

# Scientific Rationality and Cultural Diversity

*Bonaventure Mvé-Ondo*

'When the drum changes place, a new sound is invented'  
Kossi proverb (Cameroon)

One of science's chief objectives is to show that the world is intelligible to human reason. In general terms this attempt at rational understanding has a history which is closely connected with the history of science and also with that of technology and philosophy. But even though there is a tendency to confuse that history with the history of the west, it would not be complete without account being taken, first, of contributions from other cultural regions and, secondly, over and above the specificity of conceptual systems, of the essential 'transmission' of cultures and more especially scientific knowledge.

Because contemporary science is neither the fruit of a single civilization nor the consequence of a single history, I should like to start from two points: the first is that the construction of rationality in the history of the world and the history of science has not stopped but is always open. And today more especially it could be said that it is renewing a vast field of philosophical problems connected with its very nature. The second is that, seen from elsewhere, the history of western rationality has been confused with a kind of 'colonial' stance of intelligibility in various aspects, from the theory of knowledge through to practical action, aesthetics and ethics, the communicability of knowledge and scientific creation. That colonial stance has strengthened the idea of rationality's single voice and treating other cultures as inferior.<sup>1</sup>

It is increasingly clear that if rationality is a single whole, its modes of appearance are plural. In other words, beyond the content of knowledge and the contexts in which it came into being, the requirement for rationality is manifested in the very act of understanding and finds its meaning there. In general it is in the organic way in which scientific content is built up from materials emerging from diverse cultures and assimilated into rational constructions, but also from various histories, whether or not they are shared among peoples, and/or from their contexts or their relations

Copyright © UNESCO 2008

SAGE: Los Angeles, London, New Delhi and Singapore, <http://dio.sagepub.com>

DOI: 10.1177/0392192108092629

with the world, that it is possible to understand the full complexity of the problem (Coquery-Vidrovitch, 2007).

This is particularly so because in general science has been going through a fundamental difficulty for more than a decade. Its demand for a universal epistemological status can no longer be satisfied in the simplest way. It cannot any more base its cognitive and social authority on its supposed kinship with the natural order. Worse still, affirming its autonomy carries little weight today, nor does referring to its universalism or objectivity alone. The situation has become so serious that some people have not shrunk from saying that science's difficulties stem just as much from the diversity of its epistemology as from its ontology (Granger, 1989; Pestre, 1995).

In sum it now seems that scientific universalism, which gained its meaning in contemporary science being rooted in the west, should not only be embodied in a sort of broadening of the field of knowledge (particularly through study of other disciplines), but also in a kind of deepening of the logics peculiar to other worlds of meaning (or episteme) in their differences. In other words today's science has a future only if it is able on the one hand to widen the field of rationality and on the other hand to deepen it. That is how it will henceforth approach the intelligibility of the world and, beyond that, be at the heart of the development of societies.

It has been said, but it bears repeating, that science's main objective is to show that 'the world is intelligible'. And with this initial proposition I would now like to offer three initial remarks, and put forward a review of the situation of science in Africa, making a few suggestions that seem to me to be essential if we want to create a worldwide space for science that is shared and built on diversity.

### **1. Four preliminary remarks**

The first remark regarding this intelligibility is shaped by history. It is accepted that the various ancient societies developed different ways of doing science. So much so that no serious study of this problem has been possible without taking into account the history of science in its diversity, insofar as that history forms an extremely rich and lively area of problems, both epistemological and philosophical, to be classified and not a site for applying theories to be illustrated. In other words scientific knowledge is not a kind of logical system that is more or less closed, associated with already fixed categories, but rather something moving forward, evolving, if we consider both the variety of disciplines and the heterogeneity of systems of knowledge in different civilizations and at different periods.

