



# Academy News

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## NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY

### National Scientists

Teodoro A. Agoncillo, Litt. D. (*honoris causa*)<sup>+</sup>  
Encarnación Alzona, Ph.D.  
Francisco M. Fronda, Ph.D.  
Hilario D. G. Lara, M. D., Dr. P. H.  
Fe del Mundo, M.D.  
Geminiano T. de Ocampo, M.D.  
Eduardo A. Quisumbing, Ph.D.  
Casimiro del Rosario, Ph.D.<sup>+</sup>  
Juan S. Salcedo, Jr., M.D. D.Sc. (*honoris causa*)  
Alfredo C. Santos, Dr. phil.  
Francisco O. Santos, Ph.D.<sup>+</sup>

### NAST Executive Council

(1985-1988)

Paulo C. Campos	—	President
Melecio S. Magno	—	Vice-President & Secretary
Julian A. Banzon	—	Member
José Encarnación, Jr.	—	Member
Alfredo V. Lagmay	—	Member
Dioscoro L. Umali	—	Member
Carmen C. Velasquez	—	Member

### Academicians

Teodoro A. Agoncillo, Litt. D. (*honoris causa*)<sup>+</sup>  
Encarnación Alzona, Ph.D.  
Clare R. Baltazar, Ph.D.  
Julian A. Banzon, Ph.D.  
Benjamin D. Cabrera, M.D., M.P.H.  
Paulo C. Campos, M.D.  
Magdalena C. Cantoria, Ph.D.  
Gelia T. Castillo, Ph.D.  
Amando M. Dalisay, Ph.D.  
Conrado S. Dayrit, M.D.  
José Encarnación, Jr., Ph.D.  
Pedro B. Escuro, Ph.D.  
Raymundo A. Favila, Ph.D.  
Francisco M. Fronda, Ph.D.  
Emerita V. de Guzman, Ph.D.<sup>+</sup>  
Emilio Q. Javier, Ph.D.  
Bienvenido O. Juliano, Ph.D.  
Jose O. Juliano, Ph.D.  
Quintin L. Kintanar, M.D., Ph.D.  
Alfredo V. Lagmay, Ph.D.  
Hilario D.G. Lara, M.D., Dr. P.H.  
Clara Y. Lim-Sylianco, Ph.D.  
Cecilio F. Lopez, Dr. phil.<sup>+</sup>  
Melecio S. Magno, Ph.D.

Tito A. Mijares, Ph.D.  
Fe del Mundo, M.D.  
Quirino O. Navarro, Ph.D.  
Bienvenido F. Nebres, S.J., Ph.D.  
Geminiano T. de Ocampo, M.D.  
Luz Oliveros-Belardo, Ph.D.  
Faustino T. Orillo, Ph.D.  
Eduardo A. Quisumbing, Ph.D.  
Jose N. Rodriguez, M.D.<sup>+</sup>  
Casimiro del Rosario, Ph.D.<sup>+</sup>  
Juan S. Salcedo, Jr., M.D. D.Sc. (*honoris causa*)  
Alfredo C. Santos, Dr. phil.  
Francisco O. Santos, Ph.D.<sup>+</sup>  
Joventino D. Soriano, Ph.D.  
Dioscoro L. Umali, Ph.D.  
Jose R. Velasco, Ph.D.  
Carmen C. Velasquez, Ph.D.  
Gregorio T. Velasquez, Ph.D.  
Gregorio F. Zaide, Ph.D.  
Gregorio Y. Zara, D.Sc.<sup>+</sup>

+ deceased

**1985 Annual  
Report of the  
President**

The National Academy of Science and Technology (NAST) or Academy was created in 1976 through Presidential Decree 1003-A to serve as a recognition body of outstanding achievements in science and technology and to provide meaningful incentives to those engaged in scientific and technological research. The Academy was also created to compose of outstanding scientists to serve as a reservoir of competent scientific and technological manpower for the country.

It was two years later, in 1978, that it was formally organized with ten initial members or Academicians and from these, three were given the National Scientist Award. Now, the Academy is composed of 37 living Academicians ten of whom are National Scientists.

In 1982, through Executive Order 818, the Academy was formally charged the function of advisory body to the scientific community on policies and problems concerning science and technology in the country. The Academy was also mandated to engage in programs and projects designed to promote scientific productivity.

In addition to these functions, the Academy has adopted other functions expected of an academy of science such as publications and establishment of linkages with other academies of science and other scientific organizations abroad.

### **Highlights**

The Academy continued its efforts to give recognition to outstanding achievements in science and technology; provide meaningful incentives to those engaged in research; design new projects and activities to further promote scientific productivity; serve its role as an advisory body to the scientific community; and perform other functions which are expected of an academy of science.

#### *Recognition of Outstanding Achievements in Science and Technology*

Recognition given by the Academy may be in the form of conferment of the National Scientist Award by the President of the Republic of the Philippines upon recommendation of the Academy; membership in the Academy; and Outstanding Young Scientist Award. For this year, three became National Scientists; three from among 20 nominees joined the roster of Academicians; and eight from among 60 nominees received the Outstanding Young Scientist Award.

#### *Promotion of Scientific Productivity*

The Academy convenes each year a Scientific Meeting to provide a venue for researchers in the country to present recent developments in science and technology. In July, the Academy held its 7th Annual Scientific Meeting where 23 original and unpublished research papers were read by Academicians, Outstanding Young Scientist awardees and other senior scientists before the scientific community.

