THE UNDERPINNING OF SCIENTIFIC KNOWLEDGE SYSTEMS: EPISTEMOLOGY OR HEGEMONIC POWER?

The implications of Sandra Harding's critique of North Atlantic science for the appreciation of African knowledge systems

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INTRODUCTION[1]

According to common views, which we shall critically examine in the course of my argument on Sandra Harding but will not fundamentally reject, North Atlantic science is a repository of valid knowledge about nature.

However, there can be no question of North Atlantic science having the monopoly of valid knowledge about nature. Every human community, wherever in the world and at whatever period of time, that manages to survive for more than a few years and that is not totally parasitic upon other such communities unmistakably possesses the means that enable its members to engage in effective extraction from nature (resulting in food, shelter etc.) on the basis of valid knowledge about nature.

To the extent to which they enable their members to engage in effective extraction from nature, most societies outside the North Atlantic region, including most African societies, are therefore repositories of valid knowledge about non-human reality. In principle their knowledge about non-human reality is comparable with North Atlantic science. In addition to knowledge about non-human reality, every society comprises an elaborate system of knowledge about man-made symbols, classifications, norms, representations, institutions – both those of the members of that society itself, and (to a more limited extent) those of surrounding societies and

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[1] This is the revised version of a paper presented at the Colloquium 'La rencontre des rationalités', organised by the African Centre for Advanced Studies, the International Council for Philosophy and Humanistic Studies (CIPSH) and UNESCO, Porto Novo, Benin, September 18-21, 2002. An earlier, Dutch version was presented at the annual general meeting, Netherlands Association for the Philosophy of Science, Netherlands Association for the Philosophy of Science, Utrecht, the Netherlands, 23 November 2001. I wish to express thanks to Pieter Boele van Hensbroek, Henk Visser, Bert Hamminga, H. Kuiper, and other participants for their stimulating contributions to the discussion in Utrecht. In the context of the English version I am indebted to Paulin Hountondji for inviting me to participate in the Porto Novo conference, to Cathérine Coquery-Vidrovitch for chairing the session in question, and to various participants for incisive and illuminating criticism.

societies of the past. Let us call such knowledge 'societal knowledge'. This societal knowledge deserves to be called 'valid' if it enables a members of the society (or a temporary member, such as an anthropologist, Islamic or Christian missionary, or trader) to act in a socially recognised and hence effective way within that society. However, this type of valid societal knowledge is not about nature, and since it is intimately tied up with the socio-cultural constructs humans within a given local society have more or less agreed upon, it may be safely assumed to have no validity outside the boundaries (however blurred and situational) of that society in question.[2]

The valid knowledge which any society has about nature and which enables its members to engage in effective extraction from nature, is usually not stored in the abstract, specialised format characteristic of North Atlantic science; it tends, by contrast, to be embedded in complex religious representations, saturated with symbolism, in such a way that these representations tend to have considerable (but never total)[3] overlap with local societal knowledge as defined above. For this type of cognitive systems comprising knowledge about nature, cultural anthropology has coined the term 'ethno-science'[4] i.e. a strictly local form of knowledge about nature tied closely (but not necessarily absolutely) to the social and cultural orientation of the people ('ethnos') or ethnic group managing that knowledge.

Because of its being intertwined with local societal knowledge including beliefs, representations and symbolism, and because if its specific from (a form characterised by Lévi-Strauss by such terms as 'pensée sauvage' and 'la science du concret') which differs greatly from that of North Atlantic science, it is in general very difficult to isolate, from among these local systems of knowledge, that which is just valid knowledge about nature, and that which is symbolic wrapping and free variation. In

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[2] This is not to imply that, by contrast, a society's knowledge about nature has *ipso facto* validity outside that society's boundaries. Starting out with the classic (if no longer altogether up-to-date, cf. Gettier, E.L., 1963, 'Is justified true belief knowledge?', *Analysis*, 23: 121-123; Moser, P.K., 1993, 'Gettier Problem', in: Dancy, J., & E. Sosa, eds., *A companion to epistemology*, Oxford/ Cambridge (Mass.): Blackwell's, first published 1992, pp. **[add pages]**) definition of knowledge as 'justified true belief', elsewhere I present an argument to the effect that we can easily identify such justified true belief within any one given society, but that it is very difficult, if not practically impossible, to assess the justified and true nature of beliefs from one culturally constructed life-world to another; cf. van Binsbergen, W.M.J., 2003, *Intercultural encounters: African, anthropological and historical lessons towards a philosophy of interculturality*, Berlin/Hamburg/London: Lit, ch. 7. Rather than seeing in this dilemma a ground for cultural and epistemological relativism, I would suggest that we need a different definition of knowledge.

[3] 'Never total': this is a time-honoured contention of classic anthropologists (second third of the 20th century: e.g. Malinowski, Evans-Pritchard) who studied systems of knowledge outside the North Atlantic region and stressed the considerable rationality and practicality of local systems of production, medicine, etc., which in pre-classic anthropology would tend to be entirely relegated to the fields of magic, religion, and superstition.

[4] Cf.: Frake, C., 1961, 'The Diagnosis of Disease among the Subanum of Mindanao', American Anthropologist, 63:113-32; Frake, C., 1962, 'The Ethnographic Study of Cognitive Systems', in: Gladwin, T., & Sturtevant, W.G., eds., Anthropology and Human Behavior, Washington: Anthropological Society of Washington, pp. 72-85; Sturtevant, W.G., 1964, 'Studies in Ethnoscience', American Anthropologist, 66: 99-131.

itself the desire to arrive at such a distinction between 'valid knowledge about nature' and 'invalid cultural wrapping' is rather suspect, for such a desire implicitly is based on a number of interculturally untenable assumptions:

- the that the mode of knowing and the format of contemporary North Atlantic science constitutes an object touchstone by which all other valid knowledge about nature must be measured – as well as
- a universal format in which all valid knowledge about nature can be expressed,
- in such a way that such knowledge about nature as does not fit that format cannot constitute valid knowledge about nature.

On the other hand, from the point of view of the local cultural orientation and the local society, the knowledge contents of an ethno-science, including the valid contents, only attain meaningfulness on the basis of their being embedded in the whole, in such a way that the symbolic and societal components are not merely a superfluous fringe but on the contrary constitute an integral part of that knowledge and the latter's validity. This is the first time in my argument that we hit on the theme of the subordinating format of North Atlantic science; we shall have to return to this theme repeatedly.

In earlier work[5] Sandra Harding explored the limitations of established North Atlantic science (especially natural science) from a feminist and anti-racist point of view. In an important article published 1996-1997,[6] she formulates what may well be the ultimate challenge to such science, by asking the question: 'Is North Atlantic science merely an ethno-science?' In other words, is also North Atlantic science, *to which we are accustomed to attribute such characteristics as objectivity, rationality and universality on the grounds of its unique internal epistemology* – is also that form of knowledge merely one system of knowledge about nature among many such systems, and is also North Atlantic science so much intertwined with symbolism, belief and societal knowledge that North Atlantic knowledge does not really deserve

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[5] Cf.: Harding, S., 1976, ed., Can Theories Be Refuted? Essays on the Durhem-Quine Thesis, Reidel, Dordrecht, 1976; Harding, S., 1983, 'Why Has the Sex/Gender System Become Visible Only Now?' in: Harding, S., & Hintikka, M.B., eds., Discovering Reality: Feminists Perspectives on Epistemology, Metaphysics, Methodology, and Philosophy of Science., Dordrecht: Reidel **[add pages] ;** Harding, S., 1986, The Science Question in Feminism, Ithaca: Cornell University Press; Harding, S., 1991, Whose Science, Whose Knowledge?, Ithaca: Cornell University Press; Harding, S., 1992, 'After the neutrality ideal: Science, politics and ''strong objectivity'' ', Social Research, 59: 567-87; Harding, S., 1993, ed., The 'Racial' Economy of Science: Toward a Democratic Future, Bloomington, IN: Indiana University Press; Harding, S., 1994, 'Is science multicultural? Challenges, resources, opportunities, uncertainties,' Configurations, vol. 2, no. 2, and in David Theo Goldberg (ed.), Multiculturalism: A Reader, Blackwell, London, 1994; Harding, S., & O'Barr, J., 1987, Sex and Scientific inquiry, University of Chicago Press, Chicago, IL, 1987

[6] Harding, S., 1997, 'Is Modern Science an Ethnoscience? Rethinking Epistemological Assumptions', in: Eze, Emmanuel Chukwudi, ed., Postcolonial African philosophy: A critical reader, Oxford: Blackwell, pp. 45-70.

the privileged position that is so often accorded to it?

In the first part of my argument an extensive critical summary of Harding's own arguments will enable us to identify the many socio-cultural factors in North Atlantic science, specifically from three complementary critical perspectives: social and cultural science studies as conducted in the North; social and cultural science studies as conducted in the South; and the feminist perspective. This will enable us to expose, to some extent (but by no means totally) the three classic internal epistemological characteristics on which the superiority claim of North Atlantic science is based (notably: rationality, objectivity, and universality), as expressions of Eurocentrism and North Atlantic delusions of superiority. We will seek to identify the social and political processes which have contributed to the appearance of North Atlantic science as rational, objective and universal, especially in the context of European expansion from early modern times. However, we shall also have to follow Harding where she argues that these social and political contingencies, however obvious and important, are insufficient to totally account for such rationality, objectivity and universality as are claimed for North Atlantic science. North Atlantic science will remain valid and well-grounded knowledge, not only because of its specific social and political background in the context of world-wide North Atlantic hegemony, but also, after all, because its internal epistemology stipulates procedures that ensure that a considerable measure of rationality, objectivity and universality is actually realised, by whatever standards.

In the second part of my argument I return to the attractive and plausible thought that also other ethno-sciences from all over the world, regardless of their wrapping as 'pensée sauvage', must necessarily contain a core of valid knowledge about nature. Can this core be isolated and accommodated within North Atlantic natural science? Will it represent an enrichment to the latter, or must we assume that any valid knowledge about nature to be found in other ethno-sciences, must inevitably already be present in contemporary North Atlantic science? Strictly speaking, also such a formulation already takes too much for granted the privileged position of North Atlantic nature science, and it would be better to reformulate our question in the following terms:

> *can such valid knowledge about nature as we may expect other ethno-sciences than the North Atlantic one to contain, be accommodated within a world-wide system of knowledge about nature to which also North Atlantic science is to contribute and into which it is eventually to merge while losing much of its present-day distinct identity?*

Harding has an argument akin to that concerning biodiversity in the biological sciences: because every ethno-science is to meet the challenges of a more or less unique local variation of nature's possibilities, and because every ethno-science carries its own societal and cultural orientation, it is quite probable that in other ethno-sciences than North Atlantic science forms of knowledge about nature are stored which are not only valid, but which have not yet been recognised by North

Atlantic science and which therefore are to form a valuable addition to North Atlantic science.

Harding's experience with other ethno-sciences that the North Atlantic one is only abstract, theoretical, and based on the testimony of others rather than first-hand. This may be the reason why she is strikingly silent on the point of how we are to visualise such an enriching meeting and conversation between North Atlantic science (whose internal epistemological justification will have been affirmed, albeit not without socio-political and historical qualification, in the first section of my paper) and other ethno-sciences. My experience is different in that I can claim competence in at least on other ethno-science that the North Atlantic one: the world-view and therapeutic system of the Southern African *sangoma* complex. This enables me to approach the question as to the meeting of African and North Atlantic sciences in more detail.

