the Age of Reason and Project Modernity, we enter the real ideological era. To the extent that religion disappeared from public consciousness and view after the Enlightenment, ideologies functionally replaced them. Secular ideologies divorced from religion, now became pseudo-religions. ... Instead of post-religious paradise on earth, we had the most incredibly savage world wars ” He is, however, more outspoken than Tibi: “We are not surprised because it is obvious that only religions can motivate people to such an extent that they can overcome their base instincts, their sexual desires and their monumental egotism. At the beginning of the 3rd millennium there are only two world views left, which compete for the hearts and minds of Western man: post-modern Secularism and Islam. ... It looks as if religions were on their way out, more so in Europe, though, than in the United States. People are leaving the Christian churches in droves. And these churches even help speed up their demise by entering one compromise after the other with the spirit and fashion of our time. ... (My) recommendation can be summed up in one sentence: present Islam as a major contribution to the healing of Western society and civilisation and as a precious medication for the most crucial woes which are about to destroy the Occident. I am calling for assertiveness and pro-active measures, not for an apologetic posture and defensive reactions.” ([HO], p.5)

Compare this with Tibi’s remark that could be taken as a reply to Hofmann ¹⁵“Exactly because many muslims perceive Europe as a »continent in isolation« they think — in a missionary and at the same time well-meaning spirit — they can contribute to the well-being of Europeans through a striving for an islamisation of Europe. ... The self-denialist attitude of the Europeans of our time meets with the high-handed attitude of the islamists, and strengthens their muslim missionary consciousness.” ([TI], p. 184).

One could summarize Tibi’s saying as “Do not destroy the magnificent house (i.e. Enlightenment) you have built (with our contribution), because it is the only one worth living in.” And Hofmann’s as saying “This house we all want to live in cannot stand for long without its religious foundations: if you are neglecting the original, Christian ones, let us bring in Islam to reinforce these foundations, before the whole construction collapses.”

There is an ‘intrinsic truth’ in both of these observations, both can be ‘lifted to a symbolic

¹⁵ Eben weil viele Muslime Europa als einen »Kontinent in Abseits« wahrnehmen, ... glauben sie —zugleich missionarisch und wohlmeinend — durch die von ihnen angestrebte Islamisierung Europas zum Wohle des »dekadenten Europäers« beizutragen. ... Die selbstverleugnerische Haltung der Europäer unserer Zeit stösst auf die selbstherrliche Haltung der Islamisten und verstärkt dieses muslimische missionarische Bewusstsein.

sphere' and accepted by a similarly symbolically elevated Christianity-based point of view; including most statements in [TI] and [HO], and not quoted here, that on their face value are rather critical — sometimes deservedly, sometimes undeservedly, but that is here beside the point — of Christianity. The same in relation to Judaism.

The point I am trying to make is that as far as Christianity, Judaism or Islam clash (or have clashed), it is when they succumb to their degenerate forms, when they become pseudo-religious ideologies. Christianity as an assertive ideology is a sadly known fact from history. It exists today only in a rather unconvincing form of verbal crusades of its fundamentalists. Islam as an ideology, called islamism, unfortunately still exists and its battles are far from being limited to verbal battlefields, as the events of 11th September 2001 demonstrated. Judaism as an ideology is today perhaps the most assertive one. It is not directly related to its fundamentalists, and its appeal is often to the 'non-religious'. Its methods are psychologically more sophisticated and subtle than those of the Christian ideologues, and do not lead directly to physical violence (at least outside Israel), like those of the islamists.

All these three ideology-turned forms of religion are irrelevant, even anathema, to what we have here in mind. It is the historically and conceptually authentic and coherent forms of either of them that are capable of being elevated to a higher symbolic stage. At this level — something we are able to only speculate upon — the three religions are not only capable of a dialogue (without each one loosing its historical and doctrinal identity) but will have many cognitive as well as normative aspects — one might say the most important ones — in common. For instance, some interpretations and ethical norms associated with the concept of a one God, interpreted as a person, and perhaps also the ideals of Enlightenment, e.g. tolerance, possibly with different interpretations and historical or doctrinal justifications.

This is all that one can say, without getting too much carried away by speculations, about this (still imaginary) higher symbolic level of religion — or religions — with separate roots, traditions, cultural determinants and interpretations in Christianity, Judaism or Islam. And perhaps also outside the Western realm in Hinduism, Buddhism, Confucianism.

Let us conclude with a few remarks taken from the Christian perspective.

(1) A world view that is explicitly based on Christianity's (or Judaism's) central premises is today not very often confessed in the context of Western culture. In distinction to Islamic cultures, where such adherence is generally regarded as a compulsory point of departure for any world view.

(2) One can speak of two 'semi-adherences to Christianity': On one hand a believer who accepts the cognitive symbols but does not live by its norms (bad Christian). On the other hand a non-believer who lives his life as if he/she accepted Christian ethical norms (good non-Christian). Or a Jew who professes his jewishness, adherence to its cultural (perhaps even ethical) tradition, but proclaims himself an agnostic? Of course, there is no analogue for this in the mathematics-physics setup as the latter is concerned solely with cognitive, and no normative, aspects of the human condition.

(3) The insights of non-euclidean geometry did not lead to a rejection of euclidean geometry only to its expansion, generalisation. Similarly non-Christian religions do not have to be seen as alternatives to Christianity but rather as an ingredient in the expansion, generalisation of its view. Of course the same could probably be said about other points of departure, e.g. Islam.

