

# The Philippine-American Academy of Science and Engineering

by

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## *The Seed*

Likened to an oak tree, the Philippine-American Academy of Science and Engineering (PAASE) has grown from an acorn that was sown many, many years before its germination. In 1943 in Manila, during a dark period in Philippine history, in the midst of World War II, a wise and courageous high school principal, Mr. Pantaleon Regala, made an impression with his address to the graduating seniors of Araullo Boys High School and sowed seeds of inspiration to the young graduating class, seeds that have taken roots in the lives of some of these young men. Unintimidated by the presence of Japanese troops roaming the school corridors, Mr. Regala gave a stirring talk that the occupying forces, had they fully understood the implications, could have labeled as seditious, a talk filled with subtle exhortations of love of country, gratitude and sacrifice.

Ours was one of two classes to graduate in Manila from a public high school during the war years. With the bombing of Manila on December 8, 1941 and the subsequent occupation of the Philippines by Japanese forces, the four Manila public high schools: Araullo, Arellano, Mapa and Torres were dismantled. Later from the ashes of these four public coeducational schools two gender-segregated institutions were opened in Manila under the aegis of a puppet government controlled by the occupying Japanese forces. These schools were the consolidated Araullo Boys High School and its counterpart, the Teodora Alonso Girls High School. The curricula were altered significantly. English continued to be the medium of instruction; however, in lieu of Philippine History and Government, we took up Japanese History and Nippongo. English Composition was cancelled and English literature was a repeat study of the previous year's books, e.g. *Silas Marner* by George Eliot. The other noncontroversial subjects in mathematics and the sciences, e.g. physics, were left largely untouched, but many books were banned or severely censored with censored pages glued together. Loss of freedom was evident in all aspects of life. Economy was bad and life in the city tough. The future was uncertain.

Against this severe backdrop of occupation, the first and only commencement exercises at Araullo Boys High were held in 1943. We had the usual awarding of prizes, salutatory and valedictory addresses, remarks by several key persons, and some short performances by student groups. None of these were memorable. I do not have any recollection of them, not even the salutatory address that I gave. But two things stood out in my mind: (1) The Senior Glee Club moving rendition of *Going Home* from Anton Dvorak's *New World Symphony*; and (2) Principal Pantaleon Regala's commencement address. To this day, I occasionally find myself subconsciously humming *Going Home*, and every now and then Mr. Regala's words echo back from years past.

I treasure most the two simple allegorical thoughts he shared with us that day:

- I. Observe the chicken as it eats and drinks. For every grain it swallows or every drop of water it drinks, it looks up to the heavens, as if to say a prayer of thanks. We too must be mindful of the blessings we receive, thanking God for all favors bestowed.

- II. Note how the rice plant in its fullness is weighed down by the grains it carries, causing it to bend over ever so gracefully. Think of this as a symbol of the plant looking at its roots, acknowledging its origin. We too must not forget our beginnings.

### *The Nurturing*

Graduating salutatorian from Araullo Boys High earned me admission to the University of the Philippines as a university scholar with full-tuition free. While a junior in mechanical engineering, I was awarded a scholarship to study meteorology at New York University under the Philippine Rehabilitation Act of 1946, the first pensionadoships awarded after WWII. Returning to the Philippines after a brief training in the States, I served the Philippine Weather Bureau for several years. I returned to the United States to pursue graduate education, at Johns Hopkins, Penn State and Purdue (1954-61), remained to start a career in engineering at General Electric (1961-62), but quickly left industry, moved on and settled in academia: Purdue, West Virginia University, and now UMBC (1962 to the present), serving in the uncommon role of a Philippine-born tenured full professor in engineering also serving in several administrative positions along the way, developing and managing new programs.

Through all these years, my family and I maintained our Philippine-ness, nurtured by the new ties we have formed at different campuses with students and faculty members from the Philippines. Grateful for the blessings that we have received since we settled in the United States, always conscious of our humble beginnings in the Philippines, I have always dreamed of returning to the Philippines to share the fruits of my labor. We are comfortably settled now, although we have not amassed any wealth to speak of. The real wealth that I have accumulated is the education that I have had, the knowledge that my research has yielded, the students that I have taught, and the technical advice that I have been privileged to give as a consultant and administrator. These I would gladly share.