The second remark is that knowledge coming from other cultural regions is likely to renew in a timely way not only the abstract debates of scientists themselves but also and at the same time approaches to reality. Scientific activity is not geo-centred, it feeds on cultures where it develops and has developed at various times and places. However, the major difficulty lies in the ability to build bridges between knowledge and existing histories. A qualitative leap can be made here only when the very structures of our mental representations are transformed or modified. In other words it is a question of trying to understand how what earlier was unthinkable here or there now makes sense. To achieve this we only need to look at the history of scientific

controversies, which is always instructive as to science's ability to evolve and universalize (Paty, 1999).

The third remark is more radical. If it is clear that science has a history, it is no less true that the word 'science' does not always fit configurations of knowledge and practices found in very different cultures. Comparative studies on cultural regions, such as the one I carried out in the field of philosophy about the western and Fang worlds of meaning (Mvé-Ondo, 1991, 1989), have forced us to revise some simplistic certainties: for instance the idea that what is considered here and now as science is always able to take into account the diversity in time and space of all forms of knowledge. The history of science, like that of the 'encounter between rationalities', can then be only the history of knowledge which, across time and space, is invented, transmitted, applied and modified, that reflects on itself through critical, philosophical thought and interpenetration with other elements of culture.

The fourth remark is the direct consequence of the previous one: science's effective reality depends on its reflexive dimension and is connected with its intelligibility, that is, appropriation by reason, but also by particular subjective thoughts, of this or that element of knowledge. That is why there can be no science without the capacity for intelligibility, since all receptions are the fruit of experiences lived by those same subjectivities and at the same time are part of the life of 'communities'.

Armed with these remarks it is easy to see that considerable progress has been achieved from the moment when we moved from a linear, cumulative and geographically situated conception of the past to a representation that foregrounds the variety of episteme and origins of scientific concepts. But that transition has not been completely accomplished.

## **2. On the situation of science in Africa**

In the context of globalization and with the interwoven problems facing the planet, the issue of science in Africa, and thus its ability to carry through development, has become a crucial one. Of course globalization, which is focused more on results and technology, by seeing science as a product, has in fact confirmed the economy of science, an economy from which the continent is well-nigh excluded: obsolescence of equipment, very low scientific productivity, brain drain, extraversion of research themes, etc. Today we can talk of a scientific divide (Mvé-Ondo, 2005), that is, a sort of distance separating the developed and developing countries as regards production, circulation and management of knowledge. Here it is a question not only of a simple technical or economic problem but first and above all a problem of society.

This situation of scientific divide is characterized by a few main features. First of all, in the area of investments committed: in 2000, whereas North America devoted 37.2% of its investments to research and development, and Asia 30.5%, the African continent devoted only 0.8% of its spending. So how can a continent that does not invest in research hope to take part tomorrow in worldwide competition and emerge from underdevelopment?

Then in the area of the volume of scientific production: indeed today, despite 45 years of political independence and after an unprecedented growth in university and

research institutions, sub-Saharan Africa's share of scientific publications is almost zero. In 2000 it represented 1% of the world total. In comparison, in 2000, the European Union's share was 40.2%, North America's 36.8% and Japan's 10.7% (source: UIS 2005).

Then again in the area of the nature of scientific production itself: as we know African universities and research bodies have not always taken account of endogenous knowledge. Having adopted a strategy that more often than not imitates and repeats modes of operation in northern hemisphere laboratories, they have not yet made the connection between science and cultural traditions. So they have obstructed a change in attitudes. Furthermore, national and regional scientific communities tend to exist in isolation, very often ignorant of what is being done in the neighbouring lab.<sup>2</sup> So much so that scientific work cannot really put down roots, gain international standing and so be perpetuated.

And then there is the issue of quality and relevance. Since they are not truly productive of knowledge, universities and research centres in sub-Saharan Africa very often simply work with the paradigms and other methodologies developed elsewhere. So innovation is rare and production of patents well-nigh non-existent.<sup>3</sup> This is due to several factors: absence of a clear research policy, excessive compartmentalization of research bodies (when they exist), universities and industrial sector and finally lack of structures for transferring, disseminating and promoting science and technology.

