IS THERE A CULTURE OF SCIENCE IN THE PHILIPPINES?

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This paper will examine the basis of a culture of science in the Philippines. It follows the author's Toyota funded research project where he looked at the reasons for the poor development and low valorization of science. Despite certain improvements, the development and interest in science in the Philippines is among the lowest in the region. While there may be practical reasons, it seems that the conditions for a culture of science do not yet exist in the country. The paper will explore some of the conditions for such a culture of science and assess the possibility for its development in the country. The paper draws on both empirical and theoretical material.

The aim of this paper is to discuss the conditions for a culture of science in the Philippines. It looks at science as an ultimate cultural value and its practice as an example of the pursuit of cognitive excellence. The paper explores the relationship between a culture of science and the orientations and values of everyday life. My interest is to investigate cultural assumptions linking everyday life to the generation of scientific knowledge. This generation of new knowledge is based on the valorization of science. It accepts global standards and insists on contributing to the expansion of science as part of a universal civilizing process. It assumes a degree of reflexivity interested in duplicating and extending the scientific accomplishments of others. A culture of science is globally oriented.

Definitions and uses of culture

The use of culture in recent times has undergone several significant transformations. In its most basic anthropological sense, culture is the framework for organizing the world and our position in it. It is a set of principles that locate and orient human beings within their existential realities. Some of these realities (e.g. forces of nature) are pre-given, even if culture, by giving them meaning, significantly alters their implications for human society. Because culture has to adjust to given realities, its principles

are never totally consistent or uniformly applied. Lived-culture is therefore frequently ad hoc, inconsistent and accommodative. Some see culture as a post-hoc reflection of established practice rather than a set of well defined and consistent rules.

By extension, a culture of science consists of principles and practices whose aims are to explore the natural world in order to bring it under human control. Notions of the natural world and demands to control it are themselves products of culture. Using a western model, science is seen as involving theoretical and empirical knowledge dealing with the world as brute facticity, and using this knowledge both as a value in-itself (an intrinsic cultural value) as well as a tool for the control of nature for human ends. Hence, science consists of understanding the natural world as an end value as well as applying this knowledge instrumentally as forms of technology.

Science in its employment as technology is a feature of all societies even if it is more developed in some than in others. But science as a form of comprehending nature as an ultimate value is a recent feature and was best expressed in western society in the 18th and 19th centuries. It is a product of the progressive secularization of European society and associated with the growth of capitalism as well as the spread of colonization. Hence, a culture of science is derived from a broader European secular tradition that views nature (and by extension society) as ultimately amenable to human understanding and control. How well a culture of science can flourish in other (non-western) societies is an empirical question. My interest is to explore the compatibility of a culture of science within the features of everyday Philippine life. Do the features of everyday life support or hinder a culture of science?

Culture and identity

The anthropological notion of culture sees it as a mode of life. Culture is underpinned by its basis in social structure. However, modernity and globalization are characterized by widening gaps and cleavages in peoples' modes of life. Increasingly, a diverse range of social structures obliges their members to enter into 'meaningful' interactions' with each other. Filipino workers manufacture goods for an affluent western market whose representations and images simultaneously confirm the Philippines' backwardness and its poverty. Overseas workers return from abroad dressed in the latest fashions and laden with commodities, often produced at low cost in the Third World, which they flaunt before their impoverished and envious kin. Overseas workers reproduce their identities by acquiring symbols of

Otherness (Friedman, 1990), while their poor relatives can only draw from the familiar and the local. Cultural images and values are no longer directly congruent with their corresponding social structures. This disparity and fragmentation between culture and social structure is a major feature of modernity.

Globalization draws on representations and meanings often far removed from people's ordinary experience. As the field of representations and meanings expand globally, understanding them locally becomes more difficult. While there is an excess of meaning, there is also a lack of sense. A firm 'grounding' in this plethora of meaning becomes increasingly problematic despite or probably because of the expansion of structures of communication. The more there is to communicate, the less able we are to understand.