It will turn out that the analysis of *sangoma* science will lead us far away from contemporary Southern Africa. Underneath the Southern African forms we shall detect historical and geographical continuities in the light of which we are scarcely justified to speak of a truly independent and distinct knowledge system, not only with reference to *sangoma* science, but also with reference to North Atlantic science. *Sangoma* science and North Atlantic science will turn out to be branches on the same stem, whose roots lie in the Ancient Near East. Even more important however than this historical argument would be the development of a framework within the philosophy of science that will enable us to systematically compare both forms of science. That is too great a task in the present scope, and for me, except for one point. Both forms of science allow for a different selection of sources of knowledge, and I shall argue that in this way each science, in its own right, constitutes a different, but valid, window upon the same underlying reality which we all share. While this amounts to a strong realism, it also prepares the ground for an argument that cannot be avoided in the present context: that on epistemological and cultural relativism. My relegating both North Atlantic science and *sangoma* science to a protracted historical process of systematic, specialist knowledge production encompassing the entire Old World (at least) and five millennia, already shows that I am not a relativist. I esteem African rationality not for its Africanity but for its rationality. The idea that there should be a different epistemology for different cultural orientations, can only reinforce such inequalities in power and resources as characterise the contemporary world. If we uncritically affirm that it is simply the superior internal epistemological underpinning of North Atlantic science by virtue of which the latter's claims to rationality, objectivity and universality are widely accepted, and not also socio-political and historical factors, then again we risk to relegate South sciences back to the ghetto – for their internal epistemological underpinning is far less manifest. The way out appears to be the construction of a model of valid systematic knowledge about nature, to which various knowledge traditions all over the world (including North Atlantic science) may contribute under the assumption that they deal with the same reality in ways which are to be judged by the standards, not a so many relativist epistemologies, but of one unitary epistemology, in the light of which all knowledge

traditions, including North Atlantic science, will fall short in one respect or another.

One elaborate example of this is presented in my *Intercultural encounters*, [7]referred to above, with regard to extrasensory sources of knowledge. While inadmissible from the sensorialist perspective of North Atlantic modern science, extrasensory sources of knowledge are admissible from most other knowledge traditions, and – most remarkably – do seem to come within reach, do seem to open themselves to be tapped, once one effectively and expertly adopts the perspective of that non-North-Atlantic knowledge tradition. *Sangoma* science will turn out *not* to be a local idiomatic formulation of such valid knowledge as is also, and better, contained in North Atlantic science, mixed with untruths that cannot be accommodated in the latter. *Sangoma* science recognises sources of knowledge not acknowledged in North Atlantic science: intuition, dreams, and especially extra-sensory perception. It is my conviction, based on hundreds of experiences as a practising *sangoma* (some of which have been meticulously recorded and analysed), that this acknowledgement of additional sources of knowledge allows us to unlock such valid information which these sources have to offer, and thus to enhance both our specific knowledge on the specific points thus disclosed, and our general knowledge of how nature is organised, also in addition to, and beyond, North Atlantic science.

But we have not by far reached that conclusion. Let us first return to Harding's argument.

2. HARDING'S ARGUMENT

In the first place, Harding seeks to answer the question as to how we can still take seriously contemporary North Atlantic science's claims to universality, objectivity and rationality, after a spate of research since the 1960s[8] in such fields as the social

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[7] Ch. 7.

[8] This concerns what Harding calls 'main-stream Northern social and cultural studies of science and technology', cf.: Callon, A., & Latour, B., 1981, Unscrewing the Big Leviathan: how actors macrostructure reality and how sociologist help them to do so', in: Knorr-Cetine, K., & Cicourel, A.V., Advances in Social Theory and Methodology, Boston: Routledge and Kegan Paul **[add pages] ;** Cartwright, N., 1983, How the Laws of Physics Lie, New York: Oxford University Press, Dupré, J., 1993, The Disorder of Things: Metaphysical Foundations for the Disunity of Science, Harvard University Press, Cambridge, MA, 1993; Fausto-Sterling, A., 1985, Myths of Gender: Biological Theories aboat Women and Men,New York: Basic Books; Feyerabend, P., 1975, Against Method, London: New Left Books; Haraway, D., 1989, Primate Visions: Gender, Race and Nature in the World of Modern Science, New York: Routledge; Hayles, N.K., 1992, 'Gender encoding in fluid mechanics: masculine channels and feminine flows, ' Differences: A Journal of Feminist Cultural Studies, vol.4: 17-44; Keller, Evelyn Fox., 1984, Reflections on Gender and Science, New Haven: Yale University Press; Kuhn, T.S, 1970, The Strucure of Scientific Revolutions, 2nd ed, Chicago: University of Chicago Press; Latour, B., 1987, Science in action, Cambridge (Mass.): Harvard University Press; Latour, B., 1988, The Pasteurization of France, Harvard University Press, Cambridge, MA, 1988; Latour, B., 1993, Petites leçons de sociologie des sciences, Paris: La découverte; also published as: La clef de Berlin: Et autres leçons d'un amateur de sciences, Paris: La découverte; Latour, B., & Woolgar,

organisation and the cultural orientation of science has given us strong reasons for the view that contemporary science has been formed by the practices and the cultural orientation of its practitioners – and most profoundly so, not only in its superficial form but also in its cognitive contents. The claims of universality, objectivity and rationality are manifestly part of the practices and cultural orientations of the practitioners of North Atlantic science, and in that light the recourse to a superior epistemological underpinning that would have produced such objectivity, rationality and universality, may well be perfunctory. These claims may be no more than expressions of a Eurocentric claim of superiority, and the mere possibility of them being just that deprives them of much of their authority. Despite all its successes in describing, understanding and technologically controlling the world, also contemporary North Atlantic science may thus see itself be reduced to the status of an ethno-science.[9]

Speaking of the undeniable success of North Atlantic science we do not just mean the plurality and the depth of discoveries, and the efficacy of their practical applications, but especially also the disconcerting observational fact (disconcerting, at least if we insist that also North Atlantic science is an ethno-science) that that science turns out to retain a high degree of validity far away from the geographical location where it was first formulated.

Let me give some examples on this point. Probably no member of the circle of North Atlantic philosophers of science expects that the totemic classifications of natural species in Australian Aboriginal societies, which Lévi-Strauss cites as a brilliant example of 'the science of the concrete',[10] contains valid knowledge which may be applies for the management of Australian-imported Marsupialia in Dutch zoological gardens. On the other hand we are certain of one thing: the aeroplane which, based on a technology that is underpinned by North Atlantic scientific knowledge, takes the Dutch Marsupialia-specialised zoologist to Australia, will not crash somewhere above the Middle East merely because at that geographical point it

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S., 1979, Laboratory Life: The Social construction of Scientific Facts, Beverly Hills, CA: Sage; Nandy, A., 1990, ed., Science, Hegemony and Violence: A Requiem for Modernity, Delhi: Oxford University Press; Pickering, A., 1984, Constructing quarks, Chicago: University of Chicago Press; Pickering, A., 1992, ed , Science as Practice and Culture, Chicago: University of Chicago Press; Proctor, R., 1995, Cancer Wars: How Politics Shapes What We Know and Don't Know About Cancer, Boston: Basic Books; Rouse, J., 1987, Knowledge and Power: Toward a Political Philosophy of Science,Ithaca: Cornell University Press; Schuster, J.A., & Yeo, R.R., 1986, The politics and rhetoric of scientific method, Dordrecht: Reidel; Serres, M., & Latour, B., 1995 Conversations on Science, Culture and Time, Ann Arbor: Michigan University Press; Shapin, S., & Schaffer, S., 1985, Leviathan and the Air Pump, Princeton: Princeton University Press; Turnbull, D., 1993, 'Local knowledge and comparative scientific traditions, ' Knowledge and Policy, vol. vi, nos iii-iv, 1993, pp. 29-54; and Sandra Harding's own work as cited above.

[9] Ethnoscience (or what Harding calls 'comparative ethnoscience approaches') represent a movement that was initially independent from the 'main-stream Northern social and cultural studies of science and technology'. For seminal references, see footnote 2.

[10] Cf. Lévi-Strauss C., 1962a, La Pensée Sauvage, Paris, Plon ; Lévi-Strauss, C., 1962b, Le totémisme aujourd'hui, Paris: Presses Universitaires de France.

leaves the cultural region that has seen the first formulation of the principles of aerodynamics, the jet engine, aluminium construction, on-board radio, and radar.[11] By any standards it is rather unlikely that the aeroplane will crash: against the billions of aviation movements (single events of taking of and touching down) since the inception of aviation, there would be only ten or twenty thousand crashes at most. If the aeroplane carrying the zoologist must crash after all, it will be because of a human error in navigation, because of bad weather (i.e. human failure to submit nature lastingly and under all circumstances), or because of human violence in protest against such perceived arrogance and subjugation as may characterise the North Atlantic scientific-technological-military-economic complex in the eyes of local, ideologically motivated aggressors.

However, on closer scrutiny the question is far more complicated. Totems are aspects of the natural world which lend their names to social groups, so that the distinctions between these groups become thinkable in terms of the distinctions between totems; for instance in South Central Africa[12] the distinction between the Bee clan and the Firewood clan may be understood from the fact that it is with the smoke from firewood that wild bees are chased from their hives so that their honey may be gathered. Bee clan and Firewood clan are each other's opponents, their respective members are involved in joking relationships, expect to be buried by one another and not by members of other groups, and in these respects the two groups have more in common with each other than with the other groups in the local society. Neither in South Central Africa, nor in Australia, are totemic distinctions strictly local: they constitute a societal knowledge which, according to specific transformations that makes for superficial discontinuity informed by an underlying continuity of deep structure (Lévi-Strauss) extends of large parts of the and African and Australian continent respectively, across thousands of kilometres.[13] Totemic

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[11] My use here of the North Atlantic scientific terminology for such animals is a conscious form of violence, meant to bring out the inequality and hegejmonic tendencies inherent in the naive comparison of local ethno-sciences.

[12] van Binsbergen, W.M.J., 1992, Tears of Rain: Ethnicity and history in central western Zambia, London/Boston: Kegan Paul International; van Binsbergen, W.M.J., forthcoming, Global Bee Flight: Sub-Saharan Africa, Ancient Egypt, and the World — Beyond the Black Athena thesis.

[13] Amstrong's assertion that totemism has only a very limited occurrence in Africa (he mentions only the Baganda of Uganda) is only saved by a very restricted definition of the phenomenon; Armstrong, W.E., 1961, 'Totemism', in: Ashmore, H.S., 1961, ed., Encyclopaedia Brittanica: A new survey of universal knowledge, Chicago / London / Toronto: Encyclopaedia Brittanica, XXII: 317-320. If we define totemism, along Lévi-straussian lines, as a social classification system based on binary oppositions between named aspects of the surrounding non-human world, then the phenomenon is very widespread indeed in Africa, the clan (named after a locally recognised totem) being a conspicuous unit of social organisation throughout the Bantu-speaking realm, and well beyond. A generous selection from the vast literature: Aguessy, H., 1983, 'Cadre théorique: Les concept de tribu, enthnie, clan, pays, peuble, nation, Etat etc. et les sociétés africaines', Présence africaines, 127-128: 17-42; Ankermann, B., 1915, 'Verbreitung und Formen des Totemismus in Afrika', Zeitschrift für Ethnologie, **[vol. , ca. 47] : [add pages];** Beaton, A.C., 1936, 'The Bari: Clan and Age-Class Systems.' Sudan Notes and Records, 19/1:109-145; Comaroff, Jean, and John L. Comaroff, 1992b. Totemism and Ethnicity. In: Ethnography and the Historical Imagination. Boulder, CO: Westview

distinctions thus are far from local. In their combination of knowledge about nature with societal knowledge totemism is a typical form of ethno-science. And more in general it is true that many fields of knowledge outside North Atlantic science may have continental and even intercontinental distribution. Inspired by my concern to complement Harding's argument on the ubiquitous geographical distribution of modern science by a similar argument concerning systems of knowledge outside the North Atlantic, I recently undertook two extensive recent analyses of systems of animal symbolism, and much to my surprise I found very extensive patterns of intercontinental continuity going back to the Neolithic or the Upper Palaeolithic.[14]

