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## **SCIENCE ADMINISTRATION**

### **Enlightened leadership or dirty politics?**

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The management of a scientific research institution is a complex exercise even in a developed nation, with mature and tested institutional traditions and abundant financial resources. In a developing nation the extra challenges arise as political interference and fierce competition for limited financial and human resources can become truly formidable. Events at Mexico's Instituto Potosino de Investigación Científica y Tecnológica (IPICYT - Institute for Scientific and Technological Research, San Luis Potosí) – briefly highlighted in *Nature* [454](#), 143 (2008) and [455](#), 27 (2008) – have now escalated to a crisis level so serious that those in the scientific community committed to promoting research excellence in the developing world must now take notice.

The early phase of research at IPICYT was extremely promising, and the successes were quite remarkable. Local and national science administration leaders took a farsighted and bold decision to form a new research institute in the capital of the San Luis Potosí state and show that the one-hundred-years-of-solitude\* (\*footnote: from the most famous novel of Colombian Nobel laureate Gabriel García Márquez) syndrome need not be an inevitable consequence of initiatives in less privileged areas of the world: indeed, IPICYT at first demonstrated very effectively that an enlightened administration together with dynamic, bright, ambitious and resourceful young scientists could overcome the odds of various kinds to create a successful research operation.

Professors Humberto and Mauricio Terrones, who had honed their craft and initiated exciting research careers at prestigious research institutions in the U.K., returned to Mexico and were given the support necessary to develop a vibrant program. They took full advantage of this opportunity, and their efforts represent a shining example for other developing nations to follow. Sophisticated equipment was installed, distinguished visitors came to lecture and collaborate, bright students flocked to the newly formed Nanoscience and Nanotechnology Graduate Program, and international students came as interns to spend their summers doing exciting research. The bureaucratic hurdles that all-too-often hamper progress in developing nations (e.g., delays in construction due to inadequate resources, understandable lack of necessary experience, etc.) were largely overcome by a dynamic crossdisciplinary network of collaborations with leading research centers in the U.S., Japan and Europe. The operation got under way within a very short time span and excellent, internationally recognised results were quickly achieved. Not only are readily quantifiable parameters impressive but it soon became clear to the international community that the Terrones group had essentially single-handedly put IPICYT and San Luis Potosí on the world map of research centers. Figure 1 summarizes the impact of this group's publications, as measured by their citation record: even a cursory glance at their resumés makes it clear

that they had carved out a most enviable reputation as recognized leaders in this exciting, internationally competitive and strategically vital area of research.

Alas, over the last two years an extremely serious conflict has developed at IPICYT which is difficult for those outside Mexico to understand. Figure 1 reveals at least one cause of the conflict: The majority of IPICYT researchers, including in particular all the signatories of an antagonistic letter to *Nature* of Sept 4<sup>th</sup> 2008, have significantly more modest research records. It is clear that the impact of the Terrones group far outshines that of their detractors who claim in their letter that “the Terrones work [in the Advanced Materials Department] represents about 20% of IPICYT’s academic output”. The response to the deliberate deception implicit in this comment is the obvious one: in all creative exercises quality is more important than quantity. Indeed, it is the primary duty of an enlightened administration to promote, encourage and cherish its star-scientists and highlight their success as an example for other research groups to follow and attempt to emulate. Great benefit for the country develops from such successes and the institution gains much from their reflected light. Unfortunately, for reasons beyond understanding, instead of nurturing the Terrones group, bureaucratic barriers to their progress have been deliberately erected and they are now so high that their work has been ruthlessly crushed. To disinterested observers these appear to be truly spiteful and vindictive measures aimed at undermining any future research; they range from arbitrary eviction from laboratories on the basis of the flimsiest of pretexts (including confiscation of expensive equipment) to mendacious harassment of some 25 vulnerable young research associates in the Terrones group, which has been ongoing for two years.

All this may be commonplace in some academic institutions, especially in the less affluent developing nations. What makes the present case different and particularly unpleasant is the apparent complicity of CONACYT, Mexico’s overarching academic authority. A few years ago, a new administration took over, in the aftermath of a major institutional scandal: Dr. José Luis Morán-López, first director of IPICYT (2000-2005), was expelled and banned for 10 years from government positions by the organization in charge of sanctioning wrongdoings of public servants in Mexico. The new director, Dr. David Rios-Jara, eventually began a hostility campaign against the Terrones group which culminated in the events summarized below (and whose details are being discussed and analyzed at <http://nanoudla.blogspot.com/>). And this happened in the face of an explicit recommendation – solicited by CONACYT from a prestigious group of Mexican scientists and a representative from our group – to seek a “solution that will be a product of open negotiations carried out with tolerance, good will, great objectivity and agreements that avoid personal aggression and radicalization of positions”. All the arguments put forward by IPICYT for the gradually escalating abusive treatment of two outstanding scientists and the deliberate stranding of their research associates in limbo, are so trite that we - essentially disinterested observers with successful track records in developed world scientific arena - can only surmise that there is some hidden (to us) agenda at work here. Pending investigations will reveal whether all these actions were supported by CONACYT, the institution whose main mission is to promote the nation’s scientific excellence and to nurture and protect its young scientists – the delicate flower of any nation’s research initiative.