Globalization also allows for cultural complexes to be displaced beyond their original social structural sources. Hence, Filipino scientists pursue their interests even if a culture of science is poorly developed in the country. But this cultural displacement prevents the full development of scientific achievement, ensuring only duplication or minor discoveries. A common complaint of scientists is that they are not taken seriously or at best are seen as minor technicians at the behest of politicians and other power holders. Science as a major factor in the control of nature or in the improvement of production rarely enters the public discourse. Instead nature and society are perceived as being under the influence of supernatural powers open only to propitiation.

Culture as common understanding

Reaching a common and consensual understanding (Habermas, 1987) under these conditions becomes difficult. Globality makes it increasingly problematic for subjects to reach an agreement based on a common understanding of a given situation. Notions of authenticity, normative rightness and objective validity become difficult to coordinate and sustain. Culture as a set of principles that locate and orient human beings within their existential realities becomes problematic, leading to fragmented or dislocated perspectives.

As a consequence of the above, all modern societies are multicultural not only because their members migrate from different backgrounds but also because culture is internally fragmented. Agreements based on a common understanding of a given situation occur only within a given sector often across societies. The Filipino diaspora is the best illustration of this cultural

sector across societies. The new communications technologies such as mobile phones and the Internet facilitate this cultural reproduction even across global spaces. Ethnic identity coexists with other identities.

In the Philippines, a community of scientists exists but whether their members subscribe to a common theoretical-practical orientation in relation to the natural world is open to question. Their members draw their orientation both from the routines of everyday life as well as a global scientific outlook. Our research indicates that the former rather than the latter often determines the theoretical-practical orientation of Filipino scientists. Most scientists openly admit that they share popular beliefs about an animistic nature. Even agnostics say *tabi, tabi po* (please step aside) in case they encroach on the space of unseen beings. These attitudes are so ingrained among Filipinos that they should be seen as pre-doxic. They are not seen as an aspect of a cognitive order but simply as a behavioral or relational mode. It is more an orientation towards the world rather than a view of it. Filipinos are very careful not to give offence to their superiors, whether corporeal or spiritual.

Culture and social interests

In the Philippines, knowledge is often considered a personal asset rather than an aspect of a public world (Pertierra, 2003). Knowledge is guarded against interlopers and shared only with intimates. This attitude applies to science and other forms of public knowledge. It explains the preponderance of patrons and factions even in academic and professional associations dedicated to a common body of scholarship. This politicization of knowledge invades areas of technical expertise and prevents their autonomous development. Scientific and technical questions are settled politically.

Lacanilao (1994) has discussed how this politicization of knowledge as a scarce resource to be shared only among selected participants prevents the general development of expertise. Personal ties rather than professional competence determine the structure of opportunity for scientific development. Higher degrees are seen mainly as an exercise in accreditation instead of as a preparation for further research. Once completed, theses are generally not published and hence do not contribute to the public world of scientific knowledge but only to a personal career advancement. Scientific competence is constrained by wider cultural interests preventing its full development. The production of knowledge is not considered a common good but is seen as a private asset to be strategically guarded.

The model of knowledge in the Philippines resembles the qualities of the esoteric rather than that of rational-empirical epistemes. The former is particularistic and its value is proportional to its restricted circulation. Knowledge is a closely guarded secret possessed by the master. Its validity is guaranteed by the master's personal integrity. This knowledge often derives from scriptural or religious sources, often through direct supernatural revelation. The notion of communicating with supernatural forces is a reality accepted by most Filipinos. Miracles, visions, dreams and other signs of the supernatural are regular aspects of everyday life. This esoteric knowledge is transmitted only to deserving informants based on moral rather than cognitive competence. The fewer people know about it, the more valuable the knowledge becomes.

In contrast, a rational-empirical episteme is differently constituted. Knowledge is valuable only to the extent that it is widely circulated. Its validity is guaranteed by its public empirical nature rather than its private integrity. This knowledge arises from sources whose access is open to all qualified inquirers. Their qualification is cognitive rather than moral. The model of esoteric knowledge not only pervades everyday life but is also encountered in universities and professional associations. For example, many scientific and professional meetings begin with a prayer asking for divine guidance. Although this practice may be seen as a ritual of everyday life, it underpins broader cognitive assumptions.

