

Science in 100 years of UP biology

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Not yet, Rizal, not yet. Sleep not in peace:
There are a thousand waters to be spanned;
There are a thousand bridges to be crossed;
There are a thousand crosses to be borne.
Not yet, Rizal, not yet.
The glory hour will come.

-- R. Zulueta da Costa

This is the opening statement of the *Philippinensian 1960* (editor-in-chief, Pacifico Agabin). When asked by Glo Quitco-Caccam (president of the UP Institute of Biology Alumni Association) to write about our zoology class of 1960, I first thought of the *Philippinensian* -- the yearbook of graduates then of the University of the Philippines. We are the *jubilarians* on the centennial this year of Biology in UP. I just scanned the 38 pictures of the 1960 graduates of then botany and zoology departments for the surviving members to reminisce (see [photos](#)).

Going through the 1960 yearbook with nationalism as the theme, gave me a reason to write again on the state of science in the Philippines -- science in 100 years of biology in UP. The yearbook has 6 introductory articles and 21 messages by the president, deans, and directors. They gave opinions and reminded the graduates on various aspects of nationalism -- serving the country, strengthening our culture, nation building, etc.

What surprised me to see in a university yearbook -- with 27 messages to graduates -- is the lack of any mention on UP's role in national progress through research or science, except for two brief statements. These were (a) urging the graduates to solve national problems by research and (b) advising them to become future scientists. But there was hardly any hint on how these should be done; or was there anything to remind the 1960 graduates that economic development and social transformation must rely on science and technology (1).

After 48 years later in 2008, the University of the Philippines observed its centennial. And 2 years later in 2010, the institute of Biology of UP Diliman is celebrating 100 years of biology in UP. Has the glory hour of IB arrived?

Biological research through the years

My idea of observing anniversaries is to send a clear message about achievements. For educational institutions, these can use valid proofs or indicators showing academic progress and institutional growth. An example is the

research output of faculty members and alumni, which meet internationally accepted criteria. To be specific, these are papers published in journals covered by *Science Citation Index* (SCI). High-impact journals are covered in this index. SCI is a reliable tool for measuring research performance (2). It is appropriate for developing countries, which lack enough experts to do personal judgment of research output (3).

Research is no longer an auxiliary function of the university. It is the principal criterion of faculty recruitment to leading universities abroad. IB can showcase faculty and alumni who have achieved outstanding research performance; and set an example of a meaningful observance of anniversaries.

A preliminary survey of top Filipino biologists in the country and the number of their publications from 1929 to 2008 was done in 2008: "Philippine science: Time for a fresh start." See at,

<http://www.bahaykuboresearch.net/index.php?module=article&view=80> or http://www.seafdec.org.ph/news_rp_science_fresh_start.htm

It covers scientists in biological fields, like fisheries, bio-agricultural, and biomedical sciences, based in the Philippines. Criteria used are publications in at least 3 different SCI-indexed journals as sole or first author, which are accessible through Google Scholar. Note that most of our 27 National Scientists and Academicians in biological sciences did not meet the set criteria.

Some former botany and zoology professors -- locally recognized and multi-awarded -- also did not qualify. For example, one had 18 SCI-indexed publications, as sole or first author, but they were all published in the same journal. Another has over 20 SCI-indexed publications, but none of these has sole, first, or corresponding authorship (4). Sole authorship can indicate that one has passed the test of doing research independently.

Most of the 58 top scientists in the list are from the Southeast Asian Fisheries Development Center (SEAFDEC) in Iloilo -- 30; and from the Marine Science Institute (MSI) in UP Diliman -- 11.

The criteria described above were used in the present study to evaluate past and present faculty members of the former botany and zoology departments and their merged Institute of Biology (IB).

Source of information on the early botany and zoology departments was obtained from the 2008 souvenir program of the *22nd Anniversary of the UP Institute of Biology*, specifically from the articles on the history of the botany department (by Consuelo V. Asis) and on the zoology department (Anonymous).

The tables below show the faculty members and their publications during and after their term in the departments (Tables 1 & 2); and those now in the merged biology institute (Table 3). Over 12 Americans who taught in the first 2 decades of botany and zoology -- except for Bartlett in botany and Cowles in zoology -- were unpublished while in service. Their publications shown in Table 1 were

mostly published after they left UP. Some became noted scientists and book authors later. For example, botanist Merrill became director of Harvard Arboretum and zoologist Light became a famous professor at Berkeley.