To encourage scientists engage in full-time research and in other scholarly pursuits such

as writing of books, the Academy appointed nine Research Fellows. A Research Fellow does not engage in administrative work except the administration of his research work.

#### ***Provision of Meaningful Incentives to Those Engaged in Research***

The Academy provided monthly gratuity; medical/hospitalization benefits; travel support for attendance and participation in international conferences and other incentives to 37 Academicians and 10 National Scientists. These scientists have shown dedication and spent their lifetime in the advancement of science in our country.

#### ***Advisory Functions***

The Academy being the highest collegial body in our country is charged as an advisory body to the scientific community. To guide younger generation of scientists in their work, the Academy designated each Academician to write state-of-the-art papers in their fields of specialization. The state-of-the-art papers, in addition to being review papers, identify promising and neglected areas of research in a specific field of science. The Biological Sciences Division in a series of seminars, presented state-of-the-art papers in this field. Specialists as well as young workers in science were invited to discuss and react to the state-of-the-art papers presented. These papers will be consolidated and published for dissemination to a wider scale of researchers in the country.

On policy matters of national and international interest related to science and its applications, the Academy convened round table conferences and informal discussions from which policy recommendations were made. For example, the Academy conducted a series of round table conferences on Nuclear Education and Information where experts in the field were invited to discuss the matter. From these round table conferences and several consultative meetings, the Academy formulated an official statement on nuclear education and information.

#### ***Promotion of International Linkages with Science Academies and Other Scientific Organizations***

International cooperation is one of the oldest and strongest traditions of the scientific community. Since its creation, the academy has been establishing linkages with academies of science and other scientific organizations of the same stature.

Cooperation with other academies of science may be in the form of exchange visits of postdoctoral scientists in the natural sciences and technology, joint collaborative work and exchange of research results and publications. At present, the Academy has an outstanding agreement with the Royal Society of London, German Research Council and the Indian National Science Academy. An agreement with the Chinese Academy of Science has been negotiated and the signing is underway.

In 1985, the Academy received three scientists from the Indian National Science Academy who made study visits to a number of our research laboratories and gave lectures in their field of specialization.

On a regional scale, the Academy is one of the founding members of the Federation of Asian Scientific Academies and Societies (FASAS) goals of which are to: (1) advance scientific research and technological development in the region; (2) facilitate dissemination of scientific information; (3) provide scientific and technological services; (4) enhance scientific and technological education; (5) promote the scientific transfers in culture and society; and (6) promote collaborative scientific research and technological development among the member nations.

For example, every year, the federation identify training areas which are common requirements in the region. At the instance of FASAS, the Academy can nominate one scientist in the country to these training workshops where the host country takes care of the local accommodation and travel while the international plane fare is shouldered by the Committee on Science and Technology in the Developing Countries (COSTED).

### ***Publications***

One significant function which is expected of an academy of science is publication. The Academy published the ***Transactions*** which contains papers presented in the Annual Scientific Meeting and other papers of Academicians. The Academy likewise published the ***Academy News*** which contains activities of the NAST and Academicians.

### **Campos Reelected President**

For the third time, Dr. Paulo C. Campos was elected President of the Academy on October 17, 1985. He first became President in 1978 when the Academy was organized.

This head of the highest collegial body in the country is basically a medical man — a practising physician, professor and researcher rolled into one. He obtained his M.D. from the University of the Philippines in 1946 and topped the Medical Board Examination that year. From 1952-1958, he pursued postgraduate studies at the Johns Hopkins School of Medicine, Harvard School of Medicine and Oak Ridge Institute of Nuclear Medicine. He joined the U.P. College of Medicine where he rose to become Professor of Medicine.

As a medical researcher, Dr. Campos authored/co-authored 75 scientific publications some of which are award-winning. His researches namely: (1) *Observation on Some Parameters of Insulin Action* (2) *CR-51 Tagged Red Cell Studies* and (3) *The Genetic Factor in Endemic Goiter* won First Prizes in Research Award. For his achievements in research, the Philippine Association for the Advancement of Science named him Outstanding Scientist (Gregorio Y. Zara Award) in 1969.

Dr. Campos is credited for establishing the first and best known Radioisotope Laboratory in the country, the first Research Laboratory in the Department of Medicine, University of the Philippines and the Thyroid Clinic of the UP-PGH Medical Center. The creation of the present Philippine Council for Health Research and Development (PCHRD) was his vision for an effective delivery of health care in the country. The Research Fellowship of the Academy was based on his proposal paper on Research Professorship.

Being President is not unusual to Dr. Campos. He was President of the Philippine Association for the Advancement of Science (1966-1968); National Research Council of the Philippines (1983-1985); Philippine College of Physicians (1962-1964); Philippine Diabetes Association (1963-1970) and Philippine Heart Association (1966-1967), to name a few. He is also member/fellow in many scientific, medical and civic associations as well. His name is included in *World Who's Who in Science from Antiquity to the Present*, *Philippine Men of Science* and *Who's Who in Atoms*. He was also recipient of various fellowships and grants which included Fullbright Grant (1952), Rockefeller Grant and German Foundation Fellowship.

A man of varied accomplishments, Dr. Campos in addition to being a medical practitioner, professor and researcher is also an educator, businessman, civic leader and farmer. He was born on July 27, 1921 in Dasmariñas, Cavite.