Press **[add pages];** d'Hertefelt, M., 1971, Les clans du Rwanda ancien. Eléments d'ethnosociologie et d'ethnohistoire, Tervuren: Musée royal de l'Afrique centrale, (Annales, Série in-8o. , Sciences humaines, 70), Butare: Institut national de Recherche scientifique (publication no. 7); Driberg, J.H., 1939, 'Clan Functionaries.' Journal of the Royal African Society, 38/150,65 74; Ejiofor, L. U., 1981, Dynamics of Igbo Democracy: A Behavioural Analysis of Igbo Politics in Aguinyi Clan, Ibadan: University Press; Fortes, M., 1945, The Dynamics of Clanship among the Tallensi, London: Oxford University Press for International African Institute; Fortes, M., 1945, The Dynamics of Clanship among the Tallensi. London: Oxford University Press; Further on clans: von Sicard, H., 1950, 'The origins of some of the tribes in the Belingwe Reserve: '7. The Twamamba under Chief Chitawudze and the Pfuko Clan', NADA (Southern Rhodesia Native Affairs Department Annual), 27: 7-19; Griaule M., 1957, Symbolisme d'un temple totémique soudanais, Roma: **[publisher];** Hartland, E.S., 1915, 'Totemism', Encyclopedia of Religion and Ethics, Hastings, J., with Selbie, J.A., & Gray, L.H., eds., Edinburgh: Clark / New York: Scribner, pp. XII: 393-407; Haudricourt, André G., 1964, 'Nature et culture dans la civilization de l'Igname: I'origine des clones et des clans,' L'Homme, IV (1964), 93-104; Lopes, E.A. Correia, 1945, 'Observações sobre os clans no papel Manjaco', Mundo Português 12: 139; Moret, A. and C. Davy, 1926, From Tribe to Empire. V. Gordon Childe, trans. New York: Knopf; orig. Des clans aux empires: L'organisation sociale chez les primitifs et dans l'ancient Orient, Paris: Albin Michel 1923; Newbury, D., 1980, 'The clans of Rwanda: An historical hypothesis', Africa, L, 4, 389-403; Quintino, F.R.R., 1964, 'O totemismo na Guiné Portuguesa', Boletim Cultural da Guiné Portuguesa, Bissau, 19, 74: 117-128; Schlee, G., 1989, Identities on the move: Clanship and pastoralism in northern Kenya, Manchester/New York: Manchester University Press & St. Martin's Press; Seligman, C.G., n.d., Report on Totemism and Religion of the Dinka of the Sudan. Khartoum: Sudan Press; von Sicard, H., 1962, 'Lemba clans', NADA (Southern Rhodesia Native Affairs Department Annual), 39:68-80; Willoughby, W.C., 1905, 'Notes on the totemism of the Becwana', Journal of the Royal Anthropological Institute, 35: 295-314; ; In Zambia, for instance, totemic clans are ubiquitous and have been treated in passing in much of the extensive ethnographic literature, usually under the heading of 'clanship'; Apthorpe, R.J., 1959, 'Northern Rhodesia: Clanship, chieftainship and Nsenga political adaptation, in; R.J. Apthorpe, (ed.), From Tribal Rule to Modern Government, Lusaka: Rhodes Livingstone Institute, Thirteenth Conference Proceedings, pp. 69-98; Munday, J.T., 1960, 'Some traditions of the Nyendwa clan of Northern Rhodesia', African Studies, 14, 4: 435-54; White, C.M.N., 1957, 'Clan, chieftainship and slavery in Luvale political organization', Africa 27: **[add pages];** Jaeger, D., 1973, A General Survey of the Historical Migration of the Kaonde Clans from Southern Congo into Zambia, in: Tropical Man, 4 (1971): 8-45; Doucette, Joseph Melvin, n.d., The clans of the Bemba and of some Neighbouring Tribes Kasama (Zambia) : Malole Parish; Cunnison, I.G., 1950, Kinship and Local Organization on the Luapula, Livingstone: Rhodes-Livingstone Institute, Communication no. 5; Cunnison, I.G., 1959, The Luapula Peoples of Northern Rhodesia: Custom and History in Tribal Politics. Manchester: Manchester University Press; van Binsbergen, W.M.J., 1992, Tears of Rain: Ethnicity and history in central western Zambia, London/ Boston: Kegan Paul International, passim.

[14] Cf. van Binsbergen, W.M.J., 2002, 'From an African bestiary to universal science? Cluster analysis opens up a world-wide historical perspective on animal symbolism in divine attributes, divination sets, and in the naming of clans, constellations, zodiacs, and lunar mansions', now being finalised for

The Egyptologist and comparative religionist Stricker has convincingly argued in his life's work *The birth of Horus* that the representations concerning life force, conception, heredity, pregnancy and birthing demonstrate a striking continuity all over the Old World, as can be found illustrated in most ancient literatures (those of ancient Egypt, ancient Greece, ancient Rome, ancient Iran, ancient South Asia, and ancient north-western Europe).[15] A similar argument, but far more one-sidedly phallic, and much less impressively documented, is to be found independently with the Assyriologist and biblical scholar Allegro.[16] He bases his pronouncements for the entire Ancient Near East mainly on the Sumerian language, which introduces one of the few ancient literatures that were omitted from Stricker's argument. This work converges with the far more systematic assyriological study by Stol, undertaken in direct and intended complementarity to Stricker's.[17] Much of the same knowledge domain was available in ancient China.[18] In a similar fashion one can trace the distribution and development of ancient 'secret sciences' in the field of divination (and these are in fact the oldest forms of systematic science, comprising astrology along with many other forms of divination) all over the entire Old World including Africa.[19] A further example derives from the field of mythology. Most North Atlantic

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publication, meanwhile at: http://www.shikanda.net/ancient_models/animal.htm; van Binsbergen, W.M.J., in press, 'Chapter 8: Exploring the ancient cosmology of the lion and the leopard', in my: Intercultural encounters: African, anthropological and historical lessons towards a philosophy of interculturality, Berlin: LIT, ch. 8.

[15] Cf.Stricker, B.H., 1963-1989, De geboorte van Horus, I-V, Leiden: Brill voor het Vooraziatische Genootschap Ex Oriente Lux; I am preparing an extensive summary of Stricker's argument for the greatly expanded reprint of the collection: van Binsbergen, W.M.J., 1997a, ed., Black Athena: Ten Years After, Hoofddorp, Dutch Archaeological and Historical Society, numero special de Talanta: Proceedings of the Dutch Archaeological and Historical Society, vol. 28-29, under the titel of *Black Athena Alive* (Berlin etc.: LIT).

[16] Allegro, J.M., 1970, The sacred mushroom and the cross, London: Hodder & Stoughton.

[17] Stol, M., **[year, ca. 1975]** , Zwangerschap en geboorte in het Oude Mesopotamië, Leiden: Brill; revised English version 1998 **[check]**

[18] Needham, J., with Wang Ling, 1956-, Science and civilisation in China, 12 vols to date, Cambridge: Cambridge University Press.

[19] Cf. : Hébert, J.C., 1961, 'Analyse structurale des géomancies comoriennes, malgaches et africaines', Journal de la Société des Africanistes, 31, 2: 115-208; Jaulin, R., 1966, La géomancie: Analyse formelle, Cahiers de l'Homme, Ethnologie—Géographie—Linguistique, N.S., iv, Paris: Mouton; Jaulin, R., 1991, Géomancie et islam, Paris: Christian Bourgeois; Kassibo, B., 1992, 'La géomancie ouest-africaine: Formes endogènes et emprunts extérieurs', Cahiers d'Etudes Africaines, 32, 4, no. 128: 541-596; Maupoil, B., 1943, 'Contribution à l'origine musulmane de la géomancie dans le Bas-Dahomey', Journal de la Société des Africanistes, 13. **[add pages]**; Skinner, S., 1986, The oracle of Geomancy: Divination by earth, Bridport **[check Bridgport etc.]** (Dorset)/San Leandro (Cal.): Prism Press; first ed. 1977; Trautmann, R., 1939-1940, La divination à la Côte des Esclaves et à **[check: à la]** Madagascar: Le Vôdoû Fa — le Sikidy, Mémoires de l'Institut Français d'Afrique Noire, no. 1, Paris: Larose; van Binsbergen, W.M.J., 1994, 'Divinatie met vier tabletten: Medische technologie in Zuidelijk Afrika', in: Sjaak van der Geest, Paul ten Have, Gerhard Nijhoff en Piet Verbeek-Heida, eds., De macht der dingen: Medische technologie in cultureel perspectief, Amsterdam: Spinhuis, pp. 61-110; van Binsbergen, W.M.J., 1995, 'Four-tablet divination as trans-regional medical technology in Southern Africa', Journal of Religion in Africa, 25, 2: 114-140; van Binsbergen,

philosophers of science would not expect to find valid knowledge about nature in religious systems of knowledge, but if course from the point of view of non-North Atlantic ethno-sciences it is precisely in such systems of knowledge that the most valid knowledge about nature is enshrined and transmitted. Therefore it is important to realise that also such knowledge systems tend to have a very wide distribution. Thus the world of the gods and its associated stories, such as we find in the well-known ancient Greek myths, turns out to have – in all sorts of transformation which, once again, make for a great pluriformity on the surface but underneath of which lurks a converging deep structure – a distribution all over ancient Europe, North West Africa, South- and West Asia, with parallels right into China, Japan, and even the New World. An example of such mythological continuities is given in Table 1, which list s for these various regions of the world, schematically and selectively, the distribution of one mythological central theme: that of the battle between the hero and the monster. In the same vein Ginzburg has argued that converging representations concerning witches, ancestors and ecstasy have an even wider distribution.[20]

	selected protagonists	*selected enemies*	*selected passive heroines*
Africa	Perseus	Ketos	Aso, Andromeda
Egypt	Ammon, *Athena* / *Neith*, Geb, Horus, *Isis*, Min, Osiris, Ra, (Set), Thoth, *Uto, Anat, Asherat,*	Apep, Bata, Busiris, the Sea, Set, (Thoth), *Anat, Asherat,*	(Isis), Nut
Canaan, Israël, Ugarit, Syria	*Anat,* Aqhat, Baal, *Beltis*, El (Il), (*Judith),* Kadmos, Melqart, *Paghat,* Perseus, Phoenician heaven god, Yahweh	Holofernes, Humbaba, *Judith,* Ketos, Leviathan, Mot, Orontes, Phoenician hawk dragon, Satan, Tannin, Yam, Yatpan	Andromeda, Asherat, Kassiepeia, Omphale, Phoenician earth goddess
Anatolia, Cilicia, Hittitea, Cyprus	Baal Tarz, Hittite Weather God, Hupasias, *Inaras,* Kumarbi, Marsyas, Perseus, Sandon, Teshub, Telipinu	dragon, Illuyankas, *Medusa*, Okeanos, Syleus, Typhon, Ullikummi, Upelluri	Aphrodite, Semiramis

W.M.J., 1996a., 'Time, space and history in African divination and board-games', in: Tiemersma, D., & Oosterling, H.A.F., eds., 1996a, Time and temporality in intercultural perspective: Studies presented to Heinz Kimmerle, Amsterdam: Rodopi, pp. 105-125; van Binsbergen, W.M.J., 1996b, 'Transregional and historical connections of four-tablet divination in Southern Africa', Journal of Religion in Africa, 26, 1: 2-29; van Binsbergen, W.M.J., 1997b, 'Rethinking Africa's contribution to global cultural history: Lessons from a comparative historical analysis of mankala board-games and geomantic divination', in: van Binsbergen 1997a: 221-254.

[20] Ginzburg, C., 1966, I Benandanti: Stregoneria e culti agrari tra cinquecento e seicento, Torino: Einaudi; Ned. tr. 1986, De Benandanti: Hekserij en vruchtbaarheidsriten in de 16e en 17e eeuw, Amsterdam: Bakker; Eng. tr. **[year]** The night battles, **[place, publisher]** ; Ginzburg, C., 1992, Ecstasies: Deciphering the witches' sabbath, Harmondsworth: Penguin Books; reprint of the first English edition, 1991, Pantheon Books; translation of Storia notturna, Torino: Einaudi, 1989.