Some of those who later remained unpublished or poorly published in primary journals were the ones who stayed longer. For example, Walter R Shaw (offered the first botany class in 1911) and William H Brown (became botany head in 1919); they taught for 12 and 9 years.

Table 1. Foreign faculty that made up the early botany and zoology departments in UP Diliman and their SCI-indexed publications

Botany and zoology faculty	Years of service	Years of published papers	No. of journal titles	No. of publications ^a	
				Total	Sole or first authorship
ED Merrill	1912 - *	1916 - 1949	8	14 ^b	12
HH Bartlett	1934 (Exchange prof)	1914 - 1940	5	9	7
R Kienholz	1922 - 1924	1929 - 1941	4	8	8
SF Light	1914 - 1917	1923 - 1955	5	9 ^b	8 ^c
LE Griffin	1911 - *	1897 - 1937	5	8	7
RP Cowles	1914 - *	1903 - 1936	6	7	6
PB Sivickis	1925 - *	1923 - 1959	4	6	6

*End date unknown; became dept head.

^aMostly published after leaving the department.

^bOne paper in *Science* as coauthor.

^cTwo papers in *Science* as sole author.

UP, University of the Philippines; SCI, *Science Citation Index*.

Data on publications were obtained through Google Scholar in May 2010.

In the 1920s, Filipino faculty members started taking over the departments of botany and zoology. Jose K Santos was the first botany head from 1924; Hilario Roxas was the first zoology head from 1930. In succeeding decades, up to the present, several members of both faculties became famous and highly recognized in the Philippines for their “research achievements and contribution to science.”

No less than 11 received the highest honors -- 4 from botany and 1 from zoology were elected National Scientists; 6 from botany, Academicians. Only National Scientist Benito Vergara, however, and Academicians Edgardo Gomez, Rhodora Azanza, and Gavino Trono were well-published scientists (Table 2).

Note that the present assessment of research performance was based only on the number of publications. The number of times a paper is cited (citations) is another commonly used objective indicator, which measures quality (5). One with full access to citations should do such study to complement the present survey.

Table 2. Former faculty members of then UP botany and zoology departments, with publications as sole or first author in at least 3 different SCI-indexed journals

From botany or zoology	Left botany or zoology	Years of publications	No. of journal titles	No. of publications Total	No. of publications With sole or first authorship
ED Gomez	1985	1973 - 2008	15	39 ^a	16 ^b
RV Azanza	1985	1998 - 2008	12	29	13
BS Vergara	1961 (?)	1964 - 1997	18	37 ^a	6 ^c
CL Marte	1976	1980 - 2003	5	20	11
MD Fortes	1985	1988 - 2006	10	31	4
GC Trono	1985	1987 - 2002	6	16	7
M Cuvin-Aralar	1986	1988 - 2004	6	8	8
F Lacanilao	1985	1969 - 2002	7	8	5 ^d

^aOne paper in *Science* as coauthor.

^bOne paper in *Science* as first author.

^cOne paper in *Nature* as first author.

^dOne paper in *Science* as sole author.

Abbreviations as in Table 1.

Publication data were obtained through Google Scholar in August-September 2008.

Table 2 also shows the publications of former botany and zoology faculty members who moved to other institutions in the country. Except for Vergara who moved to the International Rice Research Institute (IRRI) in Los Banos and Marte and Aralar, to SEAFDEC in Iloilo, the rest moved to MSI in UP Diliman. Note that all of them started publishing in their new institutions, except for Gomez and Lacanilao.

Gomez founded and became the first director of MSI (and its former Marine Science Center) in 1974-1998. Lacanilao went on assignment to SEAFDEC as its chief in 1981-1982; 1986-1992. MSI and SEAFDEC have become the only world-class Filipino institutions in biology and aquatic sciences in the country.

In 1986, the two departments were merged into the Institute of Biology. Hence, in the 75 years of the former botany and zoology departments, there were hardly

any well-published members of the faculty. It was only since 1998 that IB has been recruiting well-published members in its faculty (Table 3).

Table 3. Present members of the UP Institute of Biology faculty, with publications as sole or first author in at least 3 different SCI-indexed journals

	Year joined IB	Years of publications	No. of journal titles	No. of publications ^a	
				Total	As sole or first author
LMB Garcia	2006	1988 - 2007	5	20	17
WL Rivera	2000	1996 - 2010	5	17	13
TL Salunga	1998	1995 - 2009	8	12	3
ZU Basiao	2005	1984 - 2007	4	7	3

^aAll published before joining or outside IB except those by Rivera, which were done in UP.