University education is marked above all by high numbers in the initial years. Badly organized research still too often leads to over-theoretical qualifications that do not always focus on development problems. This is proved by the fact that research projects, dissertations and theses are still too personal and their results neither are nor can be applied.

And finally there is a divide in the area of sharing the results of science. Indeed African universities and research bodies are totally dependent on the northern hemisphere. They import everything, from basic equipment through spare parts and consumables to books and journals. The consequence of this state of affairs is that African scientific production is directed, validated and set in motion for the needs of the north.<sup>4</sup> Above all it is destined for external consumption.<sup>5</sup> And the researcher is defined and groomed by the north both as regards identification of priorities and topics and also in the area of methodology. So we often find aberrations in scientific collaboration. For example, given an equal level of competence, we often see that African labs mainly collect raw materials whereas those in northern countries, because they are better equipped and run, carry out analysis, determine properties and in the end make finished products and produce patents.

An object of science, Africa struggles to establish itself as a 'centre productive of epistemological norms' (Bernault, 2001: 128–9), but is much more a consumer and importer of products and norms made elsewhere. This 'stance of one-way imitation and importation' has a history. It stems from the fact that modern science in Africa has not emerged from the long logical succession of immemorial knowledge accumulated over centuries by its people, but is a phenomenon of the colonial clash. In this sense it appeared only recently. Furthermore, this stance has been encouraged by the fact that science has been unable to integrate effectively with traditional oral cultures. Those

cultures, which are less inclined to capitalize knowledge, have confirmed it as 'the whites' thing', especially in central Africa where cultures and knowledge are chiefly based on oral tradition.<sup>6</sup> Finally it is associated with the major direction given to colonial and post-colonial science, which has been first of all to serve other societies' interests and to make Africans objects rather than genuine actors in science.

All this has particularly negative consequences for knowledge production and circulation (which moves mainly from the north to Africa), for the way it is managed and controlled, and for the relationship between this scientific knowledge and that of its specific cultures. The result is that science still seems to be something that is not part of black identity and refusal to take it up resembles an act of resistance.

### **3. Towards a co-construction of science**

More than economic liberalism the major cause of the scientific divide is turning inward, isolation and above all the effects of the governance of states that did not believe in science and more generally in education. While the rest of the world discovered Africa centuries ago and turned it into an object of science, it is dramatically evident that Africa has not yet really discovered the world or learnt from the west. In the face of the offensive to westernize the world and globalize science, it is important to undertake a change of stance if Africa wants to play a part in formulating the collective response the rest of the world wishes to make to the great contemporary scourges and wants to get a grip on its development.

Adopting a changed stance means first of all clarifying concepts and facts, as well as trying to think differently and, better still, trying to get out of the trap of 'culture' and 'tradition'. For a long while culture was often claimed to be unvarying, a feature that had to be perpetuated. But many African 'cultures' have today become a shadow of what they were because the vision of the world which legitimated their codes has disappeared, leaving people wrestling with ways of existing and attitudes that bear little relation to the situation which brought them about. Like all the world's societies today's Africa is not static, it is living through change, which means that it is continually examining itself, the way it sees others and thus new practices (this is the case for instance with the issues of identity and living in towns: Gondola, 1997; Rossatanga-Rignault, 2005). Caught up in the movement, it is forced to find fresh economic, social and political solutions – and not only artistic ones – in other words, a new culture: new marks compared with which it can situate itself in order to carry on existing humanly and socially. That involves the end of 'scientific nationalism' or endogenous science and the ability to be just oneself while maintaining dialogue with other traditions. Adopting a changed stance also means being able to steal other people's ancestors and use others to enrich oneself.

And so adopting a changed stance means changing culture, it is not simply a matter of reactivating content but of going back to the founding act of all cultures, discovering the originality of the movement that makes it possible for us to respond to life's demands and challenges. This is the work of producing the future, and first the present, of our cultures in their diversity that we Africans have to undertake, just like all the world's peoples.