*Dr. Campos takes respite from work.*

#### **NAST Council Members Named**

A new set of Executive Council members has been appointed by President Marcos. Their appointments were announced during the closing ceremonies of the National Science and Technology Week on July 12, 1985 in Malacañang. The Executive Council takes charge of the general administration and direction of the affairs of the Academy.

Composing the new Executive Council which will serve for a three-year period from 1985-1988 are: Drs. Carmen C. Velasquez-Biology, Julian A. Banzon-Chemistry, Paulo C. Campos-Medicine, José Encarnación, Jr.-Economics, Alfredo V. Lagmay-Psychology, Melecio S. Magno-Physics and Dioscoro L. Umali-Agriculture. They were formally sworn into office by Science Minister Emil Q. Javier before the Academy general assembly on August 8, 1985 in Bicutan.

#### **Academy Elects Officers**

The Academy elected Dr. Paulo C. Campos as President and Dr. Melecio S. Magno as Vice-President and Secretary during its meeting last October 17, 1985 in Bicutan. Drs. Campos and Magno will also serve as officers of the Executive Council.

It was the first time the general membership had a hand in choosing the officers. In previous years, officers were elected by the Executive Council from among the Council members. This year, some changes in election procedures for officers were made. The general membership instead of the Executive Council elected the officers who come from among the Council members.

Dr. Campos, the only NAST President so far, will be serving his third term of three years; Dr. Magno, his second term as Vice-President and first term as Secretary. Both took their oath of office before the Minister of Science Emil Q. Javier on separate occasions.



*The Academy en banc to elect officers.*

## SCIENTIFIC MEETING

### NAST Holds 7th Annual Scientific Meet

The 7th Annual Scientific Meeting of the Academy was held on July 18, 1985 at the Philippine International Convention Center (PICC). Twenty-three scientific papers were read during the meeting by National Scientists, Academicians and Outstanding Young Scientists. It was attended by about 400 researchers in the country. The scientific meeting is held annually by the Academy to provide a venue for researchers in the country to present and discuss recent developments in science and technology.

Papers that were read during the scientific sessions include:

1. *Pseudomonas Infection in Hospitalized Infants and Children in Metro Manila, 1984* — Fe del Mundo, M.D.
2. *Mechanisms and Timing of Diastolic in Electrical Heterogeneity in Diseased Human Ventricle* — William D. Chua, M.D.
3. *Reinfection and Infection Rates of Ascariasis in Relation to Seasonal Variation* — Benjamin D. Cabrera, M.D.
4. *The Technology of Research in the Blue-Breen Algae and Relevance to Philippine Economy* — Gregorio T. Velasquez, Ph.D.
5. *Phytoplankton Population, A Component to the Potentially Productive Municipal Waters of Estancia, Iloilo* — Paciente A. Cordero, Jr., Ph. D.
6. *Effect of Breeder Size on Fry Production of Nile Tilapia in Concrete Pools* — Rafael D. Guerrero III, Ph. D.
7. *Intraspecific Karyological Differences and Phenotypic Variations in Sorghum* — Joventino D. Soriano, Ph. D.
8. *Notes on Two Mentha Hybrids Grown in the Philippines* — Magdalena C. Cantoria, Ph. D.
9. *Boron Deficiency in Adobe-Derived Soils of Cavite* — Jose R. Velasco, Ph. D.
10. *Quantitative Aspects in the Saponification of Coconut Oil by Cold Process* — Julian A. Banzon, Ph. D.
11. *Preliminary Study on the Essential Oil of Canarium luzonicum (Blume) A. Gray as a Possible Supplement to Diesel Oil* — Luz Oliveros-Belardo, Ph. D.
12. *Continuous-Flow Fermentation of Sugar into Ethanol Using Immobilized Yeast* — Ernesto J. del Rosario, Ph. D.
13. *Factors Affecting the Nutritional Value of Rice Protein* — Bienvenido O. Juliano, Ph. D.
14. *Galactomannan Metabolism in Developing Normal and Makapuno Coconut Endosperms* — Evelyn Mae T. Mendoza, Ph. D.
15. *Mutagenicity and Clastogenicity Potential of Gusathion A., Carvil and Lannate* — Clara Y. Lim-Sylianco, Ph. D.
16. *A 6800-Microprocessor-Based Potentiometric Stripping Analyzer* — Victoria A. Vicente, Ph. D.
17. *Women in Rice Farming Systems* — Gelia T. Castillo, Ph. D.
18. *An Econometric Analysis of Some Aspects of Philippine Education* — Vicente B. Paqueo, Ph. D.
19. *Demographic Trends and Economic Crisis* — Alejandro N. Herrin, Ph. D.
20. *Modern Formulations of Covariant Physical Theories* — Roger Posadas, Ph. D.
21. *N-Cycle Block Design Systems* — Severino V. Gervacio, Ph. D.
22. *A Predictive Model for Cadmium Concentration for Water Reservoir* — Filemon A. Uriarte, Jr., Ph. D.
23. *Breeding for Low-Input Cultivars of Vegetable Crops* — Eufemio T. Rasco, Ph. D.

These papers will be published in the 1985 *Transactions* of the Academy.



*Dr. Ernesto J. del Rosario delivering a lecture at the 7th ASM.*

## RESEARCH FELLOWSHIP

### **Research Fellows of the Academy**

Nine Research Fellows were appointed by the Academy this year to undertake research or to engage in other scholarly pursuits such as writing of books. A Research Fellow does not engage in administrative work except the administration of his research. He receives an honorarium ranging from ₱5,000-10,000 a month during his appointment.