Abbreviations as in Table 1.

Publication data were obtained through Google Scholar in April-May 2010.

Garcia and Basiao were former researchers from SEAFDEC in Iloilo; Rivera and Salunga were new and published PhDs from Japan. Except for Rivera who did most of his published work in IB and other labs in UP Diliman, the three others did all their research elsewhere.

Yes, Rizal, the glory hour has begun.

For the first time in 100 years of biology in UP, the most important academic function of modern universities -- research -- has finally come in the Institute of Biology in UP Diliman. This is shown by the well-published members of its faculty during the last decade (Table 3). The IB leadership should be congratulated for making this happen and starting real academic reform -- Dr. Gilda Rivero, Dr. Nellie Lopez, Dr. Bobby Pagulayan, and Dr. Perry Ong.

The transformation can be reproduced UP wide by removing entrenched policies that still prevent the needed changes (6). With adequate institutional support from IB and proper mentoring by these new scientists in the faculty, IB is on its way to attracting and developing more of their kind.

Table 1 has shown the lack of properly published American faculty in the first 2 decades of botany and zoology. That situation had not provided the needed research mentors to train Filipino pioneers who took over, and these in turn similarly failed the next generations of faculty members.

As expected, that situation lasted until the departments' final years (Table 2), when there was still lack of research mentors for young faculty members.

Further, even foreign-trained PhDs were hardly able to do research for lack of institutional support. Table 2 also shows that former botany and zoology faculty members who moved to other institutions -- like MSI, SEAFDEC, and IRRI -- became productive scientists, when given adequate institutional support and proper research mentoring.

But the lack of these two requirements should not prevent serious and determined students in becoming future scientists. As shown in Table 3, WL Rivera, through resolved interest and determination, was able to achieve scientist status in IB conditions. Other examples of such successful Filipino scientists have been produced under frustrating conditions in the country.

The data show that it normally takes three conditions to make productive researchers -- faculty mentor, institution support, and student determination. And predominantly important are the faculty mentor and the institution support. For example, why do some graduates of UP botany, zoology, or biology become productive researchers in other institutions here and abroad, but not when they remained in the Institute of Biology? This means IB -- when celebrating the centennial of biology in UP -- cannot claim performance or institutional credit for its graduates, who became published scientists elsewhere.

The Institute of Biology, however, is now on the road to join the top research institutes in UP and in the country. If this is sustained, IB can look forward to showcase institutional growth and academic excellence in a meaningful observance of its next anniversary.

Other indicators and methods of research evaluation are also subjects of concern. The publication number of citations mentioned above is another objective indicator, which is widely used to measure quality (5). A study on this will give added basis for evaluating research performance. And this will show who among the pioneer Filipino researchers should be properly recognized. They include those who started the basic taxonomic work in Philippine biology -- for example, Gregorio Velasquez on benthic marine algae and Francisco Nemenzo on stony corals.

Further, as done in leading research universities abroad and suggested by a concerned scientist, *there is a need to go beyond numerology and to evaluate numerical data intelligently, which our next generation of scientists will need to learn.*

I invite all concerned to examine carefully Tables 1 - 3. They are designed to tell a story of the former departments of botany and zoology and the present Institute of Biology in UP Diliman. They also tell the story of science in the University of the Philippines and the state of science in the country. Many may not agree with my assessment. But think about this:

There is nothing wrong with wanting heroes in science, but we should understand the criteria used to select those whom we are asked to revere.

— Robert Marc Friedman

Let me just sum up with these quotes:

From a recent editorial in *Nature* (7) --

A number of resources have emerged in recent years to help young scientists start careers in and outside universities Doctoral programmes should build better career counseling and training into their curricula from the start. Reform-minded deans have long championed this change but faculty members have resisted, in part because they cling to the archaic prejudice — implicit at times — that students who leave academia are failures.

The failures, however, rest within the scientific leadership, when it focuses only on numbers and fails to see individuals who write the grant proposals, conduct the research (properly) and struggle to keep their careers afloat.

From the UK science advisers (8) --

Research investment needs to focus not on particular areas of research but on attracting and keeping the most talented researchers, who are able to work across various disciplines. . . . We can't always predict what the next big breakthroughs are going to be, but we can be reasonably sure which researchers are going to make them."

And from Nobel Laureate Joshua Lederberg of biotechnology fame --

It would have been tragic were any industry to have had a veto in deciding what would truly be of greatest industrial consequence.

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