Mesopotamia	Anu, Ea, (Enkidu), Enlil, Gilgamesh, *(Inanna) / (Ishtar),* Lugalbanda, Marduk, Nergal, Ninurta, Shamash, Tammuz	Apsu, Asag, Bilulu, (Enkidu), *Erishkigal*, (Gilgamesh), Girgire, Humbaba, Imdugud, *Inanna / Ishtar,* Kingu, *Labbu*, Seven Demons, *Tiamat*, Zu	
India, South East Asia, Persia	Fredun = Thraetaona, Indra, *(Kaikeyi)*	Azi Dahaka, *Danu*, Garuda, *Manthara,* Nahusha, Namuci, Ravana, Sinhika, Viparupa, Vritra	(Kaikeyi)
China	Chu Yang, Li Ping, No Cha, Shen Yi, Yi, Ying Lung, Yü	Ch'ih Yu, Chu Wang, dragon, Fung Po, Ho Po	Hsi Wang Mu
Japan	Agatamori, Amewakahiko, Izanagi, Raiko, (Susanowo), Takemikazuchi	Susanowo	Amaterasu, Izanami
North Africa and Southern Europe	*Athena* / *Neith*, Herakles, Melqart, Perseus	Antaios, Atlas, Cacus, Evander / Faunus, Geryon, Ophion	
Greece	*Apollo, Artemis, Athena, Dionysos, Erechtheus, Eros, (Hekate), Herakles, (Hermes), Io, Kadmos, Kronos, Pan, (Poseidon), Uranos, Zeus [Keraunios]*[21]	*Acheloos, Aigis, (Apollo), Ares, Delphyne, Despoina, Diomedes, (Dionysos), Drakon, Echidna, Gigantes, Glaukos, Hades, Hekate, Hera, (Herakles), (Hermes), Hydra, Kampe, Kepheus, Keto, Ker, (Kronos), Kyknos, Lamia, Laogoras, Laomedon, Linos, Neleus, Ocean = Okeanos, Ogygos, Pallas, (Perseus), Phlegyas, Phorbas, Poine, Poseidon, Python, the Sea, Sphinx, Styx, Sybaris, Tartaros, Telphusa, Thanatos, Thetys, Titans, Tityos, (Uranos), Zeus [Chthonios], Zeus's hawk*[22]	(Artemis), Deianeira, Demeter, Ge, Io, Kelto, Leto, Moirai, Persephone, Rhea, Xenodike
pre-Christian Northern Europe	Bearson, Beowulf, Hagen, Odin, Ogier the Dane, Parzival, Sigurd / Siegfried, Sigmund, Thor	dragon, Fafnir, Firedrake, Grendel, *Grendel's Mother*, *Hel, Holda, Lorelei,* Midgard Snake, Regin-Mimir, *Valkyrie, Venus, Ymir*	Audumla, Brynhild, Krimhild, Lohengrin
Christian Europe	St Evenmar, St George, St Michael	Satan, St George's dragon, *the Woman of Rev. 12 & 17*	
the Americas	Coyote, Gucumatz, Hunahpu, Xbalanque, Tahoe	Nashlah, Xibalba, Vucub-Caquix, Wishpoosh	

Table 1. World-wide continuities: The battle between the hero and the monster[23]

Note: In view of the overwhelming richness of the globally available data, I have confined myself to presenting the data from only one, reliable, source, namely Fontenrose's inquiry into the Delphic foundation myth. The fact that these data have a world-wide distribution does not in itself confirm the hypotheses (however obvious and tempting) that these myths have diffused from one unique geographical origin. For one could equally plausibly maintain that the struggle on which this mythical

[21] Many names could be added here, e.g. Agenor, Argos, Eurybatos, Euthymos, Koroibos, Lykos, Pyrrhichos, Silenos.

[22] Many names could be added here, e.g. Admetos, Akrisios, Aktaion, Amykos, Amyntor, Asklepios, Autolykos, Dryopes, Erginos, Eurynomos, Eurypylos, Eurytion, Eurytos, Euphemos, Geras, Heros of Temesa, Koronos, Ladon, Laistrygones, Lakinios, Lityerses, Lykoros, [Peri-]Klymenos, Phineus, Phorkys, Polydektes, Satyros, Theiodamas, Tiphys, Titias.

[23] Compiled on the basis of scattered information in: Fontenrose, J., 1980, *Python: A study of Delphic myth and its origins*, Berkeley etc.: University of California Press; paperback edition, reprint of the 1959 edition.

complex centres takes place time and time again in every human being in her or his own right, or at least finds resonance in every human being, and that as such this struggle is imply a reflection of the universal human condition, which cannot be tied to one specific origin in space and time. From a rather different perspective, one might reject the approach in Table 1 on the grounds that, given the richness of narrative free variation attending all of the myths involved in this complex, each of the individual personages parades here is in fact incomparable to all others; in that perspective, the reduction which is applied here (to the simple schema 'hero versus monster') would be absurd, would commit violence to the literary value and contents of these myths. My answer to such dismissiveness would be that structuralist analysis of myths has acquainted us with the thought that, underneath the narrative surface structure of the various individual myths (a surface structure which we can investigate in its own right) we can detect simple schemas that are recurrent in space and time. Making these schemas explicit enables us to recognise the unity underlying the plurality and pluriformity of myths. Ancient Greek material is unavoidably over-represented in Fontenrose's corpus; it is such material which also offers (tat is, within the confines of that corpus) the only window on North Africa and Africa south of the Sahara. For a simple illustration this is no serious defect provided we realise within what kind of self-imposed constraints we are conducting our analysis. Within the theme group ' Agency in Africa' of the African Studies Centre, Leiden, I am now conducting research aimed at making African mythological data available in a format conducive to global comparison. The intercontinental continuity of myths also plays an important role in my forthcoming book *Global bee flight.*

At the moment that they are formulated, applied, transmitted and attested, all these systems of knowledge can only manifest themselves as strictly local, as more or less embedded in a local cultural orientation and in local practices. Yet these local forms are often to be recognised as the results of *transformative localisation* : the embellishment and reformulation, more or less in local cultural terms, of knowledge which in fact comes from elsewhere and which may have a wide regional, even global, distribution.

EPISTEMOLOGICAL UNDERPINNING OR SOCIO-POLITICAL AND HISTORICAL CONTINGENCY?

Until a few decennia ago it was customary to explain the unmistakable success of North Atlantic science by reference to its internal epistemological superiority: its rationality, its unique logic of argumentation, its universal language, its methods which guarantee objectivity, etc. When this explanation was rendered less convincing, other explanations had to be offered for the same success. Harding's point of view is not, of course, the discovery – already accepted decades ago – that North Atlantic science is socio-culturally determined, but *her qualified unease with the reductionist explanation ever since given for the success of North Atlantic science, notably those in terms of European expansion, North Atlantic hegemony etc*. She wishes to assess if, despite his socio-political and historical critique, it might yet be possible to retain the internal epistemological characteristics of North Atlantic sciences (i.e. the claims of universality, objectivity and rationality) to some extent, in an adapted form. Here she lets herself be inspired, among other things, by two critical schools of research that were triggered, not by the desire to denounce North Atlantic science, but by the desire to purify it from limitations that usually remain masked and

unnoticed, but that, if removed, would allow North Atlantic science to realise much more convincingly its value – a value which these studies do not deny and whose epistemological basis they are even to some extent prepared to accept. These two schools are:

- feminist studies of science in the North Atlantic region, and
- studies of the transfer of North Atlantic science to 'the South'.

The underlying argument turns out to consist of a number of tiers.[24] In the first place, because science generates power, women and inhabitants of 'the South' do not wish to be excluded from it, they do not want to be short-changed with a limited selection which is made and lastingly controlled by others (men, 'the North'), and they prefer to bring into that science as much as impossible of their own representations. But especially this last, cultural point reveal an important second motivation. These previously underprivileged groups are not after raw power but after legitimate power, dignity and self-respect. If science has to be one of the road to reinforcing the identity and the self-determination of those groups of humankind that were hitherto vulnerable and oppressed, then the last thing we need is a science that has just been reduced to a local belief system, substantively contingent and therefore with no credible claims to truth anymore – not a science that has been deprived of its most impressive characteristics, and cast onto the dung pile, the very moment that it comes into reach of these previously excluded croups. Quite on the contrary, under such circumstances of re-empowerment science ought to appear as endowed with the greatest possible intrinsic value, notably by restoring the tradition claims of internal epistemological superiority, or by replacing them by similar but equally powerful claims. Finally a third motivation: in order to be allowed to play along in the scientific game, i.e. to be eligible for scholarships, publication of one's writings, funding of research, senior appointments, those who were previously excluded cannot afford to make light with the internal epistemological criteria imposed by the scientific establishment – on the contrary, they have to present themselves as more rational, more objective and more universal than their male and/or Northern colleagues. Here we witness in a most convincing (and moving) way Harding's own struggle as a feminist and anti-racialist philosopher of science.

This type of intellectual movement, and the dilemma's of which it is the expression, we know only too well from the contemporary dynamics of intellectual self-positioning within the globalisation of knowledge production, and the critical reflection upon such globalisation. Let me give another example of the same movement. Today's two most prominent African cosmopolitan philosophers, Kwame Appiah and Valentin Mudimbe, who have attained great mastership and recognition in the circle of North Atlantic knowledge production, have shown themselves to be critical but by and large very tolerant of those circles. The only thing for which they

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[24] I reconstruct this with somewhat more empahsis than Harding does at least in the beginning of her argument, however, also see 59f.

apparently cannot summon such tolerance is the widespread tendency, among African and African American intellectuals to embrace the popular cultural historical representations celebrating Afrocentrism, and both ethnic and pan-African essentialism. Obviously Appiah and Mudimbe detect here the same pitfall as we have seen detected by Harding, the postcolonial science researchers, and the feminist critics of sciences. For Appiah and Mudimbe people in or from the South must no allow themselves to be short-changed, must not resign themselves, to an obsolete, dismantled, simplistic, or ideologically perverted version of such scientific knowledge as circulates globally. For has not state-of-the-art science sufficiently demonstrated that all ethnic and racial identity is mere constructed and illusory? But neither this is the entire story. This honestly responsible and didactic attitude on the part of our cosmopolitan African philosophers does not do full justice to the entire range of variation, nor to the existential intensity and inescapability, of identity constructions among their Black colleagues, nor to the facts of intercontinental cultural history – for here Africa does appear, pretty much in the way as popularly claimed by the Afrocentrists, as a relative cultural unity, and as one of the few most important historical focal points of cultural innovation in the history of humankind.[25] Much in the same way, the South and feminist attempt to salvage North Atlantic science by affirming, once more, its internal epistemological superiority, may conceivably be relegated, largely, to these authors' quest for dignity, – a strategic interest that does not make them the most credible advocates of North Atlantic science's epistemological superiority in the face of the abundance of evidence of, instead, socio-political and historical factors explaining such a superiority claim. These are dilemma's which, as we shall, Harding is incapable of resolving.

Nonetheless she departs on her quest to formulate, once more, convincing epistemological standards for North Atlantic science, even though the older, internal epistemological standards appear to be denounced as Eurocentric. She does this in three steps:

- She assesses the characteristic ways in which, from a South perspective, 'European' (North Atlantic) sciences appear to constitute mere local knowledge systems
- She invoke the local nature of all approaches in science studies, and
- She identifies the need for a powerful epistemology from the perspective of South

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[25] Cf. Appiah, K.A., 1993, 'Europe Upside Down: Fallacies of the New Afrocentrism', Times Literary Supplement (London), 12 February, 24-25; van Binsbergen, W.M.J., 1997a, ed., Black Athena: Ten Years After, *o.c*; van Binsbergen, W.M.J., 2000, 'Le point de vue de Wim van Binsbergen', in: Autour d'un livre. Afrocentrisme, de Stephen Howe, et Afrocentrismes: L'histoire des Africains entre Egypte et Amérique, de Jean-Pierre chrétien [*sic*] , François-Xavier Fauvelle-Aymar et Claude-Hélène Perrot (dir.)', Politique africaine, no. 79, octobre 2000, pp. 175-180; van Binsbergen, W.M.J., 2001, 'An incomprehensible miracle': Central African clerical intellectualism and African historic religion: A close reading of Valentin Mudimbe's Tales of Faith, paper read at the School of Oriental and African Studies, London, United Kingdom, 1st February, 2001; van Binsbergen, W.M.J., forthcoming, Global Bee Flight: Sub-Saharan Africa, Ancient Egypt, and the World — Beyond the Black Athena thesis.

social and cultural studies of science and technology.