The Research Fellowship was designed by the Academy to encourage scientists to engage in full-time research and to promote high level scientific work for the Filipino scientist. The fellowship is to be awarded not only for research effort but also, more generally, for scholastic and/or productive effort in science.

The nine Research Fellows and their intended work are the following:

1. Joventino D. Soriano, Ph. D. — To conduct a research entitled *Genetic Diseases on Induced Mutations for Resistance to Sclerotium Root-Rot Diseases in Some Cultivated Plants*. This work will find significance in contributing to the advancement of human knowledge on how genetic factors govern traits controlling resistance to disease as well as on the primary effects of gene changes.
2. Alfredo V. Lagmay, Ph. D. — To conduct a preliminary study on *Attention Control under EEG-Alpha States*. This work will be significant in various psychological/behavioral procedures involving the quieting/relaxation response.
3. Gregorio T. Velasquez, Ph. D. — To complete several researches on Philippine algae. The product of this work will be the publication of a comprehensive book on Philippine Algae.
4. Clare R. Baltazar, Ph. D. — To complete an inventory of Philippine insects leading to a publication of a book, *Inventory of Philippine Insects*, which will be a basic information in this field.
5. Raymundo A. Favila, Ph. D. — To write a book entitled *Recti Linear Congruences with Generators in 1-1 Correspondence*. The work represents a solid piece of mathematical research.

6. Julian A. Banzon, Ph. D. — To write a book entitled *The Coconut as a Renewable Source of Fuel*.
7. Luz Oliveros-Belardo, Ph. D. — To finish two researches namely: (a) *Fragrance Materials in the Leaves of Philippine Grown Cymbogon martyni (Reoxb)*; and (b) *Volatiles from the Fruit Peel Oil of Diospyros discolor Wild.*
8. Hilario D. G. Lara, M.D., Dr. P. H. — To write a book entitled *A Treatise in Research*.
9. Clara Y. Lim-Sylianco, Ph. D. — To write a book on *Genetic Toxicology*.

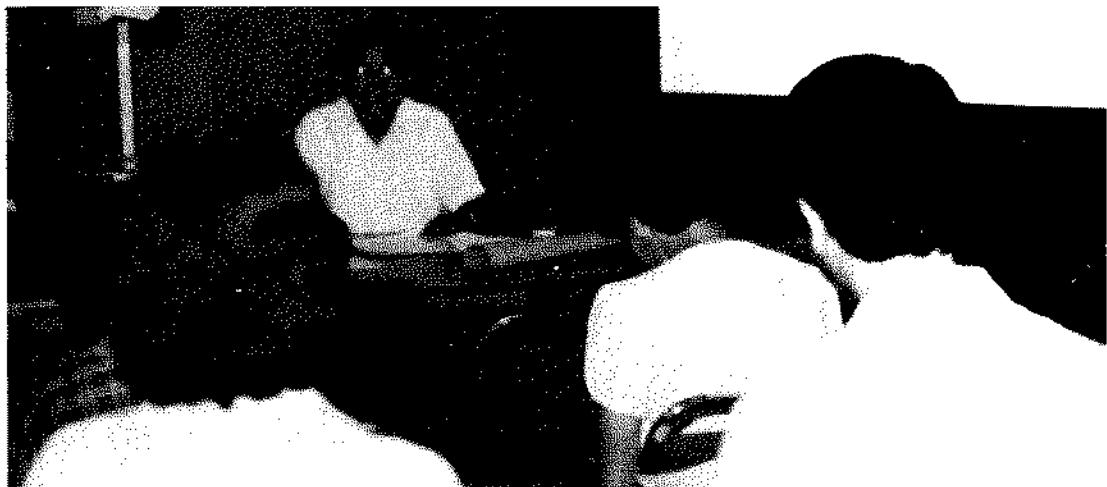
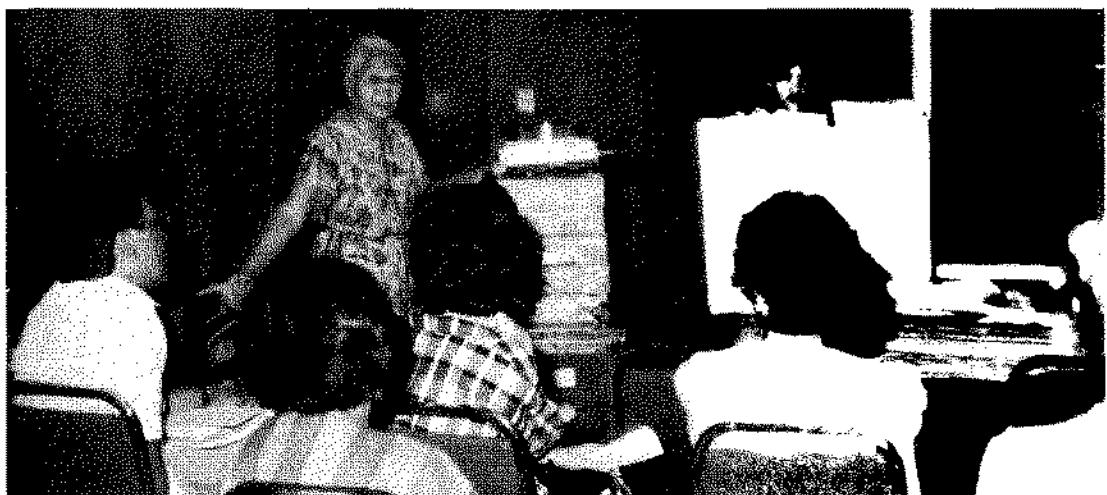
## ADVISDRY ACTIVITIES

### Biologists Come Out With State-of-the-Art Papers

The Biological Sciences Division of the Academy presented state-of-the-art papers in a series of seminars held in 1985. These papers, in addition to being review papers, identify gaps and promising areas of research to guide the younger generation of scientists in their work. Specialists, as well as young workers in science, were invited to discuss and react to the papers during the seminars.