Taken literally the idea of 'cultural diversity' should not act as a trap or a barrier, but instead an opening and an opportunity for social change. And this cannot be fully realized without a demystified vision of History, in this case our history and therefore without taking account of diversity and perhaps especially cultural plurality.<sup>7</sup> Adopting a changed stance implies opening up to the world and learning from the world. That assumes qualities of flexibility, adaptability, inventiveness and cross-fertilization which are the price to be paid for survival and existence.<sup>8</sup>

Adopting a changed stance also means taking part in developing a worldwide science that makes it possible to value different 'scientific styles or cultures'. Today, thanks to the lessons learnt from the history of science and societies, the latest research on rationality offers new and especially interesting directions and not simply hypotheses. For example rationality is no stranger to the will, there are connections that are only just beginning to be explored, in particular with aesthetics. And finally it is fruitful not only because it allows explanation but also because it makes scientific invention possible.

Indeed, when the micro-history of science is studied, particularly in order to understand how new scientific content got established in a given society, it becomes clear that scientific invention or creation of rational forms and objective knowledge is, or was first of all, an individual thing. Since the function of scholars is to understand in their own peculiar way, and (most frequently and to a certain extent) differently from others, the questions being discussed, the problems to be resolved, or the problems accepted as having been solved, the quest for intelligibility cannot be dissociated from researchers' 'scientific style', or their culture (Granger, 1988). Even though describing their 'style' is naturally a very complex operation in that it stems from their personal idiosyncrasies, their own epistemological programmes and their place in scientific traditions which are diverse in teaching, experience and culture. Because their inventiveness arises from their relations with worlds of meaning, it is important to take an interest in it. As we can see, the search for intelligibility is associated with the individual approach and even the cultural assumptions that structure and organize all relations with the world. And so adopting a changed stance truly means going back to the subject of science, to the subject that makes science and to its traditions. There would be no scientific inventiveness and thus no science if at the beginning there were not a requirement of intelligibility, a requirement that arises from a given culture and individuality.

Adopting a change of stance means leaving behind scientific Eurocentrism and finally creating meaning again by sharing approaches. That implies studying forms of rationality in other configurations that appear in the science of other cultures, as well as studying communication between those different forms and the possibility of translating between them, for instance through their relationship to utility, abstraction, proof, etc. It is interesting and reassuring to realize that knowledge formulated in very different cultures is largely communicable, whatever its specificities and differences. And it is even possible to identify that knowledge as belonging to mathematics or physics or botany, etc. For instance, what was mathematical to a European Jesuit scholar arriving in China in the 17th century found a correspondence in the thinking of his Chinese interlocutor, which allowed them to talk on the same footing (Needham, 1969). That tacit recognition is in itself a fact of invariance and univer-

ality and has considerable importance. And so science does not belong to any particular civilization but is rather a synthesis of them.

Adopting a changed stance means beginning with the fact that scientific universalism starts from a given culture and civilization and thus the diversity of cultures. For its creation there had to be conceptual elements of intelligibility in place that made it possible to assimilate knowledge in a given state (Dieudonné, 1987: 10). In this way we see that every scientific theory, even in the human and social sciences, has always been historically constructed or constituted. In recognizing or stating it we are simply confirming a fact, the necessary condition for bringing about a possibility and its matrix. Now we must go deeper to grasp its meaning. That means studying the mentalities or the symbolic thought of our contemporaries, but also those from other eras who developed that theory.<sup>9</sup>

The encounter between rationalities implies not only understanding what a certain paradigm meant for people at a given period and place, that is, the particular content and systems of thought they used, but also building bridges between us and the specific period in order to grasp that thought according to the 'system' of its own meanings, without projecting on to it our present-day demands or criteria of intelligibility. This encounter is not only culturally interesting, it is also epistemologically fruitful because, compared with the forms of thought, expression or technique that we know in our own time, it is important to know the nature of the link that runs from those old forms to current forms and especially the new significance the current forms, which were unthinkable in the earlier period, give to those first achievements (Dosse, 1999).