Harding justifies the great simplifications and omissions of her argument by pointing to its intending gains, which she sees as:

> 'the gain of a kind of map in which diverse science studies approaches can be seen each to contribute distinctive resources to more accurate and comprehensive understandings of relations between natural knowledge and social power. It is precisely the lack of such a map, I suggest, that has left obscure important relations between histories of sciences and of cultures.' *(p. 48)*

Referring to North social and cultural studies of science and technology since the late 1960s, Harding affirms that no science can avoid reflecting its own socio-cultural environment. The is not one scientific theory that is dictated directly, cogently and without the slightest prejudice, by the evidence (Quine);[26] it is this very fact which makes possible a continuous process of scientific innovation, and the choice between rival theories always involves a complex and opaque process in which forms of social organisation and power relations play a substantial role. Thus the specific characteristic of the local society and local cultural orientation may have an important influence upon the grown of science. In principle it is possible that also scientific theories from other cultural tradition than the North Atlantic one may compete in this game of competitive plausibility, even in the case of the natural sciences.[27]

But while this makes sense at the abstract level, as a theory of the relationship between knowledge production and the society in which it take place, this is far too deterministic to be convincing. If we agree that all systems of specialist knowledge production constitute ethno-sciences, including North Atlantic science, then they all situate themselves in a field of tension between, on the one hand, knowledge about nature (which has to be valid, at least in part, in order to support such effective extraction from nature – i.e. production – on which the reproduction of society and its members depends), and on the other societal knowledge, which is in principle symbolic, creative, and subject to free variation. Against the broad systematic, long-term tendencies that produce the right science and technology when society is ripe for it (of which numerous examples could be cited),[28] there is the free play of the imagination, of idiosyncratic fascinations and experiments, that is not, or only much later, or only in a very different place, picked up by the great movements of society in history. The celebrated history of science in Late Antiquity from Hellenistic times

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[26] Quine, W.V.O., 1953, 'Two dogmas of empiricism, ' in From a Logical Point of View, Harvard University Press, Cambridge, MA, 1953 .**[add pages]**

[27] A term borrowed from Martin Bernal; cf. Manning, S.W., 1990, 'Frames of Reference for the Past: Some Thoughts on Bernal, Truth, and Reality', Journal of Mediterranean Archaeology 3, 2: 255-74; van Binsbergen, W.M.J., 1997, 'Black Athena Ten Years After: Towards a constructive re-assessment', in: van Binsbergen, Black Athena: Ten Years After, *o.c.*, pp. 11-64.

[28] An inspiring and lasting, example of studies along this line is J. Bernal's (M. Bernal's father) four-volume study *Science in history*, written from a vulgar Marxist perspective. But inevitably the book also brings out the limitations of such an approach, in terms of naivity and a-historical over-determining reductionism.

onwards; the rather neglected history of empirical natural sciences in the European Middle Ages; the history of *Science and civilisation in Chin*a – scholarly available in abundance, yet without the local take-off by which it might have completely revolutionised Chinese society – as brilliantly documented in Needham and Wing's famous multi-volume study; the great constancy of the 'secret sciences', especially astrology, throughout a few thousand years of the history of Old World science no matter what specific socio-political or political economy context; the fact that new scientific and technological developments often may be underpinned by forms of mathematics formulated centuries before with no particular application or purpose at the time except the free play of scholarly imagination; the fact that anthropology, once started as an obvious complement of European expansion, quite soon in its history, by the middle of the twentieth century, turned into the most powerful tool to combat colonialism and imperialism by reference to a – now obsolete, but once extremely effective and liberating – cultural relativism – all these are examples of the fact that between knowledge production and the wider socio-political-economic context there is certainly not a one-to-one relation of over-determination, but rather a creative interplay that tells us as much about the constraints as about the freedom of the human condition. I think that this a-historical determinism is one of the main flaws of Harding's approach, although not central to her argument.

Let us continue on the point of the participation of other scientific traditions in a game of competitive plausibility involving also North Atlantic science. While this appears as no more than a theoretical possibility in Harding's argument, in fact it is of course a simple historical given that stands at the very cradle of North Atlantic science. North Atlantic science derived its very origin from other cultural traditions than those of the European mainland, In the Ancient Near East, between Egypt and Mesopotamia, science emerged in the for of systematic knowledge that was gradually expanded on the basis of experience and research, and that was administered by established forms of organisation close to the centres of religious powers – the temples and the 'houses of life'. It was initially partly a practical science, but especially a science orientated towards magic and divination – something which today we are at liberty to call a pseudo-science, precisely because from that same domain of scientific knowledge production a more valid knowledge of nature developed, with a stricter methodological underpinning of its epistemological claims, in the light of which most earlier forms can be regarded as obsolete. However, let us not forget that from the earliest Antiquity on which we have documentary sources (the end of the fourth millennium BCE), right into the eighteenth century CE, magical and divinatory science constituted dominant forms of knowledge production and of publication, not only in South and East Asia and the Middle East, and not only in the largely illiterate traditions of Africa, but also in Europe. In addition to being an innovative astronomer, Kepler was an astrologist. And even it is a moot point whether the main founder of modern North Atlantic natural science, Newton, was also involved in astrology, he was certainly involved in alchemy, and considered not his contributions to mechanics, optics and mathematics, but his pious studies of biblical time reckoning as his life's work – enough to demonstrate that at least to a

considerable extent he moved in world of thought in which magical and divinatory sciences had remained fairly dominant.[29]

As a next step Harding shows which traits of North Atlantic science have been identified by South social and cultural research of science and technology, as characteristically North Atlantic, and by implication, as less than universal. Here we are particularly concerned with traits that from a Northern perspective appear as self-evident and which therefore would remain virtually invisible to North researchers.

(a) For instance, Harding mentions Needham's hypothesis to the effect that the European conception of invariable and universal laws of nature was based on a combination of Jewish-Christian representations of divine judgement, coupled to the absolute monarchy in early-modern Europe; wherever such traits would be absent, like (allegedly) in China, the idea of law of nature would not exist but instead we obtain the Taoist image of a self-regulating nature. *I find this a moot point, for a number of reasons. Harding's point of reference as a philosopher of science is the history of North Atlantic science in the late modern period, and her knowledge of other periods or regions of the world appears to be pardonably sketchy. A detailed analysis of the concept of* logos*, first attested in the Presocratic philosopher Heraclitus – albeit in a potentially contaminated Byzantine source*[30] *– suggests that we cannot completely reduce the concept of law of nature to a Jewish-Christian religious representation. As much as two*

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[29] Cohen, I.B., 1941, 'Query no. 99: Isaac Newton — an advocate of astrology?', Isis, 33: 60-61. Coudert, A., Alchemy: The philosopher's stone, London: Wildwood House, 1980, p. 198. In anycase Newton was preoccupied with the history of astrology, cf.: Morus (= R. Lewinsohn), Die Enthüllung der Zukunft, Hamburg: Rowolt, p. 8, cf. Tucker, W.J, 1939, Principes d'astrologie scientifique, **[place, publisher]**. Tester, S.J., 1989, A history of western astrology, New York: Ballantine, repr. of 1987 first edition.

[30] Vergeer, C., 2000, Het Panterjong: Leven en lijden van Jezus de Nazarener, Nijmegen: SUN, pp. 306f, argues the case for a Byzantine text corruption on this in fragment 50; if Vergeer is right there is only fragment 2 as attestation that Heraclitus used the word *logos*, and (despite the frequent and central use of this word in classic Greek philosophers; see the very full entry in Liddell, H.G., & Scott, R., 1968, A Greek-English lexicon, ed. H.S. Jones with R. McKenzie, with a supplement, Oxford: Clarendon, reprint of the 1940 9th ed., s.v. 'logos'), there is somewhat more reason to detach the *logos* philosophy of early Christianity from the mainstream classic Greek philosophical tradition – which would be in accordance with Harding's view of things. However, via the Stoa and Philo there is an unmistakable link between the classic and the Christian usage of this term. On logos in Heraclitus also cf. Gadamer, H.-G., 1999, Der Anfang des Wissens Stuttgart: Reclam, pp. 43f, and especially 96f n. 29.

millennia, as well as a few thousand kilometres, separate Heraclitus from the early modern absolute monarchy in Europe, but similar forms of royal rule, although rather absent from ancient Greece in the classical period, did inform the great states of the Ancient Near East of which Greek communities often constituted an underprivileged cultural, social and political periphery. Moreover in later periods of Chinese history than the emergence of Taoism (which emerged in the second half of the first millennium BCE) there was a considerable degree of political centralisation. I believe Harding misrepresents Needham, whose erudition gives far less reason for doubt than Harding's. But, as Harding continues, while on the one hand Christian culture may have furthered the growth of natural science through the concept of law of nature, on the other hand it retarded the same process by the idea that heaven was composed of fixed crystal concentric orbs. *Here we detect another flaw in Harding's knowledge of the history of science: the idea she cites is already found in Anaximenes and Aristotle,*[31] *and was simply inherited by Christianity as part of a fairly limited selection of classical scholarship available to the early Church. There is nothing in the idea of the crystal concentric orbs that is dictated by the doctrine of Christianity, and if anything, such an idea is in contradiction with the much older view, first attested in the oldest Sumerian and Babylonian sources, then adopted in the Hebrew bible and hence in Christianity, of a much more open, airy, transition between heaven and earth, allowing for the breath of the Gods to soar over the waters, and for communication and exchanges by means of a tower, rain, the rainbow, a ladder, etc.*[32]

(b) Further, the growth of North Atlantic science would owe much to European expansion in the same early modern age. Science picked problems which related to that expansion – obviously an example of science and society reflecting each other rather than being perpendicular or unrelated, as in free variation. In addition to the examples that Harding gives, one might cite here the example of the invention of the chronometer, John Harrison's successful response (developed in the years 1729-1760) to a context already launched by the British government in 1714 for a prize of £20.000, to determine the longitude of ship within 30 nautical

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[31] For Anaximenes, see the collected complete fragments in: Fairbanks, A., 1898, ed. & tr., *The first philosophers of Greece*, London: Kegan Paul, Trench & Trubner, pp. 17f. Aristotle: *De caelo*, 8 and 9, numerous editions; an authoritative summary in: Dijksterhuis, E.J., 1989, *De mechanisering van het wereldbeeld: De geschiedenis van het natuurwetenschappelijk denken*, Amsterdam: Meulenhoff, 6th impr; 1st imp. 1950, pp. 35f.

[32] Genesis 1f.

miles, after a voyage of six weeks.[33] But the situation did not change dramatically in the course of centuries:

> 'We can generalize the point. the world was added as a laboratory to modern science in Europe through European expansion, and continues to so function today through the science and technology components of ''development'' that are controlled by the cultures of the North'. *(p. 54)*

(c) An important goal of science was to facilitate European appropriation, not to reduce the local costs of such appropriation, not to improve local conditions regardless of the interests invested in the European presence. The benefits of science accrue to those who are already privileged (the inhabitants of the North Atlantic region, and the South elites in collusion with the latter). With the aid of science these can realise their extraction and exploitation of natural resources in the South, whereas the costs are carried by others. In general this cost/benefit distribution remain invisible because it is dismissed as scientifically irrelevant.

(d) The claim that science could be value-free and culturally neutral is in itself already unmistakable North Atlantic and betrays – along with the emphasis on the abstract and the formal – a bureaucratic rationality (cf. Weber) is likewise particularly North Atlantic. For this reason the introduction of modern science into another culture is always a brutal penetration. Such objectivity and universality as are claimed by North Atlantic science privileged North Atlantic experts above local knowledge and local priorities.

Finally Harding discusses two crucial problems:

(1) how may local characteristics of a science (i.e. characteristics which do not just informs its superficial appearances but its very cognitive core) function as growth points of knowledge?, and
(2) how to respond to the South need for a more powerful internal epistemological underpinning of science?