The state-of-the-art papers and their authors were as follows:

1. *Current Efforts in Plant Eco-Physiology* — Jose R. Velasco, Ph. D.
  - A review of the effort in eco-physiology in the country in the past decade (1975-1984) which spanned into the two areas of weeds and their control, and of plant nutrition and fertilizer application.
2. *Fish Parasitology and Aquaculture Management in the Philippines* — Carmen C. Velasquez, Ph. D.
  - A review of the status of research on fish parasites and diseases in the Philippines in relation to aquaculture management. Representatives of major groups of parasites of fish cultured or with aquaculture potential were discussed and areas requiring further research were noted.
3. *Efficient Seed Irradiation and Mutant Selection with Emphasis on Peanut and Sorghum* — Joventino D. Soriano, Ph. D.
  - A presentation of the recent developments in seed irradiation research consisting of the use of pre- and post-irradiation treatments; proper management of the distribution of mutations; and continuous or recurrent selection of mutants.
4. *Chemical Plant Taxonomy* — Magdalena C. Cantoria, Ph. D.
  - A review of the status of plant chemotaxonomy, a hybrid discipline which emerged in the early sixties, giving insights into what is being done in this field in other parts of the world.
5. *Taxonomy of Philippine Diptera* — Clare R. Baltazar, Ph. D.
  - A presentation of important taxonomic literature dealing with Diptera described or recorded in the Philippines from 1758 to 1984, covering a



*Top to Bottom: Drs. Cantoria, Velasquez and Soriano deliver their state-of-the-art papers.*

## **Need for Nuclear Education Stressed**

The importance of nuclear education and information in the country was discussed by a group of scientists in a series of round table conferences convened by the Academy in April 1985. This activity was in line with the advisory function of the Academy. The group agreed on the following points:

- In view of the nuclear arms race and the continuing threat to peace that more sophisticated weapons of destruction pose against the security and well-being of all mankind, education about military uses of nuclear power and information concerning nuclear war must reach all Filipinos.
- A study of probable implications of the presence of nuclear weapons in Philippine territory and the effects of possible nuclear bombings in the Philippines should be undertaken.
- Policy and decision makers should be enjoined to contribute their utmost to the avoidance of conflicts and to their peaceable resolution where these cannot be avoided, to the reduction of arms, and above all, to the effective outlawing of war and nuclear armaments.
- Nuclear science and technology should be integrated in the existing general education and science courses.
- Education and information materials on nuclear science and technology should be made available and disseminated through media.



*Dr. Paulo C. Campos, NAST President, presiding over the round table conference on nuclear education and information.*

**Academy Round  
Table to Draft  
R & R on Biological  
Specimen Collection**

The Academy, in cooperation with the Association of Systematic Biologists of the Philippines, will hold a series of round table conferences next year to draft rules and regulations on the collection of natural history specimens by foreigners in the country.

This concern was brought about by the observation of our systematic biologists headed by Dr. Domingo Madulid that in the past, and even at present, many foreign scientists have visited our country with the specific purpose of collecting plants and/or animal specimens that will serve as scientific references in their institutions abroad. Some collectors contact local scientists to request assistance on the procedure of collecting natural history specimens but many also enter the country without making official arrangements and oftentimes they amass huge collections and take these specimens away from the country without a trace.

Dr. Madulid says that this is deplorable and a cause for alarm to the Philippine scientific community since our valuable biological resources are being plundered to the extent that many of them are endangered with extinction. Such is the case because, at present, though there are existing laws and regulations governing environmental protection, they are vague and not specific with regard to the collection of natural history specimens. Thus, there is a need to establish a national policy or system that will guide and regulate the collection by foreign scientists of plant and animal specimens for scientific or systematic references.

## **RECOGNITION AWARDS**

**New National  
Scientists**

Three eminent scientists were conferred the rank and title of *National Scientist* last July 12, 1985 upon the recommendation of the Academy. The newly-named National Scientists were: Prof. Teodoro A. Agoncillo (posthumous), Dr. Encarnación Alzona and Dr. Hilario D.G. Lara. The National Scientist Award, which is the highest honor a man of science in our country can aspire for today, is given to scientists who have made exemplary contributions to science and technology.

### **Teodoro A. Agoncillo**

Prof. Agoncillo, considered as a radical historian, had been a major influence in Philippine Historiography, which reflects the Filipino point of view, from its beginnings, when it was largely unpopular, to the present when it is now integral with Filipino writing of history. He authored about 20 books and numerous articles. Among his books are: *Ang Kasaysayan ng Pilipinas*; *The Revolt of the Masses: The Story of Bonifacio and the Katipunan* (awarded first prize in the Republic Contest on Bonifacio and the First Epoch of the Revolution); *Malolos: The Crisis of the Republic*; *Philippine History* (adopted as the official textbook in Philippine History); and the *History of the Filipino People*.