(4) In mathematical physics speculations cannot ‘fly away’: they have to be checked by their usefulness in theoretical physics, which itself has to agree with observations. Likewise, in looking for a higher symbolic system based on Christianity, speculations cannot ‘fly away’: they have to be checked by their coherence with a ‘suitable’ theology, which itself must not contradict a ‘reasonable’ interpretation of scriptures. Of course, one would have to define here the terms ‘suitable’ and ‘reasonable’; these definitions will probably have to depend on whether the point of departure is from the Catholic or from some Protestant position. One might hope that at a sufficiently abstract level the differences will not be that decisive.

(5) In science a physical theory is the more acceptable — i.e. formally coherent, in accordance with observations/experiments, and useful for applications — the more it can fit into a mathematical model (*of* and/or *for*); either a model built from existing mathematical material or from mathematics still to be ‘invented’ (or discovered). From a Christian standpoint one could likewise argue that any ‘Grand Theory’ based on science or philosophy is the more acceptable — i.e. ‘truthful’, in accordance with utilitarian ethics (the ‘common good’ criterion), and properly reflecting the human condition — the more it can ‘fit into’ or is compatible with the Christian outlook; either as generally understood or with symbols suitably generalised. Of course, like the new mathematics that has to be ‘invented’ cannot be arbitrary, it has to follow some intrinsic rules, so the generalisation of existing Christian symbols — cognitive or normative — cannot be arbitrary, has to follow some intrinsic (theological? magisterial? exegetic?) rules, as opaque as they might be in comparison with rules that govern mathematics.

(6) Darwinism and Big Bang are two examples showing that if suitably understood, scientific theories do not have to impact on religious attitudes, i.e. they interfere neither with theistic nor with atheistic beliefs. Darwinism, when naively interpreted, seems to contradict Christian tenets, whereas the Big Bang theory, when naively, ‘non-mathematically’, understood, seems to ‘prove’ that the universe was created. In both these cases the ‘resolution of conflict’ between a scientific theory and a religious disposition lies in a ‘technically proper’ understanding of the scientific theory, and in a ‘symbolically proper’ understanding of the Christian doctrines.

(7) A good example of a symbol and its interpretation, and how the two things should not be confused, is Tibi’s reference to the distinction between the Christian teaching of “love thy neighbour” and the Enlightenment produced principle of tolerance.¹⁶ “From what one hears today, many Europeans talk about »Christian charity« — for instance, under the banner of the fight against anti-Semitism — in order to make respectable all sorts of pre-modern, non-

¹⁶ (Es ist) in unserer Zeit zu vernehmen, dass viele Europäer von der »christlichen Nächstenliebe« reden um — z. B. im Namen der Bekämpfung des Antisemitismus — alle vormodernen nicht-europäischen Weltanschauungen salonfähig zu machen. ... Daher ist es wichtig ... in aller Deutlichkeit und Offenheit klarzustellen, dass Toleranz nicht heissen kann, das Gebot Jesu zu befolgen, »demjenigen auch die andere Wange hinzuhalten, der einem bereits einen Schlag auf die eine Wange versetzt hat«. Dieses Gebot ist in diesem Sinne nicht mit Toleranz vereinbar.

European world views. ... That's why it is so important to openly and clearly state that tolerance cannot mean to follow Jesus' command »unto him that smiteth thee on the one cheek offer also the other«. This command is in this sense, not compatible with tolerance" ([TI], pp. 37&38). Here the justified criticism should be directed against a particular interpretation of the symbol of neighbourly love — as spelled out in the first sentence — not against the very symbol. Tibi's dislike for Christianity, as much as it might be understandable, seems to blur for him the distinction between religion and ideology (based on that religion as well as many other things), between a religious symbol, and its — admittedly often erroneous — interpretations.

(8) A rather trivial illustration of the situation, when a symbol taken verbatim can lead to absurd conclusions, could be the statement "My maiden is more gentle, graceful, than any other." In the Middle Ages — since, taken verbatim, two maidens cannot both have the same property — the conflicting statements had to be resolved, often by a duel. Today two lovers might still say this to their 'maidens', but now they are both aware of the symbolic (poetic) character of the statement, and there is no conflict. Could this not somehow apply also to all sorts of non-trivial inter-denominational controversies, contradictions of doctrines held by 'competing' religions, which would not have to be resolved (by surrendering one position to the other) only lifted to an appropriately symbolic level?

Postscript: The reader familiar with the work of Clifford Geertz will have noticed a discrepancy between my practically unconditional endorsement of his early writings ([GE1], [GE2], [GE3]), and a more critical view of his later positions e.g. on cultural studies, the contribution of Thomas Kuhn to philosophy of science, his blurring of the distinction of human and natural sciences at the expense of the latter, and to some extent also his general anti-anti-relativism attitude.¹⁷ This could be due either to an inconsistency in my understanding of Geertz, or to a 'paradigm shift' in Geertz's thinking over the years. I do not dare to resolve this but perhaps the paradigm shift is not so much with Geertz as with American anthropology and culture in general. The following words by a contemporary anthropologist explain perhaps a lot: "Clifford Geertz pressed the claims for a detached, cerebral hermeneutics of culture. But the scholarly Dr. Jekyll drank his potion, ... and the subversive Mr. Hyde took to the streets. In the 1990s, culture theory in America could hardly be distinguished from cultural politics. Inevitably, the anthropologists were sidelined." ([KP], p. 228)

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¹⁷ Geertz in his recent book [GE4] seems to endorse Kuhn's camouflaging of the essence of science with its social and historical ramifications, as well as this philosophy's consequence: the mushrooming of various versions of 'science studies' (which often lack, among other things, mathematical sophistication needed to understand what physics is all about). Also disturbing, and so markedly different from his previous writings, is his preference for sarcasm over argument when criticising anti-relativist views of culture, etc.

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