Whereas her concept of cultural was already obsolescent (she entirely follows the classic convention of defining culture as a bounded, form of life, which is learned, designated by an ethnic name, internally integrated, and within whose unitary conceptual space a total human life from cradle to the grave can be realised),[34] in her

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[33] Gould, R.T., & Anonymous, 1961, 'Chronometer', in: Ashmore, H.S., 1961, ed., Encyclopaedia Brittanica: A new survey of universal knowledge, Chicago / London / Toronto: Encyclopaedia Brittanica, V: 663-664.

[34] Cf. van Binsbergen, W.M.J., 1999, 'Culturen bestaan niet': Het onderzoek van interculturaliteit als een openbreken van vanzelfsprekendheden, inaugural lecture, chair of intercultural philosophy,

discussion of point (1) above her concept of culture totally shipwrecks – it merges into one of 'local reproductive population'(whereas of all things the distinction between learned and genetically innate is central in almost any accepted definition of culture):

> 'Cultures develop biological traits to deal with their environments: lungs to accommodate high-altitude conditions, inherited resistances to malaria, dark or light skins to deal with the effects of differing exposures to the sun, etc.' ***[add pages]***

It is amazing to see that someone who shows herself to be so subtly sensitive to world-wide patterns of inequality and power in the production of knowledge, yet can be so insensitive to concepts as culture and race (*pace* Harding 1992) which yet have become the central political concepts of our time. Nonetheless, this false start yet proves to lead to an interesting insight. For if we accept that any society, in order to survive (other than parasitically), must supply its members with valid knowledge about nature, then we are justified to pose, with Harding, that:

> 'These ''cultural differences'' create possibilities for different cultures all to contribute to the expansion of knowledge about the natural world. The claim is here not that belief based on some set of local interactions is always more accurate; very often it is not. (...) Rather the claim is that cultures' different locations in heterogeneous nature expose them to different regularities of nature, and that exposure to such local environments is a valuable resource for advancing collective human knowledge. Cultures are repositories for historically developed and continually refined knowledge about different parts of nature.' *(p. 57).*

Subsequently, every 'culture' (I prefer to speak of cultural orientation, to avoid the reification attached to the classic concept of culture) makes a different use of its local experience of nature, and this to distinct forms of knowledge. Therefore every cultural orientation approaches nature with a different discursive tradition, which leads to a different representation of nature, and which makes a different science possible. And within each cultural orientation peoples organise themselves in a specific manner for work, including the work of the production of scientific knowledge. These points define a wide range of variation, which, coupled to the continuous dynamics of change within nature itself, turns to local into an inexhaustible sources of resources to contribute to human knowledge. *Elsewhere in her argument Harding speaks of the devastation and the plunder which was perpetrated in the name of science during the period of European expansion. But not all changes which humans have effected upon nature can be brought under this heading. Arrived that the point of the endless variability of the local experience of nature and of the local cultural interaction with nature, Harding overlooks the interesting possibility that local nature responds to a specific local cultural orientation. For example: specific flora and fauna may emerged, or rather be selectively privileged, in response to centuries of exposure to specific methods in*

Erasmus University Rotterdam, Rotterdam: Rotterdamse Filosofische Studies, voor uitvoerige kritiek op deze opvatting van cultuur, en de ontwikkeling van een alternatief in termen van 'culturele oriëntatie'. English version *Quest: An African Journal of Philosophy*, 2002.

agriculture, animal husbandry, habitation etc. In addition to such social and cultural factors of course also political and economic ones must be considered.

AN EPISTEMOLOGICAL UNDERPINNING, AFTER ALL?

Now it is time for us to see whether we can reinforce the epistemological underpinning of science from an intercultural perspective. Harding begins this part of her argument with a most interesting claim:

> *'Southern SCSST's ['Social and Cultural Studies of Science and Technology'] relocation of science and technology studies on to the historical maps generated by the postcolonial, single-stream global histories is clearly intended to provide not just another, culturally local account on an epistemological par with Eurocentric, single-stream histories of science and technology, but, instead, an account that is more objective and rational. However, to claim such an epistemological status does not require denial of the fact that Southern SCSST are constituted by their local cultures and practices. Instead, such a claim recognizes that at some moments in history and culture, certain locally generated cultures and practices can provide knowledge of interest far beyond the locations where it was generated. It is not just that such "local knowledge" travels well and far, but that it travels in a determinate historical relationship to other knowledge claims: it overtly contests them, claiming that they lack maximal accuracy and comprehensiveness. It claims greater objectivity, in that it can identify distorting or limiting features of the claim it contests.' (p. 59).*

This claim is interesting for a number of reasons.

Not in the last place because it seems to contain the promise that North Atlantic science's claims to superiority may, after all, turn out to be justified. If such science studies as have been undertaken from the South may turn out to be the superior products of a privileged situation in space and time, then it is in principle thinkable that also North Atlantic science, for comparable reasons of a privileged situation in space and time, might also turn out to be such a superior product. I am not just being hypercritical or sarcastic. Harding definitely turns this promise into a firm claim before the end of her argument, affirming the superiority of North Atlantic science as if we never embarked on our quest in the first place!

At least as important is that from a specific point of view self-evidences appear in a new, revealing light, which is how the growth of knowledge is realised. But as soon as we ask ourselves what is the specific point of view which appear to be illuminating to Harding, we once again find her argument thwarted by an inadequate concept of culture. Here the point is not that she confuses culture with demography; but she confuses culture and 'a geographical provenance that is marked as non-North Atlantic'– with a myopia that may in part be caused by the common, non-specialist – i.e. non-anthropological – American language use of today, cf. the expression 'ethnic food' for anything culinary pattern that is not White Anglo-Saxon Protestant, as if the latter were not inherently 'ethnic' too simply by virtue of being socio-politically

dominant. The South science studies to which Harding refers[35] have been largely undertaken by researches working in or originating from the South Asian subcontinent. They are excellent studies, based on a sophisticated methodology, written in superior English and often published by international, or rather intercontinental publishing houses. Let us admit that the authors occupy a structurally different place in the intercontinental production of science from, say, their colleagues who were born and bred in the North Atlantic. Yet many of these South researchers may hold appointments, or have done so, at prominent academic institutions in the North Atlantic region. What is it that marks these studies are local, and as specific products of a distinct culture that rejects the products of North Atlantic culture? Such studies are brought to fruition, in book form, but the felicitous combination of two conditions none of which can be convincingly identified as the manifestation of a distinct local culture:

(1) the critical reflection upon a past in which third persons with whom the author identifies, were exposed to colonial oppression, exclusion and other forms of humiliation;[36]
(2) the effective acquisition of a globally circulating academic subculture.

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[35] Cf. Goonatilake, S., 1984, Aborted Discovery: Science and Creativity in the Third World, London: Zed; Kumar, D., 1991, Science and Empire: Essays in Indian Context, 1700-1947, Delhi: Anamika Prakashan, and National Institute of Science, Technology and Development; Nandy, A., 1990, ed., Science, Hegemony and Violence: A Requiem for Modernity, Delhi: Oxford University Press; Sardar, Z., ed. , The Revenge of Athena: Science, Exploration and the Third World, London: Mansell. These studies complement a body of equally critical studies emanating from the North Atlantic, e.g.: Blaut, J.M., 1993, The Colonizer's Model of the World: Geographical Diffusionism and Eurocentric History, New York: Guilford; Brockway, L. H., 1979, Science and Colonial Expansion: The Rolc of the British Royal Botanical Gardens, New York: Academic Press; Crosby, A., 1987, Ecological Imperialism: The Biological Expansion of Europe, Cambridge: Cambridge University Press; Dupré, J., 1993, The Disorder of Things: Metaphysical Foundations for the Disunity of Science, Cambridge, MA: Harvard University Press; Hess, D.J., 1995, Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artifacts, New York: Columbia University Press; Joseph, G.G., 1991, The Crest of the Peacock: Non-European Roots of Mathematics, New York: Tauris; McClellan, J.E., 1992, Colonialism and Science: Saint Domingue in the Old Regime, Baltimore, MD: The Johns Hopkins University Press; Needham, J., 1969, The Grand Titration: Science and Society in East and West, Toronto: University of Toronto Press; Petitjean P., et al., 1992, eds , Science and Empires: Historical Studies About Scientific Development and European Expansion, Dordrecht: Kluwer; Turnbull, D., 1993, 'Local knowledge and comparative scientific traditions, ' Knowledge and Policy, 6, iii-iv: 29-54; Watson-Verran, H., and D. Turnbull, 1995, 'Science and other indigenous knowledge systems, ' in Jasanoff, S., Markle, G., Pinch, T., &Petersen, J., Handbook of Science and Technology Studies, Thousand Oaks: Sage, pp. 115-39.

[36] Here the emphasis is on studies of the school of postcolonial theory, which is dominant in South Asia. On a world-wide scale, Islam today furnishes a framework where the source of critical protest is not only colonial oppression in the past (cf. the Palestinian question) but also and particularly North Atlantic rejection of alternative forms of social, cultural, political and religious practices and representation today, epceially in so far as these revolve on alternative trajectories through modernity and globalisation. The orientalism iscussion was a reflection of this process in the context of South science studies.

What Harding calls 'local culture' and treats as a source of superior (for more rational and more objective) scientific insight, is in fact (as science is so often) not a reflection of local society in South Asia, but perpendicular to the latter, amounting instead to a variety of a critical *prise de conscience* within the globalised pursuit of science, underpinned by a personal identity construction as under (1). Such authors' distancing from the North Atlantic hegemonic discourse springs not so much from a South Asian cultural orientation which all these authors may have in common, but from the coupling of a personal identification, to universalist values of equality, justice, dignity, liberating potential, and the societal mission of society. Some of these may resonate with traditional South Asian cultural orientations but by no means all: not equality but inequality has been the basic orientation of South Asian society for three millennia. By and large however they must be considered elaborations of global intellectual elite subculture, which has strong roots in the North Atlantic. *Thus local cultural and local knowledge which Harding, for reasons of political correctness, invokes as a source of superior knowledge, appears to be a anti-hegemonic myth (albeit a highly sympathetic one, let there be no doubt about that).* The local element to which she calls attention amounts to a strategically chosen position of critical distance (or of selective critical distance) within the North Atlantic regime of subjugation through knowledge production – it is a critical alternative which does not have to be derived from South Asian traditional culture (where I suspect it cannot be found), because it is abundantly available within the North Atlantic social and historical sciences, with their partly Marxist and social-critical roots. Although being an Indian intellectual in the contemporary world system does help, one does not have to be an Indian to come to such a critical position: being young, being a woman, being gay, coming from a working-class background (like in my case), any of these backgrounds may bring one to the same critical position, and even a highly privileged background does not preclude such a positioning, as it well illustrated by the revolutionary sons of the upper class, such as Willem Wertheim and Martin Bernal.

In addition to local South culture also the female perspective features rightly as an illuminating alternative in Harding's argument, throwing into relief 'conceptual power practices'(Dorothy Smith) much more clearly.[37] While Harding's approach to South culture remains abstract and 'politically correct' to the point of distortion, as we have seen, with regard to the feminist perspective she speaks from the personal experience of many years, and with much great power of conviction.

After, in the above manner, objectivity and rationality are beginning to take on a new meaning regardless of the traditional internal epistemological claims, Harding finally investigates whether there are reasons to go on making the third claim with regard to North Atlantic science: the claim of universality. Her formulation of the problem is so striking that it almost appears as the very solution to the problem:

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[37] Cf. Smith, D.B., 1990, The Conceptual Practices of Power: A Feminist Sociology of Knowledge, Boston: Northeastern University Press.

> 'In contrast to the case with only local knowledge systems, people from other cultures who do not share each other's values and interests can nevertheless understand and use such real sciences, and whether or not they understand and use them, the universally operative natural forces that shape their lives can be predicted and explained by the laws of nature that real sciences articulate. In such accounts, terms such as "universal science", "universally valid claims", and "universally operative forces" call up a number of different meanings originating, evidently, in everyday uses of the term, as any dictionary reveals.' (p. 61).

In the first place she rejects the idea that only value-free science can be universally valid. For are not all claims to scientific and technological knowledge local, in the sense that they spring from the cultural practice of specific knowledge projects? Value commitment, she claims, is a positive factor in the growth of knowledge.