In discussions with Philippine American colleagues in academia, many expressed the same desire to be able to return to the Philippines to share scientific and technological knowledge and skills with colleagues in the Philippines. Some did in fact spend time in the Philippines. For myself, I visited the College of Engineering at U.P. in 1976 as a DOST-sponsored Balik Scientist, gave several lectures, and talked to professors and students. In 1977, with support from the U. S. National Science Foundation, Dr. Alfredo H. Ang and I, he of the University of Illinois then and I from Purdue University, organized in Manila The U.S.-Southeast Asia Symposium on Engineering for Natural Hazards Mitigation. While each of these pursuits was satisfying, the impact of these individual encounters had been limited and short-lived. How could one broaden these ventures? How can we best serve the Philippines from our vantage point? These activities whetted my interest; the desire to help has not been satisfied.

### *Germination - The FOUNDING*

The unease caused by unquenched thirst remained with me through the years. The question persisted: would it not make sense to gather together into a working body Philippine-born research scientists and engineers interested in sharing their work with colleagues in the Philippines? Would not the collective efforts of the group of kindred spirits and driven by similar goals create a greater and more lasting impact? In the United States there are hundreds and hundreds of organizations dedicated to fostering regional Philippine culture, organizations of the Ilocanos, the Bikolanos, Hiligaynons, Cavitenos, etc., mostly functioning as social clubs. There are the usual alumni organizations of Philippine universities, e.g. U.P., U.S.T., etc., as well as professional organizations such as the Philippine Engineers and Scientists Organization (P.E.S.O.) and the Philippine American Medical Association. But there is not a single Philippine-American organization devoted to scientific research and technology transfer.

Perhaps it was my earlier experiences as Founding Secretary of the Society of Engineering Science, Inc. founded at Purdue University in 1963, and as Founding Member of the American Academy of Mechanics, incorporated as a non-profit corporation in 1969 in Pennsylvania, that channeled my thoughts towards the official establishment of a non-profit organization. The procedure for effecting this non-profit incorporation in the State of Indiana was simple enough, but it could not be done by a single individual. The articles of incorporation needed an initial Board of Directors composed of at least four members.

It was serendipity that brought together a key group to attend the 25th wedding anniversary celebration of Dr. Jose and Minda Serrano in 1978. (Dr. Serrano, a successful practicing physician in Northern Indiana, was a classmate and co-graduate from Araullo Boys High School.) It was at this celebration that I first met Dr. Pat Mangonon, Director of Research at Inland Steel, and Dr. Charles Melendres, Staff Scientist at Argonne National Laboratory. We were seated together at a table with others, which included an old friend, Dr. Edgar Buyco, Professor of Mechanical Engineering at Purdue University at Calumet. There were many medical doctors in attendance, but I believe that we were the only four with PhDs in engineering and the sciences.

We quickly discovered our common interest in wanting to contribute to the advancement of the Philippines through our respective expertise, knowledge of certain branches of engineering and science, and academic and industrial experiences. Excitedly we discussed the forming of a non-profit organization of scholars and researchers. We made plans to meet again to pursue this interest and to forge ahead with the necessary paperwork that had to be filed with the Indiana Department of State.

On April 23, 1980, the Secretary of State of the State of Indiana, Mr. Edwin J. Simcox, certified the Incorporation of The Phil-American Academy of Science and Engineering Inc under the provisions of the Indiana Not for Profit Corporation Act of 1971. The stated purposes of the Academy are:

1. To promote the advancement of science and technology and to encourage collaborative work among scientists and engineers in research and development;
2. To support interaction among United States citizens of Philippine descent, residents of the United States and other countries of Philippine descent, in scholarly and scientific endeavors that would be of particular benefit to the United States and the Philippines; and
3. To provide a means for transfer of scientific and technological advances between the Philippines and the United States.

The Incorporators and the Members of the Initial Board of Directors registered with the State of Indiana in the Academy's Articles of Incorporation were the four who first met at the Serrano wedding anniversary celebration: Dr. Severino L. Koh, Dr. P. L. Mangonon, Dr. Edgar H. Buyco, and Dr. Charles Melendres.