The pragmatics of culture

An editorial of the *Philippine Daily Inquirer* (20 Oct 99) asked: 'as a nation, then, are we forever consigned to backwardness and pre-modernism, bound to commit errors of judgment and short-sightedness because we have failed to develop a scientific attitude that can explain the world and predict its vagaries?'

Only if the world is perceived in certain ways (e.g. unambiguous realities, regularity and predictability, falsifiability, disenchantment) is it likely to result in a scientific attitude. While culture is only one element that shapes this perception, its salience is undeniable. Many of the world's vagaries may be avoided by a better knowledge of its governing structures. Globalization and the new technologies, with their capacities and necessities for coordination, only exacerbate the imperative for a scientific orientation.

The process of secularization during the 18th and 19th centuries in Europe resulted in a broad agreement not to include supernatural elements as part of a rational-empirical orientation to the natural and social worlds. Spirit

encounters were a regular feature of European life until the mid 18th century, when they ceased to be reported as part of everyday events (Schneider 1993). Earlier, in 1618 scholars at Leiden University were granted special rights to investigate the natural and social worlds (Pertierra 1997). Eventually, these two elements resulted in the separation of the private and public spheres. The former (private) referred to beliefs and values that could not be verified in an empirico-rational mode, while the latter (public) represented knowledge and values that could be established by science within a political-legal order. Religion and morals were consigned to the private sphere while science and rationally based consensual laws determined the public sphere. The latter no longer privileged private knowledge, experience or morals. Instead, claims within the public sphere had to be validated according to the criteria of science or of democratically established laws.

Science and global culture

Globalization is exerting increased pressures for the Philippines to improve its technological expertise. While the rhetoric on the importance of technology is extensively circulated in the media, there is very little investment in the scientific infrastructure of the country. The government's earlier claims of making the Philippines the region's IT center by 2004 is unfulfilled. Any objective assessment of the country's scientific expertise points in the opposite direction. The index of scientific publications is one of the lowest in the region. In the period 1981-1992 the Philippines contributed 4% of the refereed science publications in Asia. Singapore with a population under 4 million people contributed 10% (Lacanilao, 1994). Since then Singapore has doubled its number of publications from 502 to 1270 while the Philippines increased from 209 to 224 (Lacanilao, 1999). The OECD recommends a minimal investment of 1% of GDP for R & D; in 2003 the budget of the Department of Science & Technology was 0.15% of GDP. The United Nations estimates that 4 scientists per 10,000 are needed to maintain adequate standards. The Philippines has less than 2 scientists per 10,000.

The interest in science

There are many reasons for the lack of interest in science in the Philippines. The relatively low salaries and social status of scientists as well as their lack of influence in public life, discourages the pursuit of scientific competence. Why is this competence given little social or cultural value? Is

this because scientific knowledge depends on objective and impersonal criteria rather than on the personalized networks Filipinos normally use for success? Is the lack of a scientific orientation partly cultural? Cultivating skills in science only make sense if corresponding structures ensuring appropriate rewards exist. These reward structures are generally provided by the state or by the private sector. Neither is significantly effective in the Philippines.

The Philippine State has never shown a great interest in science (Pertierra 2003). The American colonizers tried to instill an interest but Philippine political culture and the local economy saw little need for science. Institutions of science established by the American colonizers quickly deteriorated when local officials took over. They saw no advantage in carrying out research whose benefits were not immediately obvious, preferring instead to import technology as the need arose. Even adapting this technology for local use is not developed. The jeepney is a standard example of such an adaptation but its use has long since been superceded. In its place Filipinos have adopted the Tamaraw FX (Toyota local van) to replace the jeepney instead of designing a more original and effective replacement. While a culture of bricolage is not incompatible with science, its concentration on the close-at-hand prevents more fundamental solutions.