But if the solution foes not lie in value-free-ness, could the universal validity of science then mean, that its authors hail from many different cultures and adhere to many different specific belief systems? Harding acknowledges that in fact all involved must endorse a scientific subculture, which is in principle perpendicular to their various cultural identities outside science:

> 'So why could they not all also agree to scientific claims permeated by Confucian, Brazilian, or African ''cultures and practices''?' (p. 61)

Harding finds this a non-trivial and promising point of view, because it opens up the possibility that scientists could agree on scientific claims that are not rooted in North Atlantic culture and practice. She reminds us of the fact that Indian mathematical concepts, Arabian numbers[38] and Chinese acupuncture have been incorporated in global science – examples of an important theme in South science studies. *But here again rises a moot point. The incorporation of Chinese acupuncture in global science appears to have been merely at the level of condoning practices and possibly making them eligible for insurance refunds. The extensive revision of cosmopolitan science so as to incorporate the acupunctural meridians and nodes as a factual reality largely remains to be undertaken.*

And here again it appears that Harding's conception of the history of science and of cultural specificity is much too static. In the first place, cultures do not exist, and the appeal to distinct cultures is an artefact of the contemporary socio-political

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[38] Which incidentally came from India, cf.: Alberuni, 1888, Alberuni's India: An account of the religion, philosophy, literature, geography, chronology, astronomy, customs, laws and astrology of India about A.D. 1030: An English edition, with notes and indices, tr. E.C. Sachau, 2 vols, London: Trübner & Co; Ifrah, G., 1991, Universalgeschichte der Zahlen, Frankfurt a.m. /New York: Campus, 2. ed.; German tr. of: 1981, Histoire universelle des chiffres, Paris: Robert Laffont/ Seghers **[check]** , pr.1994; edes, G., 1931, A propos de l'origine des chiffres arabes. In: Bulletin of the London School of Oriental and African Studies vi/1931, S. 323-328; Woepcke, F., 1863, Mémoire sur la propagation des chiffres indiens', Journal Asiatique 6 Ser. i/1863, pp. 27-79, 234-290, 442-529. Surprisingly, Harding (whose keen appreciation of the intercultural and intercontinental dynamics of science production is based on her reading of contemporary South sciences studies as produced in a postcolonial theory frame, much more than on her reading in the history of South science in its own right) does not seem to be aware of this, although she used the example of the European appropriation of Arabic numbers once more (p. 62).

situation which privileges cultural identity as a major asset within the arena of the politics of recognition. Secondly, beyond the reification of culture, let us admit that there is some truth the notion of the specificity of a considerable number of parallel cultural orientations, none of which however sufficiently distinct and comprehensive to allow an adherent to live one's entire life in its from the cradle to the grave; but then the scientific cultural orientation, or any number of such scientific cultural orientations, does not necessarily coincide with other cultural orientations outside science, but only partially overlaps with it or is perpendicular to it. A scientific cultural orientation is often a isolated, important body that, rather than spring from a local cultural orientation, needs to be specifically adapted, trough a process of transformative localisation, in order to be accommodated. And thirdly, the history of science is not only, and not in the first place, a process of the contemporary convergence (real, potential, or thwarted) of initially independent and irreducible distinct cultural positions. The distinctness in itself is largely the product of two factors working upon an initially more unitary input. These two factors are, in the first place, transformative localisation (which helped turn Babylonian and Egyptian science into Greek science, Greek science into Indian science, Chinese I Ching into the medieval Arabic divination system of 'ilm al-raml, 'ilm al-raml into African divination systems as Ifa *(West Africa),* sikidy *(Madagascar), and* hakata *(Zimbabwe, Botswana South Africa), as well as in the European Renaissance magic known as geomancy; and in the second place the geopolitical ideology of European expansion, which (after the early expansionist invention of the interrelatedness of Indo-European languages) could hardly afford to see identity between the cultural history of the colonisers and the colonised, and therefore had to invent difference where in fact there was largely the sharing of a joint history for millennia. And fourthly, a problem that Harding does not seem to perceive at all: given the hermeneutical impossibility of representation without violence, it is so very difficult to represent non-North Atlantic knowledge systems in such a way that*

(a) the rendition is not severely mutilated by the imposition of an alien, North Atlantic model (as happens in many contemporary, highly politicised studies of so-called indigenous knowledge systems, where local knowledge appears in commoditified and juridified form as if they were initially conceived along North Atlantic lines in the first place);

(b) the internal richness and complexity of the knowledge system can still be more or less appreciated.

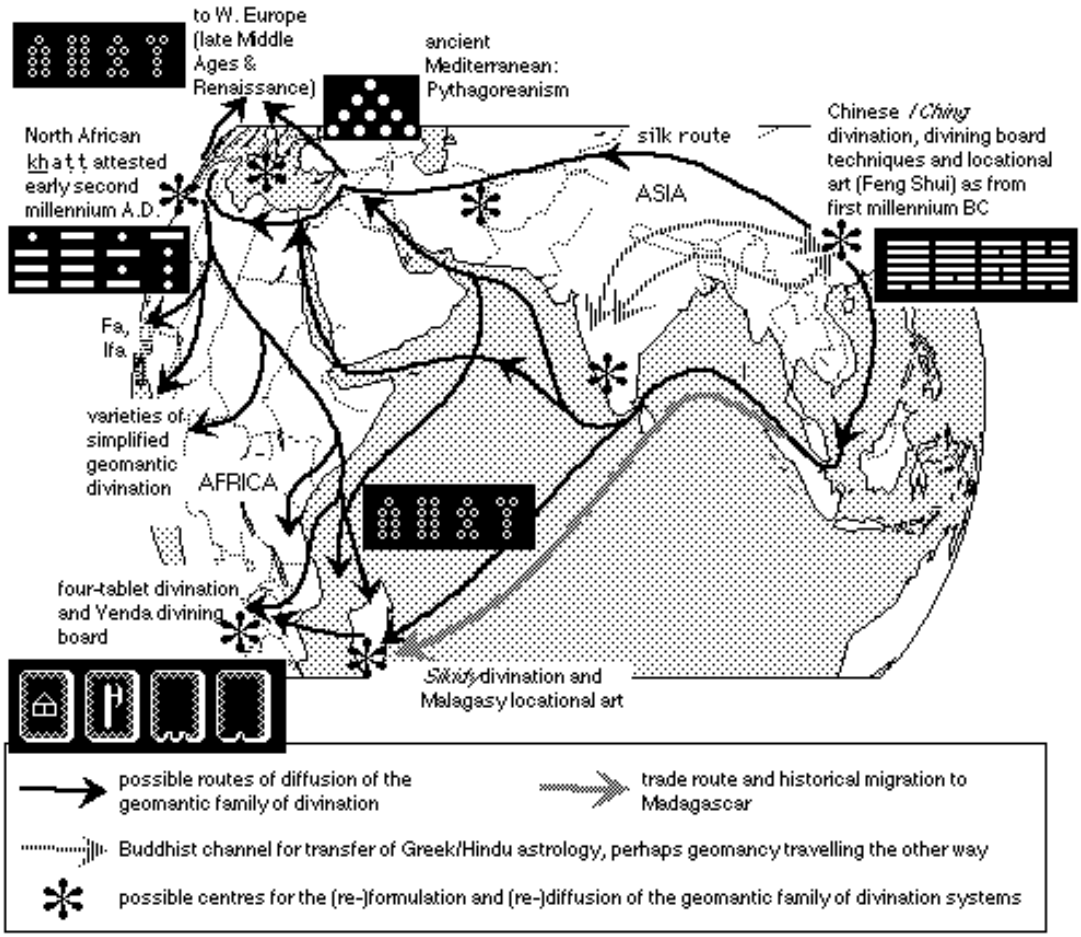

Fig. 1. Old world geomantic systems

LEGEND
1. Chinese *I Ching*, divining board techniques and locational art (*Feng Shui*) as from first millennium BCE
2. silk route
3. Buddhist channel for transfer of Greek/Hindu astrology, perhaps geomancy travelling the other way (i.e. east-west)
4. trade route and historical migration (first millennium CE) from Indonesia to Madagascar
5. Pythagoreanism of the ancient Mediterranean; it is plausible that this belongs to this intercontinental system of interaction, but how remains unclear
6. *sikidy* divination and Malagasy locational art
7. invention of *'ilm al-raml* probably in the milieu of the Ikhwan al-Safa'a ('Pure Brethren), Basra, Persian Gulf, late 1st millennium CE
8. North African *'ilm al-ram*, early 2nd millennium CE
9. Ifa, Sixteen Cowries: the elaborate geomantic systems of West Africa
10. simplified geomancies of the African interior
11. Four-tablet divination and Venda divining board, Southern Africa, as from middle second millennium CE
12. to the New World
13. Western Europe as from early second millennium CE (*Ars geomantica*, *Punktierkunst*)
* centres for the (re-)formulation (re-)diffusion of the geomantic family of divination systems

Especially the introduction of African knowledge within the global, North Atlantic dominated edifice of knowledge is difficult and still largely in its infancy, for a number of reasons:

- *Many African knowledge situations are illiterate*
- *In many African situations knowledge features as personal property*
- *Many African knowledge situations are characterised by practices of secrecy*
- *Many African knowledge situations have religious and occult connotations, which are very difficult to transfer to a North Atlantic science emphatically identifying as secular and rationalistic*
- *There is the point, also articulated by Harding, of the paralysing effect of North Atlantic science, which on the side of local African knowledge systems brings about such distress that exchange on an equal footing is virtually impossible*
- *And finally, the discourse on African scientific systems is still insufficiently developed, it is still in danger of being too apologetic, even condescending, or worse still, racialist.*[39]

Another reason for the universality claim is that nowadays many people from many different cultural orientations and geographical locations wish to borrow elements from North Atlantic science for local use far from the point of origin of these elements. Of course this is nothing new. In the same way Babylonian astronomy, the Phoenician alphabet, Arabic numbers or Chinese acupuncture have

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[39] Racialist denunciations of Africans' alleged incapabilities for science abound in the literature produced in the North Atlantic region between 1850-1950. A classic study of an African knowledge system remains: Evans-Pritchard, E.E., 1972, Witchcraft, oracles and magic among the Azande, London: Oxford University Press, reprint of the first edition of 1937. The conception of magic as misfired science, often implied in the North Atlantic analysis of African knowledge systems, derives from: Frazer, J., 1890—1915, The Golden Bough: A Study in Magic and Religion, 9 vols. London: Macmillan, and many later editions and excerpts. Detached, sensible approaches to African science in: Horton, R., 1967, 'African traditional thought and western science', part 1, Africa, 37, 1: 50-71; part 2, Africa, 37, 2: 155-187; Horton, R., 1993, Patterns of thought in Africa and the West: Essays on magic, religion and science, Cambridge: Cambridge University Press. The other side of this sustained argument is represented by: Winch, P., 1964, 'Understanding a primitive society', American Philosophical Quarterly, 1: 307-24; reprinted in: B.R. Wilson (ed.), Rationality (Basil Blackwell, Oxford 1970), pp. 78-111. The discussion, which still has not subsided, is reflected in an illuminating manner in: Sogolo, G.S., 1998, 'Logic and rationality', in: Coetzee, P.H., & Roux, A.P.J., 1998, eds., The African philosophy reader, London: Routledge, pp. 217-233. Without resorting to the Afrocentrist discourse, the claim that original and systematic knowledge about nature is at home in Africa was developed in: Hountondji, P.J., 1994, ed., Les savoirs endogènes: Pistes pour une recherche, Paris: Karthala/ Dakar: CODESRIA. Afrocentrist sentiments and modes of analysis (occasionally bordering on essentialism, even racism) prevail in: Finch C. S., 1990, The African Background to Medical Science . Essays on African History, Science and Civilizations, London: Karnak House; Lumpkin, B., 1984. 'Mathematics and Engineering in the Nile Valley', Journal of African Civilizations 6, no. 2: 102-119; Pappademos, J., 1984, 'The Newtonian Synthesis in Physical Science and Its Roots in the Nile Valley', Journal of African Civilizations 6, 2: 84-101; van Sertima, I., 1983, ed., Blacks in Science: Ancient and Modern. New Brunswick, N.J.: Transaction Books. Such approaches have come under heavy fire, e.g. Palter, R., 1996, 'Black Athena, Afrocentrism, and the history of science', in: M.R. Lefkowitz & G. MacLean Rogers, eds., Black Athena revisited, Chapel Hill & London: University of North Carolina Press, pp. 209-266; Howe, S., 1999, Afrocentrism: Mythical pasts and imagined homes, London/New York: Verso, first published 1998.