For his contributions to literature and Philippine historical writing, the community of scholars, as well as private and public institutions, had given numerous awards and prizes. These include among others: cash prize and diploma of merit for winning the UP National Heroes Day Contest in Biography, 1941 and the first Commonwealth Literary Contest in History, 1940; Grand Prize for winning the Republic Contest on Andres Bonifacio and the First Epoch of the Revolution, 1948; First Prize in the short story contest (Tagalog Division) by the Carlos Palanca Memorial Awards for Literature, 1941; UNESCO Prize for the best essays on the characters of Rizal's novels, 1969; and the Pro-

fessional Award by the UP Alumni Association for Achievements in History and Scholarship, 1976. The University of the Philippines had given him the title *University Professor*, the highest academic appointment in any university.

Prof. Agoncillo obtained his Ph. B. and M.A. from the University of the Philippines in 1934 and 1935, respectively. He was born on November 9, 1912 in Lemery, Batangas. On January 14, 1985, he succumbed to a heart attack.

### **Encarnación Alzona**

The first Filipino woman with a Ph. D. degree, Dr. Alzona has made significant contributions to Philippine History. Now an Emeritus Professor of History, University of the Philippines, she was mentor to a generation of other eminent historians in the period of transition after the Philippine Revolution and the war against the United States to the present time. A prolific writer, some of her works have already become classics, particularly her *A History of Education in the Philippines*. Her other writings on notables of the post-revolutionary era have made available to our people a legacy of the past which has been illuminated for us in a unique way because of her proximity in time to those parts of history and its participants.

A much-honored preceptor in the tradition of the academic guild, Dr. Alzona has received practically every distinguished award the country can bestow upon her. Some of these were: Barbour Fellowship, University of Michigan, 1933; Lone Prize, awarded by the II Congrèse de Hispanistas de Filipinas, 1954 for *El Legado de España a Filipinas*, a historical monograph; Apolinario Mabini Centennial Award, National Heroes Commission, 1951; Rizal Pro Patria Medal, Republic of the Philippines, 1971; Republic Cultural Heritage Award for Historical Writing, 1966 and the Award of Distinction, Philippine Institute of Republic Opinion, 1961.

The academic achievements of Dr. Alzona bespeak of herself. She obtained her B.S. and M.A. from the University of the Philippines in 1918. She earned her A.M. at Radcliffe College in 1920 and her Ph.D. at the Columbia University in 1922.

### **Hilario D.G. Lara**

Dr. Lara has been recognized for his pioneering contributions to public health and public health education in the Philippines. His studies on the epidemiology of cholera, typhoid fever, dysentery, measles, and diphtheria led to the control of these diseases in the country. He is also known for the founding and developing of the present Institute of Public Health, University of the Philippines thus enhancing the progress of medical science in the country.

Dr. Lara authored 42 scientific and technical publications; most of them were pioneering works and two were published in the *American Journal of Hygiene* and *American Journal of Public Health*.

This distinguished medical man obtained his M.D. from the University of the Philippines in 1919 while his M.P.H. and Dr. P.H. from the Johns Hopkins University in 1923 and 1924, respectively. He was three times fellow of the Rockefeller Foundation, recipient of the Meritorious Service Medal, Philippine National Red Cross and listed in the *American Men of Science* and *World Biography*.

Born on January 15, 1894, in Imus, Cavite, Dr. Lara at 92 does not look his age. Though no longer active in research, he busies himself writing treatises and memoirs.



*President Marcos conferring the National Scientist Award on Dr. Hilario D. G. Lara while Science Minister Emil Q. Javier, National Scientist Encarnación Alzona and Dr. Anacleta Agoncillo look on.*

#### **New Academicians**

For their outstanding achievements in science and technology, three scientists joined the roster of Academicians in 1985. They were Drs. Quintin L. Kintanar, Quirino O. Navarro and Gregorio F. Zaide. As Academicians, they now belong to the collegial body, the NAST, which is composed of scientists who have demonstrated and earned distinction in independent research or significant innovative achievements in the basic and applied sciences, as manifested by their published works in recognized scientific and technical journals.

#### **Quintin L. Kintanar**

Dr. Kintanar is one of the very few researchers in the country who possesses an academic degree of Ph. D. over and above a professional degree of M.D. which he obtained from the Johns Hopkins University in 1969 and the University of the Philippines in 1961, respectively.

Equipped with these academic achievements, Dr. Kintanar has from then on distinguished himself in the fields of pharmacology and environmental science through original researches that advanced the frontiers of knowledge in these fields. He investigated the mechanisms of fatty liver and hypotidemia induced by orotic acid thus assisting in the clarification of the molecular mechanisms of lipoprotein biosyntheses. He also pioneered in the pharmacological screening of Philippine plants using multidimensional observation technics. Noteworthy also are his contributions in the studies of the pharmacology and toxicology of local plants such as pandacaqui as anticancer agent; coconut water as an intravenous fluid for emergency rehydration; and the drug requirement of the Philippines based on morbidity and mortality data. He also headed the team that undertook the preparation of the environmental impact statement for the Southern Negros Geothermal Project.