Adopting a changed stance means, finally and henceforth, using the historical method and the retrospective approach in science, but also taking into account the diversity across space of systems of thought. So, instead of merely understanding how today's meaning content has been made possible based on that preceding it, we must also understand not only its conditions of possibility but also the effective realization of those possibilities in our present-day intelligible and meaningful universe. Knowledge of the past and of other worlds of meaning may thus allow us to conceive of the possibility and ways of building up current knowledge and therefore its significance, at least in part (Paty, 1996).

By way of a conclusion, on the question of relations between scientific intelligibility and cultural diversity, which are often mistakenly seen as contradictory or divergent, I wanted to demonstrate that intelligibility is not in the end the property of one culture or one civilization; that invention of new forms of representation has not only been possible but still remains so; that cultural diversity has been and still is an opportunity and that it is important to 'decolonize' or 'de-westernize' science.

But that means a return both to the diachronic history of knowledge and study of cultural transmission, in particular transmission of scientific scholarship. An ecumenical history of science and even of the human and social sciences, as J. Needham so rightly suggested, is therefore not only more possible than ever but also and especially necessary.<sup>10</sup> For, despite the apparent incommunicability of conceptual and theoretical systems, it is clear today that transmission of knowledge has occurred but also and above all that it is still occurring. We have only to refer to what the facts of the history of science teach us. Indeed there is a common measure between the

knowledge that is part of different systems of thought, and that is so despite the difficulty in describing the transition from one to another or the dialogue that is possible between them. We need to leave nationalism behind in order to write science using shared approaches.

And so we see that the rationality of science is neither single (across disciplines and objects, periods and cultures), nor does it speak with a single voice (for a given science and object of science), but that it remains always modifiable and open. However, that openness does not mean impossible universality because it is always possible to stretch the comparable elements of thought systems and thus observe them in themselves. In fact all that confirms the fact that rationality is situated beyond the content of knowledge and is a kind of deeper nucleus thanks to which we can reach, from our present, an always perfectible understanding of the past or of other places in the present (Paty, 1990). In this way neither the westernization of science, nor scientific nationalisms, nor even endogenous science will really describe the science that is truly invented in human thought. Now we have to avoid those pitfalls and make sure that tomorrow science becomes the first place people can invent a new world, a world of shared responsibilities, a world that turns cultural and linguistic diversity into its veritable driving force.

Bonaventure Mvé-Ondo

*Agence Universitaire de la Francophonie*

Translated from the French by Jean Burrell

## Notes

1. On this point see the work of Edward Said (1994, 2003). Readers could profitably look at the work of Karine Chemla who, after J. Needham, criticized westerners' 'prejudices' about Chinese science. She writes: 'science is a single whole and it is not solely western', in *Les Mathématiques chinoises dans un contexte international* ([www.reunion.iufm.fr/dep/mathematiques/seminaires/resources/chemla2.pdf](http://www.reunion.iufm.fr/dep/mathematiques/seminaires/resources/chemla2.pdf)).
2. On this point see the work of Paulin J. Hountondji and in particular his article 'Le monde comme il va, la science comme elle va', at [www.humboldt-foundation.org/de/netzwerk/veranstalt/hoersaal/doc/hountondji.pdf](http://www.humboldt-foundation.org/de/netzwerk/veranstalt/hoersaal/doc/hountondji.pdf)
3. cf. OECD (2004), which reports that more than 850,000 patent applications were registered in Europe, Japan and USA in 2002.
4. African countries are currently merely consumers of the north's knowledge and products (objects, patents, paradigms) rather than co-producers of that knowledge.
5. Rather than a brain drain, now it is a knowledge drain that has been put in place.
6. In fact it is necessary to make a distinction between the three great regions of Africa: first southern Africa, which has an international, high-level scientific base and has no reason to envy developed countries. Nevertheless it still remains for the production of that knowledge to be increasingly shared by the black population. The second region as regards scientific production is northern Africa, which has a long tradition of writing and contacts with Europe. The last region is central Africa, with no tradition of writing, no ancient states and no proven scientific tradition.
7. I am adopting Jean Tardif's distinction between cultural diversity – which is natural – and cultural plurality, which always remains to be constructed (Tardif and Farchy 2005).
8. As L. S. Senghor said, 'we are all cultural crossbreeds'.