The private sector, given the undeveloped nature of the economy, has expressed even less interest in science. New areas such as IT are seen as an immediate source of profits rather than an opportunity to develop new global structures. Given the poor standards of education, the Philippines mostly graduates low level technicians rather than advanced computer engineers. The IT boom has resulted in call centers where operators take advantage of cheap international communication services. English language rather than technical skills are the main qualifications needed and only between 1 to 3% of applicants meet the required standards.

Role of the middle class

One of the major questions facing sociologists in the Philippines is the extent and significance of the middle class. Most theorists of modernity point out the crucial role of the middle class not only in providing society with its professional skills but also for instilling the value of professional work and the rewards of individual achievement. People born to wealth or those trapped in a cycle of poverty tend to view the world as constitutively determining their future. Both the wealthy and the poor often depend on private networks, rather than on achieved and public criteria of competence.

If life in the palace or the village is characterized by the intimacy of kin and consociates, modern middle class life consists mainly of interactions with strangers. Such strangers exchange services on the basis of formal rules and criteria of competence, while simultaneously preserving their anonymity as part of urban life. To facilitate such exchanges, members of the middle class resort to a conscious strategy of politeness. Much of middle class life consists of learning complex codes of behavior (linguistic, cultural and social) appropriate for such public interactions (e.g. how to address strangers such as customers and clients, how to express intimacy and formality in public, how to deal with superiors such as managers, administrators or government officials). Appropriate behavior in these situations differs from that in the domestic context. Learning these social skills is known as secondary socialization, involving specialized institutions removed from domestic relationships such as schools, work, prisons and other complex organizations.

The public sphere, within which interactions with contemporaries are conducted, is characterized by an elaborate set of formal rules. These rules are part of a generalized body of knowledge whose perspectives allow subjects to view the world from interchangeable positions (e.g. an official in one situation may become a client or a customer in another). In contrast, the private sphere arising out of direct consociation, assumes a fixed perspective based on personal and contingent knowledge. The formation and orientation of middle class interactions are marked by an acute awareness of applying formal and impersonal rules of behavior. Many members of the middle class even apply these formal rules in the domestic context, by emphasizing a discourse of excessive politeness (e.g. would you mind washing the dishes tonight).

The middle class and the public sphere

The middle class is a product of the public sphere and defines itself in its terms. For members of this class, the world is not constitutively given but must be created through rule-governed actions. While their members naturally have private interests, these are ideally separated from their public duties and expectations. For this reason, middle class life revolves around the distinction between domestic-private concerns and publicly appropriate behavior. Such a distinction becomes crucial in the context of urban life, where most interactions occur between strangers rather than among a palace coterie or co-villagers. Middle class families often train their children for

future interactions by adopting formal language more suitable for strangers than kin (e.g. May I please leave the table; sons address their father as Sir).

In the political sphere, the middle class is supposed to instill the respect for law and for individual rights, these being the foundations of a democratic polity. Theoretically, such a polity is formed by consensus where each party formally establishes its legitimate claims through processes of argumentation. That is, through processes which involve abstract and general rules, implemented by unknown functionaries rather than private decisions reached on the basis of hereditary claims. The middle class is also responsible for ensuring the independence of the public sphere, with its guarantee of universal rights for all individuals, irrespective of birth or status. Most of these qualities of the middle class are associated with its strong emphasis on formal schooling as the determining factor for allocating social roles and for inculcating cognitive structures favoring abstract modes of thinking. The middle class encourages a culture of excellence as a way of legitimating its orientations and interests.

Culture of excellence

Institutions such as the National Commission for Culture and the Arts (NCCA) as well as more specialized bodies like the Cultural Center of the Philippines have been entrusted with the generation and transmission of the nation's artistic heritage. Much of this heritage includes the western canon but there are increasing attempts to supplement it with indigenous experience. While their rank and file must necessarily draw on the middle class, policy making is still controlled by people drawn from the country's most privileged elite. This is illustrated by the personal networks which control appointments to senior positions in government as well as the private sector. Positions of importance are decided on the basis of political or social connections. The same may be said of the Department of Science and Technology (DOST) and other technical associations.