Prior to his election to the NAST, Dr. Kintanar was already being recognized for his accomplishments and contributions to science. In the 60's, he received the Burke Award for Excellence in Cardiovascular Medicine and the Republic Cultural Heritage Award for Science. He also won First Prize in the Manila Medical Society Research Contest. The following decade, he became recipient of the Ten Outstanding Young Men (TOYM) Award for Science, 1975; President Manuel A. Roxas Medallion for Science, 1975; and First Prizes in the PMA-Abbot Award (Applied Science) and the 1979 NSDB Researcher of the Year. In 1981, Dr. Kintanar received the UP Alumni Association Professional Achievement Award in Science and was cited in the 1980 editions of the *Outstanding Leaders of the Philippines, Men of Achievement* and *Who's Who in the World*.

Dr. Kintanar, who is better known as the Deputy Director General of the National Science and Technology Authority (NSTA), was born on August 12, 1937 in Cebu City.

### **Quirino O. Navarro**

Dr. Navarro holds a degree in Chemistry obtained from the University of the Philippines in 1956 and a Ph. D. in Nuclear Chemistry from the University of California at Berkeley in 1962. He has worked, however, on nuclear and solid state physics and now classifies himself as a physicist.

A significant contribution of Dr. Navarro to science was the determination of the nuclear property in the isotopes of californium, einstenium and dysprosium using cryogenic techniques. His findings were cited in two books and three international reference tomes on nuclear science and later confirmed at the University of California at Berkeley with the use of more advanced instrumentation. Dr. Navarro has also worked on neutron spectrometry and crystallography; and electronics and instrumentation process.

Dr. Navarro is author/co-author of about 61 scientific and technical articles published here and abroad. He joined the Philippine Atomic Energy Commission (PAEC) in 1964 as a Nuclear Physics Research Specialist and rose to his present position as Associate Commissioner in 1984.

Dr. Navarro was born on March 29, 1936 in Pinamalayan, Oriental Mindoro.

### **Gregorio F. Zaide**

Perhaps very few have not heard of the name Gregorio F. Zaide. High school students, as well as college students, know him very well through the history books and articles he authored. The hardworking scholar that he is, Dr. Zaide has to his name 67 books and more than 500 articles published in local and foreign periodicals.

The noted historian obtained his Ph. B. and M.A. in History at the University of the Philippines in 1921 and 1931, respectively. Three years later, he earned his Ph. D. in History at the University of Sto. Tomas. He retired as Full Professor and Head, Department of History of the Far Eastern University (FEU) in 1964 and was the first FEU Professor Emeritus.

For his accomplishments, Dr. Zaide received the Diploma of Outstanding Writings on Filipino National Heroes; a Special Prize in History in the 1940 Commonwealth Literary Contests; the Republic Cultural Heritage Award of 1968 for his outstanding contribution to historical writing; the diploma of Distinction for valuable researches on the life and works of Dr. Rizal; the Distinguished Public Service Award, among others.

Dr. Zaide is the only Filipino member of the following prestigious historical societies: American Historical Association, Washington D.C.; Pan-Americano de la Historia y Geografica, Mexico City; and the Historical Association, London.

A native of Pagsanjan, Laguna, Dr. Zaide was born on May 25, 1907. At present, he is still active in historical studies and writing history textbooks for high schools and colleges.



*Science Minister Emil Q. Javier investing Dr. Duirino O. Navarro and Dr. Quintin L. Kintanar as Academicians.*

#### **1985 Outstanding Young Scientists**

Eight scientists received this year's Outstanding Young Scientist (OYS) Award during the closing ceremonies of the National Science and Technology Week in Malacañang on July 12, 1985. The OYS Award is given annually by the Academy to scientists not more than 40 years old in recognition of their outstanding achievements in their fields of specialization. The award carries with it a cash prize of ₱10,000 and a Presidential trophy.

#### **William D. Dar — Horticulture**



Dr. William D. Dar was chosen in recognition of his researches in the field of agriculture, some of which are the seed production of lucrative vegetable crops in some areas of the Philippines which could cut down seed importation cost; the determination of the needs and problems of Benguet farmers which were used as bases for implementing a Ford Foundation financial undertaking; the identification of drought-resistant potato varieties being recommended for areas which lack water supply; and the production systems of some major high income vegetable crops.

A Ph. D. degree in horticulture from the University of the Philippines at Los Baños, Dr. Dar is presently Vice-President for Research Development and Support Services and concurrently, Research Director of the Highland Agricultural Research Center, La Trinidad, Benguet. He was born on April 10, 1953 in Sta. Maria, Ilocos Sur.



### **Alumanda M. de la Rosa – Biochemistry**

In recognition of her researches in the fields of radiation chemistry and biochemistry which find application in radiation carcinogenesis, radiation therapy and food irradiation and other areas of biological research, Dr. Alumanda de la Rosa was chosen as an awardee.

Dr. de la Rosa's research on the high energy irradiation of *E. coli* membrane vesicles is one of the first studies on the effects of ionizing radiation on the structure and functions of biological membrane with isolated membrane vesicles as model systems. The study has contributed new knowledge on the role of the plasma membrane as an important radiation target. Likewise, her research on the utilization of agricultural cellulosic waste materials for energy production through the application of atomic energy won her third prize in the 1982 NSTA Most Outstanding Research Award. This study showed the enhancing effect of gamma radiation in the rate of acid and enzymatic hydrolysis of cellulosic wastes.

For her achievements, Dr. de la Rosa was awarded the 2nd prize, 1980 PAEC Most Outstanding Researcher and an EEC Postdoctoral Fellowship to Rome in 1984. She obtained her Ph.D. in Biochemistry at the University of Hawaii through two fellowships: the IAEA Academic Fellowship and the Cancer Center of Hawaii Doctoral Research Fellowship.