9. This is the case with certain paradigms that have outlived their usefulness in the human and social sciences, for instance the idea of 'tribe'.
10. J. Needham's virtue was not only producing a prodigious inventory of science in China but encouraging us to think about the complexity of the intellectual history of the world.

## References

- Bernault, F. (2001) 'L'Afrique et la modernité des sciences sociales', *Vingtième siècle. Revue d'histoire*, 70: 127–38; online at <http://history.wisc.edu/bernault/L'Afrique%20et%20la%20modernite.pdf>.
- Coquery-Vidrovitch, C. (2007) 'Histoire du monde, histoire de l'Afrique, histoire de France', in P. J. Hountondji (ed.) *La Rationalité, une ou plurielle*. Dakar: unesco/codesria, pp. 114–29.
- Dieudonné, J. (1987) *Pour l'honneur de l'esprit humain*. Paris: Hachette.
- Dosse, F. (1999) *L'Histoire ou le temps réfléchi*. Paris: Hatier
- Gondola, C.-D. (1997) *Villes-miroirs, Migrations et identités urbaines à Kinshasa et Brazzaville*. Paris: Karthala.
- Granger, G.-G. (1988) *Essai d'une philosophie du style* (1968). Paris: Odile Jacob.
- Granger, G.-G. (1989) *La Raison*. Paris: PUF.
- Mvé-Ondo, B. (1989) *Quête du sujet, univers de signification et transcendance*. Doctorat d'Etat, Université de Bordeaux III.
- Mvé-Ondo, B. (1991) *L'Owani et le Songa, deux jeux de calculs africains*. Paris: Sépia.
- Mvé-Ondo, B. (2005) *Afrique: la fracture scientifique | Africa: the Scientific Divide*. Paris: Futuribles.
- Needham, J. (1969) *Within the Four Seas: the dialogue of east and west*. London: Allen & Unwin.
- OECD (2004) *Compendium statistique de la science et de la technologie*, at <http://www.oecd.org/dataoecd/17/35/23653499.pdf>.
- Paty, M. (1990) *L'Analyse critique des sciences, ou le tétraèdre épistémologique (sciences, philosophie, épistémologie, histoire des sciences)*. Paris: L'Harmattan.
- Paty, M. (1996) 'Remarques sur la production sociale des sciences et la question de la vérité', in E. Malet & H. Le Bras, *Science et démocratie. Penser le XXI<sup>e</sup> siècle*. Paris: Passages, pp. 185–219.
- Paty, M. (1999) 'L'universalité de la science. Une idée philosophique à l'épreuve de l'histoire', *Mâat. Revue Africaine de Philosophie*, 1, 1: 1–26.
- Pestre, D. (1995) 'Pour une histoire sociale et culturelle des sciences, Nouvelles définitions, nouveaux objets, nouvelles pratiques', *Annales, Histoire, Sciences Sociales*, 3: 487–522.
- Rossatanga-Rignault, G. (2005) *L'Afrique existe-t-elle? – A propos d'un malentendu persistant sur l'identité*. Paris: Dianoïa.
- Said, E. (1994) *Culture and Imperialism*. London: Vintage.
- Said, E. (2003) *Orientalism*. London: Penguin.
- Tardif, J. and Farchy, J. (2005) *Les Enjeux de la mondialisation culturelle*. Paris: HC.
- UIS (UNESCO Institute for Statistics) (2005) 'Comment les indicateurs bibliométriques nous renseignent-ils sur la production scientifique mondiale?', *Bulletin de l'Institut de Statistiques de l'UNESCO sur les statistiques de la science et de la technologie*, 2.