As Philippine society becomes more complex and globalized, there is a greater need for technical expertise. But despite their growing influence, Filipino scientists lead an economically precarious existence. Since their natural domain is the public sphere, often drawing their salaries from the state or other non-profit institutions, they are often persuaded to mute their social criticisms. The general weakness of public institutions in the Philippines, in particular those concerned with the generation or dissemination of knowledge such as science, disempowers members of the middle class.

The importance of the middle class for a culture of excellence has been mentioned but their socio-critical function is severely constrained by their economic dependency. The structural weakness of the Philippine middle class prevents it from exercising a steering function in the nation's cultural life. Instead, this steering function is dominated by the elite's understanding of high culture, a view which sees it as a form of display, a mere representation. By contrast, the middle class views culture as involving an understanding of the fundamental artifactuality of social life and hence of the limitless possibilities for its constitution. The middle class advocates social change and transformation as an essential element of modern life. For it, conceptions of the future shape the present. By contrast, the elite and the chronically poor see tradition and the past as a justification of the present. This temporal transformation defines the transition from the premodern to the modern.

A view of culture that sees it not only as negotiable but also as arising out of rationally defensible criteria involving cognitive and technical judgments, encourages its public discussion rather than simply its private accumulation or consumption. Culture is simultaneously an appreciation of the existing human condition as well as an expression of its counterfactual possibilities. It is this latter concern which members of the middle class are best able to explore. Until their members play a more significant role in its constitution, the Philippines will remain not only a bastion of an uninformed elitism but also trapped in populist misconceptions. It will not be able to generate a culture of excellence in the sciences or the arts.

Filipino self Images

Aguilar (1997) has argued that Filipinos often see the country as a small, weak 'feminine' entity easily preyed on by foreigners and therefore requiring protective measures. The Philippines is portrayed as emotionally immature, unable to seek its own destiny in a world of predators. In actual fact, the country is as big as the U.K. and with a population (82 million) larger than Germany's. This self-perception contrasts strongly with Singapore's view of itself (4 million) as a technological and economic powerhouse in the region.

Part of this perception of weakness and unimportance is the country's inability to fully participate in the achievements of modernity, of which science and high culture are the leading indices. Only in the sphere of political participation is the Philippines an exemplar of modernity for its neighbours. But even the country's accessible opportunities in education have not translated into technical competence. Instead, large numbers of

teachers, nurses and other professionals regularly depart for overseas in search of better salaries and opportunities, including working as domestic helpers. In the last case, this often results in de-skilling. It also contributes to the perception that Filipinos are only suitable for menial jobs.

Aguilar argues that part of the reason for the country's low self esteem is its insistence to compare itself with the United States instead of its regional neighbors. This American orientation is predisposed to a relationship of servility, dependence and patronage. It reproduces the hierarchic structure of local society, where subjects occupy constitutively ascribed roles. Despite the nationalist rhetoric, Filipinos remain in awe of their American superiors. This American adulation reflects the weakness of the local elite in establishing an independent cultural, social or political perspective.

Until members of the middle class take a more active role in shaping Filipino society, culture will remain trapped in traditional hierarchies. Arrangements of the past rather than possibilities of the future will continue to determine the present. Neither a culture of excellence nor a culture of science can thrive within traditional hierarchies. The Philippines will only be able to look with envy not only at the achievements of the United States but even its local neighbors.

Natural and cultivated skills

The view that Filipinos are uninterested in science is prevalent and contrasts with the equally strong perception of the Filipino's musical and social skills. This self-perception indicates an imbalance in Philippine culture. It indicates that Filipinos are more interested in manipulating social relationships than in controlling the forces of nature. While finely honed social skills constitute a marked feature of everyday life (*pakikipagkapua*), understanding natural causes receives far less emphasis. The former evokes creative responses while the latter reinforces acceptance and fatalism. The forces of nature, applying the logic of existing social relations, can only be propitiated rather than rationally controlled.