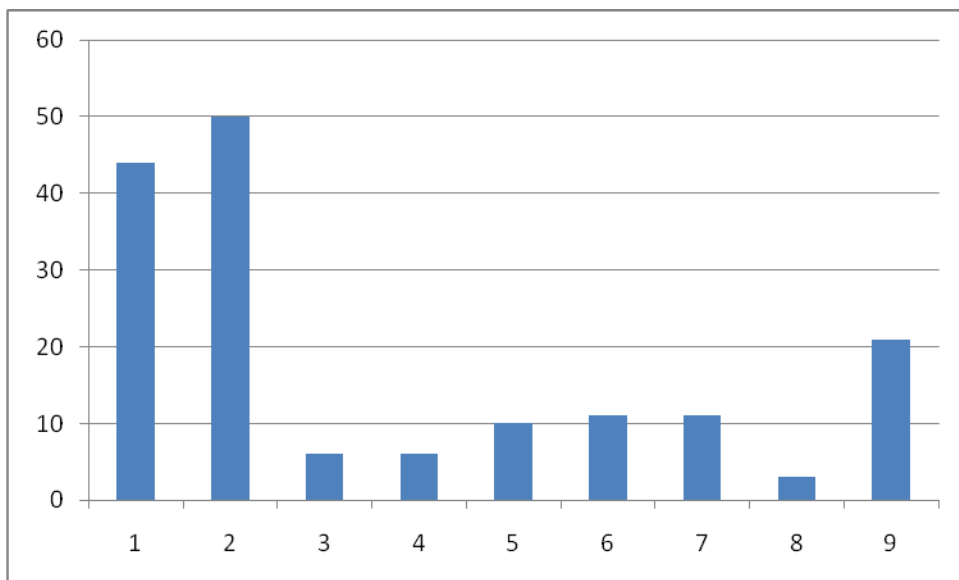
An international group of some 75 scientists, who support the efforts of the authors of this note, has bent over backwards for two years in the hope of brokering a statesmanlike solution to this sorry affair. Letters were sent to CONACYT and IPICYT directors, and meetings were attended in Mexico in which CONACYT went through the motions that appeared to seek sensible solutions - to no avail. The irony of the situation is that most political leaders in developing nations profess to be in a David vs. Goliath fight to prevent a loss of talent to the developed nations. In this case, had there been any enlightened leadership at CONACYT and/or IPICYT, this disaster would have been prevented easily. It is bitterly disappointing that after all this time the level of crass stupidity reflected in the administrative actions is such that all our efforts to prevent Mexico's loss of young talent has come to nought. The politicized character of the current leadership of Mexican R&D has also been exposed by the Mexican Academy of Sciences at a recent forum entitled "Science in Mexico: a disaster zone" (<http://www.jornada.unam.mx/2009/06/17/index.php?section=ciencias&article=a02n1cie>), with calls for resignation of the CONACYT director.

Several months ago, two visiting senior US scientists witnessed quite disturbing harassment of young Terrones group associates at IPICYT and wrote a report of the events. Amazingly, such behaviour was repeated and culminated in even more dramatic events witnessed directly by a prestigious international group of senior scientists who visited IPICYT for two PhD oral thesis defenses on December 17, 2009. If this is what happens in the presence of outside observers, one can only imagine the treatment meted out in the absence of disinterested observers!

On December 18, 2009 the IPICYT/CONACYT administration formally expelled the Terrones brothers from the research institute. (A most telling testimony to the brutality of their approach is the involvement of police in these actions.) It should be noted that by this point the Terrones brothers were on the verge of making a decision to leave IPICYT and Mexico anyway. They were understandably agonizing over this for the past two years as they have been attempting to balance their family life with a sense of duty toward their homeland and the responsibilities towards the younger members of their research group. When the dust settles it will be clear that this is a classic subject-object reversal case: in fact, IPICYT did not get rid of the Terrones brothers; rather, these two outstanding researchers rid themselves of an incompetent and envious IPICYT bureaucracy! The pending lawsuits, which may take several years to run their course, will expose the triviality and arbitrariness of the arguments assembled for this 'dismissal'. For now, the focus should be on the fact that harassment continues at IPICYT against the remaining members of the Terrones group and their students, who cannot afford to wait that long and may have to seek employment opportunities elsewhere.

Thus Mexican science, and more broadly the R&D efforts in developing nations, are the biggest losers in this shocking endgame: the best and the brightest will be looking for jobs elsewhere, and young scientists from Mexico and other developing nations will be discouraged from returning to their native countries, as did the Terrones brothers. The arguments summarized above, and the detailed evidence available elsewhere (<http://nanoudla.blogspot.com/>), lead to a simple but sad verdict: petty politics allied with personal mendacity and intellectual mediocrity have taken hold in a once promising and thriving research institute, which will now be engulfed in a messy lawsuit; indeed, without an

enlightened leadership IPICYT may now be “condemned to one hundred years of solitude” and, as in García Márquez’s novel, it may “not have a second opportunity on Earth”.



**Figure 1.** Recent H-factors (ISI Web of Science): 1 and 2 correspond to Humberto and Mauricio Terrones, respectively, while 3-9 correspond to IPICYT researchers who are most active in the campaign against the nanoscience and nanotechnology research group of the Terrones brothers.