### **Rooting - The INAUGURATION**

The founding of The Philippine-American Academy of Science and Engineering, Inc. (PAASE) was achieved on April 23, 1980 in Indiana, U.S.A. The more difficult task of establishing the roots of the new sprout in firm foundation required immediate attention. Qualified members had to be recruited to the Academy. The Constitutional By-Laws of the Academy is clear on the qualifications of members: membership shall be restricted to scientists and engineers who have distinguished themselves in their respective fields through research publications and other technical achievements. It was the objective of the founders of the Academy that the Founding Members and other elected Members of the Academy that PAASE become an intellectual organization of highly educated Filipino-Americans of demonstrated outstanding achievements in some fields of science and engineering with dedication to serve the mother country, the Philippines, and the adoptive country, the United States. To be a member of PAASE would be an honor; therefore, the standards for admission into this elite group should be kept high and firm.

The incorporators of PAASE served as an Ad-hoc Membership Committee charged with the nomination and the acceptance of other individuals into the Academy as Founding Members. The basic tenet of the Academy on Membership as written in the Incorporation Papers and the Constitutional By-Laws is simple, clear and unequivocal: prospective members have to be research scientists and engineers with good publication records and other technical achievements. In a sense this requirement is similar to one of the key criteria for granting academic tenure to a faculty professor at a top-rate research university in the United States. Based on this, the Committee established some initial guidelines. It was decided that as a minimum an earned Ph. D. degree from a reputable institution would be required of the nominee. Beyond this, the nominee should also have continued research with publications in recognized peer-reviewed journals and periodicals. Doctorates not in the sciences and engineering, for example the Ed.D. degree, were not considered. Other professional degrees, including M.D., Pharm.D., and other degrees, were

similarly not considered unless the nominees were doing significant research and publishing in their respective fields.

The task of identifying qualified members for the Academy was a gargantuan undertaking. A careful search of biographical references was conducted, including such volumes as Who's Who in America, 1978-79; Who's Who in the Midwest, 1978-79. The American Men of Science, 1968, and the American Men and Women of Science, 1972 and 1976 yielded a good collection of names of possible Filipino-Americans who might be interested in joining us as Founding Members of the new Academy. School catalogs were also searched, and friends and colleagues were contacted for possible leads. There were numerous inquiries about joining the new Academy; however, those who did not satisfy the basic qualifications established by the Ad-hoc Committee on Membership were discouraged from pursuing the nomination. The initial list of prospective Founding Members exceeded fifty names. Ultimately a total of twenty-one qualified scientists and engineers accepted the invitation to become the Founding Members of the Academy<sup>1</sup>.

To formalize the establishment of the Academy, an inaugural celebration was held in Manila on January 6 - 8, 1981. The first order of business of PAASE was to call a meeting of the Founding Board of Directors jointly with the newly elected Founding Members to validate the incorporation papers, ratify the Constitutional By-Laws, confirm the incorporators and the Founding Directors, as well as accept the recommendations of the Committee on the first group of Founding Members. The first election of officers was conducted. Dr. Severino L. Koh was elected Founding President; Dr. Jose B. Cruz, Jr., Founding Vice President and President-elect; and Dr. Linda Gutierrez-Bartolome, Founding Secretary-Treasurer.

A Founders' Symposium was held in conjunction with the inaugural celebration with Founding Members in attendance presenting results of their research studies. In five sessions on Frontiers of Research, demonstrating the breadth and scope of interest of the Academy, lectures were presented by the following Academicians:

Dr. Josefino C. Comiso, Geophysics  
Dr. Apolinario D. Nazarea, Biophysics  
Dr. Eusebio L. Koh, Mathematics  
Dr. Crisostomo B. Garcia, Statistics  
Dr. Robert S. Mariano, Economics  
Dr. Francisco M. Bartolome, Food Science and Technology  
Dr. Linda Gutierrez-Bartolome, Food Science and Technology  
Dr. Augusto C. Ouano, Polymer Science  
Dr. Severino L. Koh, Theoretical and Applied Mechanics  
Dr. Edgar H. Buyco, Mechanical Engineering  
Dr. Jose B. Cruz, Jr., Electrical Engineering

Dr. Paulo C. Campos, President of the Philippine National Academy of Science and Technology, hosted the Inaugural Dinner honoring the Founding Members of PAASE. This was the first meeting of PAASE members with the distinguished members of NAST. PAASE Founding President Severino L. Koh gave the inaugural address on The Founding of the Phil-American Academy of Science and Engineering, which was an abridged version of the present article on the Genesis of PAASE.