Many aspects of Philippine culture and social life are easily recognized as modern and global but the lack of interest in science points to a more traditional orientation. Moreover, developed musical and social skills are generally seen by Filipinos as being naturally endowed rather than gradually achieved through a long process of disciplined learning. Networking and negotiating skills are necessary for everyday life. Most Filipinos learn these skills as an ordinary aspect of social life. The variations on the notions of *pakikisama* (cooperation) and *pakikipagkapua* (empathy) (Enriquez, 1990)

indicate a nuanced orientation towards others. This orientation includes performance skills such as singing, dancing, oratory and other abilities to entertain, amuse, praise or disparage. Although Filipinos are generally highly skilled in these performances, they are nevertheless seen as natural or ordinary accomplishments. Most Filipinos are skilled amateurs in a range of fields but very few are globally professional.

The lack of a conscious and developed culture of cultivation limits the achievements of Filipinos. It constrains them within the limits of ordinary convention seen as a natural skill. It encourages under-achievement and reproduces traditional hierarchies. For science and excellence to prosper, culture has to be seen as a field of cultivation requiring disciplined learning and exemplary standards. In other words, a culture of science must see culture as amenable and subject to an increasing rationalization. Science uses culture as a way of understanding the natural world in order to bring it under human control.

Culture of disenchantment

The notion of the disenchantment of nature as a condition for the rise of modern science was one of Max Weber's (1978) main sociological interests. The progressive de-animation of nature and its replacement by abstract, universal laws was a major feature of the Enlightenment which, according to Weber, ultimately led to the rise of western science.

The interpenetration of the sacred and the secular were slowly disentangled. This eventually resulted in separate domains. The public and secular world of science dealt with empirical phenomena governed by discoverable regularities and abstract theories. This knowledge had to be publicly validated and any restrictions on its pursuit were strongly resisted.

Alongside this public, secular world was the private sphere, consisting of deeply held beliefs about a reality whose existence was no longer commonly shared. Religion, until then a public reality, was consigned, after generations of fruitless and irresolvable conflict, to this private sphere. Universities, hitherto repositories of knowledge of the sacred, shifted their attention from theological argumentation to science and public administration. Unexpectedly, both spheres flourished, each enriching the other. Natural science was complemented by the flowering of a critical, aesthetic reflectivity in areas of life such as art, music, literature and religion. The rise of the social sciences was one expression of this new reflectivity which partly bridged the two separate domains (Pertierra, 1997).

Local informants

We interviewed prominent scientists in leading Philippine universities to inquire into their notions of everyday culture and its relationship to scientific achievement. Students in these institutions were also interviewed. While the sample was limited, it is sufficiently representative. Most of the scientists interviewed shared conceptions of the natural world very similar to mainstream views. Despite their advanced training and even after living abroad for many years, their cultural attitudes and orientations remain within the broad stream of Filipino life. There seems no evidence of a strong sub-culture among them that differs significantly from most Filipinos. There are, however, some strong personal differences.

A leading physicist argues that 'a scientific tradition does not emerge by chance in society. It results from a conscious and coordinated effort by many sectors of society (industry, government and the academy) over periods of time...Scientific research is very difficult to perform in the Philippines – the supporting research structure has not yet been sufficiently developed'. In other words, science is the product of a developed public sphere whose members coordinate their resources for collective ends. A biologist noted that 'science does not appeal to the masses. Scientists are projected in the media as geeks, with no social responsibility and relevance. Our media is teeming with pseudo-scientists, who give science a bad face'.

Secondary science teachers are even more emphatic about the centrality of religious belief in their lives than their counterparts at university. 'I put God in everything I do' is a typical view. They readily admit that supernatural forces intervene in nature. One teacher admitted that: 'Yes, everything that happens in nature is the work of God', while another was more specific: 'God controls the weather. We pray to him for good weather'. But while the views above are common, other teachers are less emphatic or insistent about the centrality of divine intervention.