been appropriated, without it being necessary to adopt the wider cultural imbedding which these forms of knowledge had at their origin. With contemporary globalisation the frequency of such appropriation has greatly increased, but the fact in itself is of all ages. Here again we meet the tension between the empirically valid and the societally valid: if these and other knowledge systems which have been effectively and widely appropriated far outside their origin, were completely and irrevocably defined by their original societal setting, such appropriation would have been impossible unless under conditions of the wholesale adoption of the original culture – which seldom is the case. The relative, 'perpendicular', independent of knowledge from society, and the high probability that a knowledge system contains elements that amount to valid knowledge about culture, each constitute major factors towards the possibility of such appropriation. (Of course, in the case of conventional formal systems such as an alphabet, valid knowledge is not at stake, only relative cultural independence; valid knowledge is however at stake when it come to such borrowings as astronomy.) So, part of the explanation of the universality claim of North Atlantic science lies in the possibility of it containing valid knowledge about nature. If it does, such science will demonstrably hold true far outside its origin: the aeroplane will not crash. Harding admits that in the same way also science from outside t he North Atlantic may work: Chinese acupuncture, Ptolemaic astronomy (which she might have recognised as mainly a Hellenistic reformulation of Babylonian astronomy), and Aristotelian physics (which she might have designated, more precisely, as Archimedean physics), also turned out to explain much and to predict much, even though the later explanations by Copernicus and Newton are superior. In other words, and once more: the North Atlantic does not have the monopoly to valid knowledge about nature.

This is the point where Harding arrives at her formulations in terms of some sort of scientific biodiversity of knowledge systems, triggered by the different local natural surroundings.

However, Harding does not so easily revert to the position that the universality claim may be simply based on the sheer validity of scientific knowledge. Before she gets there she first draws attention to alternative explanations on this point, as advanced by such science researchers as Latour.[40] They sought to answer this question by pointing at the wide networks of communication through which heterogeneous and isolated form of knowledge could be mobilised at all sorts of places and times. In fact, the history of the 'secret sciences' all across the Old World is one example of such a large and enduring network. The argument is persuasive up to a point. It makes the claim to universal knowledge appear, not as an intrinsic characteristic of that knowledge, but as a social product of interaction and of communication technology. What is important here is the idea that it is the privileged *recognition* as valid knowledge, which is thus attained as the result of a social process. But recognition of validity is not the same as validity. That validity and its

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40 Cf. Callon & Latour, Unscrewing the Big Leviathan, *o.c.***;** Latour, Science in action, *o.c.*; Latour, The Pasteurization of France, *o.c.*; Latour, Petites leçons de sociologie des sciences, *o.c.*; Latour & Woolgar, Laboratory Life, *o.c.*; Serres & Latour, Conversations, *o.c.*

universality then yet leads us back to the epistemological condition which Harding, at this point in her argument, pushes under the table. It is the internal epistemology of North Atlantic science (which however in principle is also applicable to non-North Atlantic science) which is thus smuggled back in.

This finally brings Harding to four processes which in a unique way have privileged North Atlantic science to universality. European expansion offered the opportunity to

(1) test out European scientific insights all over the world as if in one big laboratory
(2) to scrutinise the entire world for fragments of local knowledge that could be integrated within European science
(3) to destroy local knowledge systems and technologies in favour of European alternatives, and most importantly
(4) the predatory conceptual framework of European science, which through a constant process of substitution of the abstract for the local and concrete, replaces local knowledge (for instance a culture specific vision upon local nature) by European knowledge (e.g. in terms of scientific taxonomy and ecology; thus local totemic animals become Marsupialia.

In this way the illusion could be established that only North Atlantic scientific knowledge is real, valid knowledge.

Harding is rather optimistic about the potential of South science studies to counter these developments. However, once more she overlooks the fact that most South science researchers, because of their commitment to intercontinental academic life, are at least in their professional identity fairly alienated from any local South culture. More important, she does not in the least indicate what the possible strategies could be to,

(1) Identify valid scientific knowledge in other cultures (here there is the problem of subordination: how could such an identification take place in any other way than by using North Atlantic science as a touchstone?
(2) To bring such valid knowledge within the orbit of globally available and accepted knowledge.

Finally she makes too much of the binary opposition between the local and the global. In fact this is a pitfall. All knowledge is always local in the sense that it is acquired and administered by a concrete set of people, but the very possibility of the mediation of knowledge beyond that initial set of people (a possibility given by the existence of language, cultural orientation, interaction, and the globular shape of the earth) any knowledge has in principle the potential of spreading to a global format. And that has happened with much local knowledge, in a general process that has recently been intensified by the spread of education, literary, and the Internet.

Elsewhere[41] I have tried to approach the same problem of the opposition between the local and the global in terms of the question whether contemporary communication and information technology (ICT) is or is not, at home in Africa. The answer turned out to be surprising. On the one hand I had to admit that also in the North Atlantic society ICT is not self-evidently at home: it first had to be enculturated there, even though in many ways ICT bears the traces of having been mainly conceived and implemented by members of North Atlantic society. On the other hand the appropriation and enculturation of exotic technology and prestige goods which at the same time symbolise and effectively underpin local power, has a history of millennia among the political and social elites of Africa. ICT fits this framework very well indeed. And finally it turned out that African are remarkably successful in the appropriation of ICT, a process in which they exploit not only global factors (such as the fact that industry needs customers no matters where, and the fact that ICT can be used as a black box without the user being required to have more than nominal knowledge about its internal working), but also local African factors such as the long history of African formal systems, and a much greater emphasis, in Africa, on rhyzomatic (network-like) structures and processes, which although rather at variance with the dominant forms of social organisation in the North Atlantic, yet have a considerable formal similarity with hypertext and hyperlinks in ICT. Thus it appears that between the local and the global there is not the insurmountable, lapidary difference as suggested by the binary opposition, but the latter is largely, Derridean fashion, resolved in a tension relation, where both poles need to be simultaneously appreciated in the analysis.

At the end of the exciting quest on which Harding has taken us, we are beginning to realise that cultural specificity and ethnic appropriation may all amount to ideological rhetoric. In the last analysis all knowledge has always both a local and a global aspect in the sense that it is in principle an achievement of humankind as a whole, in principle communicable as such. This involves more than the epistemologically underpinning of procedures along which that knowledge can be valid or true knowledge. Truth plays scarcely a role in Harding's argument. Yet even she cannot escape the idea that much of North Atlantic knowledge is, after all, valid knowledge, which may be effectively applied far outside the North Atlantic region, and not only for reasons of social and political hegemony – and that in fact the same applies to much knowledge produced outside the North Atlantic region. However, the recognition of such validity is a social process, in which global power relations privilege one type of knowledge, and one format of knowledge, far above all others. Only once we have become conscious of these socio-political contingencies, can we realise that the acquisition of such true validity depends, in the first place, on the

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[41] van Binsbergen, W.M.J., 2002, 'ICT vanuit intercultureel perspectief: Een Afrikaanse verkenning', in: J. de Mul, red., Filosofie in cyberspace: Reflecties op de informatie- en communicatietechnologie, Kampen: Klement, pp. 88-115; English version in press as a chapter in: van Binsbergen, W.M.J., in press, Intercultural encounters: African, anthropological and historical lessons towards a philosophy of interculturality, Berlin: LIT; also at: http://www.shikanda.net/general/gen3/index_page/cursus_1999-2000/ict_english.htm

internal epistemology of any local knowledge system, be it North Atlantic or exotic.

CONCLUSION

The idea that North Atlantic science is of an incomparable higher order than other local sciences typically forms part of Eurocentrism and European expansionism of the nineteenth and early twentieth centuries. Cultural relativism emerged in the middle of the twentieth century as the Northern intellectual reaction against colonial subjugation, and as the self-evident implication of the theory of the internal systematic of local cultural orientations such as was supported by prolonged anthropological fieldwork within one narrowly circumscribed local community. To declare all science including North Atlantic science to ethno-science is an act of cognitive relativism. From that relativistic perspective the internal epistemology of North Atlantic science (the claims of objectivity, relativity and universality) was declared to constitute a hegemonic myth. Although Harding, under reference to specific studies, contributes much to an understanding or socio-cultural, political and historical factors because of which such claims could establish themselves, *in fact she rejects the strong relativism implied in that position*: if we deduct all socio-cultural, political and historical factors, and wholeheartedly admit that North Atlantic science is a knowledge system that to a considerable extent has been determined by North Atlantic society and its history, then it still turns out that North Atlantic scientific knowledge is largely valid knowledge, for reasons which cannot be reduced to such over-determination but which instead simply lie enshrined in the internal epistemology which stipulates scientific procedures through which manifestly valid knowledge about nature can be obtained. Thus Harding ends up in a position which, from a very different point of departure and along a very different argument, has been defended for a considerable period of time by Gellner and his anti-relativist school.[42]

This would mean that there is something in the contents, the format, the reproducibility, the validity of certain forms of knowledge by which the latter detaches itself definitively from the social contexts in which it was first produced and administered, and is no longer dependent upon those contexts. North Atlantic science is often surrounded by the pretension of such an abstract, universal applicability. However, the depressing results of much international development cooperation demonstrate that it is only under specific additional conditions (relating to physical environment, social context, infrastructure, attitude to work, discipline etc,) that North Atlantic scientific insights can be affectively applied globally, On the other

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42 Cf. Gellner, E., 1959, Words and things, London: Gollancz; Gellner, E.A., 1970, 'Concepts and Society', in: Emmet, D., & A. MacIntyre, 1970, eds., Sociological Theory and Philosophical Analysis, New York: Macmillan, pp. 115-149; Gellner, E.A., 1990, Relativism and the social sciences, Cambridge: Cambridge University Press, first published 1985; Hall, J.A., & Jarvie, I., 1996, eds., The social philosophy of Ernest Gellner, Amsterdam/ Atlanta: Rodopi, Poznan Studies in the Philosophy of Sciences and the Humanities.

hand we have experienced, over the past few decades, an increased availability and circulation of non North Atlantic forms of knowledge: through the popularisation of alternative modes of medicine often from an origin outside the North Atlantic, and by the circulation of non-North Atlantic knowledge systems (including methods of divination) in a New Age context, via workshops, books, and more recently especially through the Internet. It is important to investigate to what extent these do contain valid knowledge about nature, and to what extend such valid knowledge may have survived the transformation of such knowledge systems to a globally recognisable and transmittable format. Elsewhere (in my forthcoming book *Intercultural encounters,* chapter 7) I have done precisely this for the *sangoma* science of Southern Africa, and the results – which I shall briefly indicate in my oral presentation on the basis of the present paper - are very encouraging.

This is where we have to stop, by indicating exciting routes for future exploration. Meanwhile we have made considerable advances. We have gathered some additional insights in the socio-cultural, political and historical factors under which North Atlantic science has been able to claim universality, rationality and objectivity, largely for valid reasons, but still at the expense of other knowledge systems' claim to equally valid knowledge about nature. We have largely rid ourselves from the guilt feeling according to which it could only have been hegemonic or racialist reasons that made us attribute a high validity to North Atlantic science, of all knowledge systems. We have recognised that valid knowledge about nature must also abundantly available in non-North Atlantic knowledge systems. We have begun to suspect that non-North Atlantic knowledge system may even have access to forms of valid knowledge to which North Atlantic has no access for the time being, because of the admission, in non-Atlantic knowledge systems, of other sources of knowledge than those recognised in North Atlantic science, as well as because of a knowledge situation in which partly different natural phenomena and different socio-cultural organisational forms of the knowers are involved. An application, in my oral commentary, to *sangoma* science will focus on the concrete application of these lessons with regard to a specific African knowledge system, and its reformulation and circulation in a globalised format.