As part of the celebration, the Academy presented plaques to honor several individuals:

Dr. Edward Teller, Eminent Scientist, for Lifetime Achievement.  
The Honorable Dr. Melecio Magno, Minister, National Science Development Board,  
Outstanding Scientist of the Year.  
The Honorable Engr. Alfredo Juinio, Minister of Public Works and Dean of the U. P.  
College of Engineering, Outstanding Engineer of the Year.  
Dr. Paulo C. Campos, President of the National Academy of Science and Technology (NAST), and  
President of Aguinaldo College in Cavite, was presented with a Plaque of Appreciation for  
Support in the inauguration of the new Academy.

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<sup>1</sup> A list of the Founding Members of PAASE is appended at the end of this article.

A post-inauguration visit to Cavite was arranged by Dr. Paulo Campos. This included a tour of the Aginaldo College and the Dasmarias Project, an attempt by the Philippine government to provide public housing to barang-barong dwellers in the slums of Greater Manila.

Two other special events were conducted in conjunction with the inauguration of PAASE. With principal support from the National Science Development Board of the Philippines and the Society of Engineering Science, and with the co-sponsorship of several government ministries, research institutes, NAST, PAASE and other organizations, an International Conference on Energy and Environment was consolidated with the inauguration of PAASE. The Honorable Dr. Melecio S. Magno, Minister, National Science Development Board of the Philippines, gave the keynote address on behalf of The Honorable Madame Imelda R. Marcos, Minister of Human Settlements, Honorary President of The International Conference. World-renown, eminent American Physicist Dr. Edward Teller presented the first PAASE Distinguished Scientist Award Lecture. Other general lectures were presented by Dr. I. H. Usmani, United Nations Center for Natural Resources, Energy and Transportation; Dr. T. Nejat Veziroglu, University of Miami; Dr. Robert E. Bailey, Ohio State University; and Dr. Essam El-Hinnawi, United Nations Environment Programme. The International Conference was the first international meeting on energy and environment ever held in Asia. Because of the pertinence and breadth of the main focus of the conference, it attracted many participants from Southeast Asia, Taiwan, Japan, India, Pakistan, some European countries, and America.

The second special event was a short course on solar energy systems which was organized by Engineer Atilano D. Bondoc, P. E., president of the Philippine Engineers and Scientists Organization (P.E.S.O.) based in Chicago. The principal instructor of the course was PAASE Founding Director Dr. Edgar H. Buyco, Professor of Mechanical Engineering, Purdue University Calumet. Special lectures were given by Dr. Severino L. Koh, Purdue University Calumet, Dr. H. Dana Moran, Solar Energy Research Institute, and Dr. Paul S. Hoover, The Ohio State University. Registered participants for the course were primarily practicing engineers from the Philippines and from the United States, many from the Philippine-American engineering societies in Chicago (P.E.S.O.) and San Francisco. Continuing education credits (3 CEU) from Purdue University-Calumet were awarded to the registered participants.

Without question, Dr. Teller was the star attraction of the week-long inaugural celebration. His Award Lecture on fission generated a great deal of interest, and his views on the practical applications of nuclear energy were sought primarily due to Operation Plowshare which was his brainchild. He was invited to Malacanang Palace to meet with President Marcos, accompanied by Dr. Melecio Magno, Minister of Science and Technology, and a group of us from PAASE. Sharp and knowledgeable as he had been noted, President Marcos engaged Dr. Teller in a lively discussion on the peaceful use of atomic energy, also seeking expert advice on the nuclear power plant being built in Bataan. At an impressive convocation at the De La Salle University the following day, Dr. Edward Teller was conferred the degree Doctor of Science, honoris causa.

### *The Tree*

The Philippine-American Academy of Science and Engineering was founded in 1980 and had a most auspicious inauguration in 1981. Allegorically, PAASE was a seed of an idea planted in the heart of a young man during the difficult times of World War II in Manila. It stayed quiescent through the years until at the proper moment it germinated and sprouted into an organization of Filipino Americans of kindred spirits and similar love of country. These highly motivated, accomplished expatriates are truly driven by the desire to help the mother country in the best way they can: dedicated to extending their acquired knowledge, skills and expertise to help their native country through research and technology transfer. The sapling has now grown into a sturdy oak tree celebrating its twentieth year this year 2000 (XX:MM). It is still youthful and still growing. It continues to attract outstanding scientists and engineers. Over these past twenty years, many of its members have individually returned to the Philippines to lend their expertise with enthusiasm equal to those who preceded them. But this is another story<sup>2</sup>.