As might be expected, students share many of the above views regarding science and the natural world. However, there is some evidence that students are developing a more secular consciousness than their elders. This is best expressed in their attitude and acceptance of new technologies. Rather than questioning the possibly disruptive aspects of new technologies, students not only willingly accept them but are quick to adjust their everyday lives around these new opportunities. Research on the effect of mobile phones on youth identity and practice is revealing how transformative these new technologies are (Pertierra, et.al., 2002).

The assumptions of culture

I started this paper by asking about the relationship between aspects of everyday culture and a valuation of achievement. I argued that a culture of excellence depends on supporting structures and on orientations best provided by the middle class. These structures constitute the public sphere and involve competencies learnt through disciplined study. But the Philippine middle class is still insufficiently developed. Its members have few resources and often depend on systems of patronage whose basis is rooted in private networks. The elite still control the public sphere, where patronage rather than competence is the basis of success. Even technical questions are often decided on the basis of general criteria.

A major use of culture is to refer to practices and beliefs so common and taken-for-granted that its assumptions are rarely challenged. Hence the grounds of these practices and beliefs are rarely problematized. I use this understanding of culture when looking at aspects of the taken-for granted-world.

A major element of this taken-for-granted-world is the notion of an animated and purposeful nature regularly intervening in human culture and society. Natural events such as earthquakes, volcanic irruption and floods are often interpreted as signs of a displeased nature (Bankoff 2003). Sometimes nature is seen as an instrument of higher supernatural powers. The natural world is inhabited by spiritual entities that must be propitiated to avoid their anger. Most Filipinos conduct propitiative rituals whenever they have transgressed the domain of nature-spirits. These cultural notions are so common that most Filipinos take them for granted, including scientists.

Another example of a taken-for-granted reality is the common belief that Filipinos are naturally skilled in the performance and discursive arts. These so-called natural skills do not require further cultivation and hence prevents the attainment of exemplary achievements. Many of our informants often claim that Filipinos possess world-class skills and talents but are unable to explain why these accomplishments remain undiscovered. The contribution of Filipinos to the world is readily recognized but it lies in relatively unspecialized areas such as seamen, domestic workers and care-givers. In the arts, sciences and sports, at a global level, Filipinos are clearly underrepresented. The Philippines is a society of skilled amateurs but very few accomplished professionals. Advanced scientific knowledge cannot prosper under these conditions, leaving only the cultivation of basic technical skills.

Achievements of culture in a culture of achievement

For the reasons mentioned, highly developed conscious and disciplined accomplishments leading to 'products' such as art, science, law and philosophy are weakly developed in the Philippines. Most Filipinos are satisfied with quickly learnt skills expressed in much popular culture rather than the disciplined accomplishments resulting in 'high culture'. This attitude is also reflected in activities such as sport, where general, basic or self taught skills predominate rather than the institutional and systematic training required of a globally successful athlete. Since most activities do not presume highly developed skills, many talented Filipinos switch from a field such as entertainment to art or politics.

The Philippines has competent scientists but most of them point out that their abilities are better rewarded abroad. Local scientists and other professionals feel left out of broader societal resources. The undeveloped nature of the public sphere discourages structures like science which depend on objective rather than inter-subjective knowledge.

Invisible and contrived cultures

Culture may be so familiar that it is invisible or, alternatively, so accomplished as to be seen as exemplary. There are striking differences between these two understandings of culture. The first makes culture disappear within the routines of everyday life while the second extricates it from daily experience in order to focus on as yet unachieved goals. In the first usage, culture disappears as an element of the taken-for–granted-world. In the second, culture is detached from this unquestioned world and oriented to another more abstract, less immediate and still unachieved reality. When exemplary standards are achieved in the arts, sciences or sport, the results may be shocking, astonishing or awe inspiring.

Most of our informants readily admitted practicing religious rituals as part of everyday life. Catholic Filipinos make the sign of the cross almost unawares, indicating the invisible aspect of culture. But our more abstract oriented informants dismissed such rituals in favor of more counterfactual ones such as praying for world peace. In the context of everyday life such a prayer requires a strong abstraction and detachment from mundanity. Culture allows us to shift almost unperceptively from a taken-for-granted-world to a more abstract and less directly experienced reality. But only a self-critical

reflection will reveal this transition. Such critical reflections constitute attitudes best exemplified in the middle class.

Structures for the development of science

Social, political and economic institutions play a determinative role in developing an interest and competence in science and technology. The Philippine State is a major player and often determines their practical success. The lack of government support for science and technology (0.15 % of GDP) is a constant complaint of all our informants. Expenditure in research and development as well as in education is among the lowest in the region and declining further. There is little hope for political support for science and technology to improve in the near future. As our informants claim –'science is not a major interest of government' – 'there are no role models of politicians in science'.

Political goals in the Philippine reflect the cultural malaise discussed in this paper. These goals range from the fantastic (e.g. IT center of Asia), the impractical and unattainable (e.g. reduction of poverty without population control) or the mediocre (providing basic facilities such as water and electricity or one book per student). They suffer from an excessive imagination ungrounded in the world or alternatively, from a lack of creative and challenging insights. These goals emanate from elites unaccustomed to realistic achievements or populist demands for basic citizenship rights.

The students we interviewed, while sharing most of the cultural orientations of their elders, showed some signs of a greater awareness of global factors. While still deeply influenced by the family, many young people are making their own decisions and see science as an opportunity to declare their independence. The youth are likely to develop a less enchanted view of nature than their elders. This is as much a consequence of the growing specialization of contemporary culture as it is a rejection of earlier views. Peer influence and the growth of youth culture accentuate more material and less enchanted features of contemporary life.

Conclusion

In this paper, I discussed the complex relationship between a culture of science and the practices of everyday life. I have shown that various aspects of everyday culture inhibit but not prevent an orientation towards science. The view of nature as animated, the ordinary and common acceptance of miraculous events, a personalized attitude towards knowledge, seeing it as an

asset to be guarded against interlopers, the overlapping of the private-public spheres and the low valorization of a specialized competence in favor of generalized social skills are the main cultural factors impeding the development of a culture of science.

There are also social factors affecting science. Among them is the lack of a political interest in funding science, the undeveloped nature of an economy requiring low-level rather than high-level technical skills and the absence of institutions specializing in research. The lack of supporting structures prevents a scientific ethos from establishing local roots. In addition, a cultural valorization of competence is weakly developed. These factors are related to the undeveloped nature of the middle class and its corresponding public sphere.

Globality has led to the proliferation of cultural representations, with their corresponding meanings. These images are often disembedded from local structures and everyday experience. This is why science exists even in societies that do not have a scientific culture. But for science to prosper, the corresponding cultural incentives have to be present. Attempts to incorporate these cultural incentives into the routines of everyday life have so far not succeeded. For this to happen Filipinos have to become more aware of the invisible elements of culture as well as establish exemplary standards of achievement.

A major paradox of globality is that while it results in the universalisation of elements of culture, it also encourages their resistance. The culture of science has come under challenge as science itself becomes increasingly indispensable in everyday life. The classical distinction between science, as a disinterested pursuit of knowledge, and technology as its instrumental application, is no longer viable. Technological need increasingly determines scientific inquiry, making possible new forms of liberation as well as fears of domination. Genetics creates a post-human subject combining the immediacy of a tool with the effectiveness of a machine. While we earlier controlled the machine, now the machine becomes us. *Homo habilis* is transformed into *homo cybergensis*. Social theorists (e.g., Kirby, 1997) presage the end of the human corporeal and its replacement by the post-human cyborg. Over enthusiasts of science, such as Gray (2002, p. 9) (after Babel) declares 'We're going to be Gods, we might as well get good at it.' While such declarations of hubris are far from everyday Philippine life, a closer approximation may be necessary if Filipinos are to survive and prosper in the present age.

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