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<sup>2</sup> Dr. Victoria Guerrero-Abellera, who has served PAASE as Secretary-Treasurer for several years, and recently as President and Director, has undertaken the task of writing the history of PAASE.

## Apology

It has been difficult to tell the story of the Founding of PAASE without using the first person. I apologize if this short narrative has become monotonously personal.

### **THE PHIL-AMERICAN ACADEMY OF SCIENCE AND ENGINEERING FOUNDING MEMBERS**

1. Alfredo H-S. Ang (PhD, Civil Engineering, U of Illinois)  
Professor of Civil Engineering, University of Illinois, Urbana-Champaign, IL
2. Angel S. Arambulo (PhD, Medicinal Chemistry, U of Illinois Medical Center)  
Professor of Manufacturing Pharmacy, U of Illinois Medical Center, Chicago, IL
3. Francisco M. Bartolome (PhD, Food Technology, Purdue U)  
Manager, Technical Development, The Pillsbury Company, Minneapolis, MN
4. Linda G. Bartolome (PhD, Food Technology, Purdue U)  
Senior Food Scientist, Henkel Coporation, Minneapolis, MN
5. Edgar H. Buyco (PhD, Chemical Engineering, Purdue U)  
Professor of Mechanical Engineering, Purdue U-Calumet, Hammond, IN
6. Leon O. Chua (PhD, Electrical Engineering, U of Illinois)  
Professor of Electrical Engineering and Computer Sciences, UC Berkeley, CA
7. Josefino C. Comiso (PhD, Physics, UCLA)  
Physical Scientist, NASA Goddard Space Flight Center, Greenbelt, MD
8. Jose B. Cruz, Jr. (PhD, Electrical Engineering, U of Illinois)  
Professor of Electrical Engineering, U of Illinois, Urbana-Champaign, IL
9. Mariano A. Estoque (PhD, Meteorology, New York U)  
Professor of Atmospheric Science, U of Miami, Coral Gables, FL
10. Jose C. Gan (PhD, Biochemistry, U of Illinois Medical Center)  
Associate Professor of Biochemistry, U of Texas Medical Branch, Galveston, TX
11. Crisostomo B. Garcia (PhD, Operations Research & Statistics, RPI)  
Professor, U of Chicago, Chicago, IL
12. Eusebio L. Koh (PhD, Engineering Analysis, SUNY Stony Brook)  
Professor of Mathematics, U of Regina, Regina, Saskatchewan, Canada
13. Severino L. Koh (PhD, Engineering Sciences, Purdue U)  
Professor of Mechanical Engineering, Purdue U, West Lafayette, IN
14. Pat L. Mangonon, Jr. (PhD, Metallurgy, UC Berkeley)  
Manager, Steel Research and Development, Foote Minerals Company, Exton, PA
15. Carlos A. Melendres (PhD, Physical Chemistry, UC Berkeley)  
Physical Electrochemist, Argonne National Laboratory, Argonne, IL
16. Amador C. Muriel (PhD, Physics, SUNY Stony Brook)  
Vice President & Dean of the College, Burlington County College, Pemberton, NJ
17. Apolinario D. Nazarea (PhD, Theoretical Biology, U of Chicago)  
Research Associate, Center for Studies in Statistical Mechanics, U of Texas, Austin
18. Augustus C. Ouano (PhD, Chemistry, Stevens Institute of Technology)  
Research Staff Member, IBM Corporation, San Jose, CA
19. Eduardo A. Padlan (PhD, Biophysics, Johns Hopkins U)  
Medical Research Scientist, JHU, Baltimore, MD
20. Marcelino G. Reyes (MD, U Philippines; Neuropathology Fellow, U Missouri)  
Assistant Professor of Neurology, Rush Medical College, Chicago, IL
21. Romeo M. Zarco (MD, U Philippines; MPH, Johns Hopkins U)  
President, Cordis Laboratories, Inc., Miami, FL