Dr. de la Rosa is a Nuclear Research Specialist at the Philippine Atomic Energy Commission. She was born on March 17, 1947 in Tayum, Abra.



### **Ann Inez N. Gironella – Statistics**

The OYS award of Dr. Ann Inez Gironella was in recognition of her contributions to the science of statistics – in theoretical statistics, efficient methods of estimation and hypothesis testing was shown by her treatises on robust procedures in the analysis of linear models; in applied statistics, a standard system of sizing fitted to Filipinos was based on her findings; and as a professor, she helped develop a simplified method in presenting basic concepts of statistics in textbooks.

Dr. Gironella is a Ph. D. graduate from the Kansas State University, U.S.A. In 1983, she was a recipient of the UPLB Distinguished Teacher Award for the Physical Sciences. She was also a SEARCA Professorial Chair holder for Statistics, UPLB in 1980-82. At Kansas University, she was named Outstanding Graduate Student in Theoretical Statistics in 1978.

At present, Dr. Gironella is Associate Professor of Statistics, Institute of Mathematical Sciences and Physics (ISMP), College of Arts and Sciences of the University of the Philippines at Los Baños. She was born on January 8, 1946 in Manila.



### **Jose A. Magpantay – Physics**

In recognition of his researches in high energy physics, the field of physics which aims to explain the fundamental particles and their interactions, Dr. Jose A. Magpantay was chosen OYS awardee. In particular, he has worked on various technical problems in gauge theories like invariant formulations, symmetry breaking and restoration, and the problems in quantization. These researches are important to man's understanding of the

fundamental structure of the matter. An understanding of the basic constituents of matter usually leads to concrete technological innovations which can benefit mankind.

Dr. Magpantay obtained his Ph. D. in Physics at Purdue University, West Lafayette, U.S.A. in 1980. He was a NSDB scholar from 1968-1974 at the University of the Philippines. From 1980-82, he became recipient of a Postdoctoral Fellowship at the International Centre for Theoretical Physics, Trieste, Italy.

Dr. Magpantay is connected with the National Institute of Physics, University of the Philippines. He was born on January 11, 1952 in Manila.



### **Corazon M. Raymundo — Population Science**

Dr. Corazon Raymundo was chosen OYS in recognition of her significant contributions to the development of demography as a discipline and for the application of population studies to development planning and population program implementations. The quality and appropriateness of her research output is attested to by the manifold uses — policy formulation, human resources development, intervention schemes — to which such research has been employed by government agencies.

Most important awards of Dr. Raymundo include: Harvard University Grant, United Nations Fund for Population Assistance Grant, UP Population Institute Professorial Chair and UP Diamond Jubilee Professorial Chair.

Dr. Raymundo is a product of Harvard University where she obtained her M.S. and D. Sc. in Population Sciences. She is now connected with the Population Institute of the University of the Philippines as a Balik Scientist awardee in 1980.

Dr. Raymundo was born on August 5, 1946 in Pasig, Metro Manila.



### **Mediadora C. Saniel — Medicine**

The choice of Dr. Mediadora Saniel was in recognition of her researches on the epidemiology on diarrheal diseases, including morbidity patterns in different socio-economic groups, seasonality, risk factors and etiologic agents which are basic information in the formulation of a strategy in controlling diarrheal diseases, a leading cause of morbidity and mortality among infants and young children in the country. Likewise, her study on rotavirus diarrhea provides the basis for future trials of a rotavirus vaccine.

Dr. Saniel obtained her M.D. from the University of the Philippines in 1972. She went on a residency in medicine at the D.C. General Hospital, Washington D.C. from 1975-76 and a fellowship in infectious diseases at Wayne State University, Detroit, Michigan from 1976-79.

Dr. Saniel is Chief Science Research Specialist and Head, Research and Training Division, Research Institute for Tropical Medicine in Alabang. She was born on April 26, 1949 in Catbalogan, Samar.

### **Amaryllis T. Torres — Psychology**

In recognition of her researches in population, industrial psychology, social development and participatory strategies and in evaluation studies, as well as her work on human



development training which have made substantial contributions to the development of knowledge in several areas of social psychology, Dr. Amaryllis Torres was chosen OYS.

Dr. Torres earned her undergraduate and graduate degrees in psychology at the University of the Philippines. In 1984, she was recipient of a UP Diamond Jubilee Professorial Chair in Community Development Practice.

She is at present the Director for Research Development and Evaluation, NSTA-Assisted UP System Integrated Research Program "A" and at the same time Associate Professor of Community Development, University of the Philippines.

Dr. Torres was born on December 31, 1945.

#### **Regalado G. Zamora — Animal Science**



Dr. Regalado Zamora was named OYS in recognition of his researches in animal science (nutrition) which generated interest in the utilization of indigenous and inexpensive materials as feed for growing and finishing swine; his pioneering work in using computer for least cost formulation of swine and poultry rations; his book on *Feed Composition Tables for the Philippines* which is widely used in the livestock industry.

Dr. Zamora obtained his Ph. D. in Animal Nutrition from the University of Missouri in 1978. For his achievements, he has received the following awards: ESAR Outstanding Young Man in Animal Science, 1980; Best Paper Award in Animal Nutrition, 1981; and Best Paper Award in Swine Production, 1983 and 1984.

Dr. Zamora was born on July 18, 1948 in Candon, Ilocos Sur.

### **INTERNATIONAL LINKAGES**

#### **Indian Scientists on Exchange Visits**

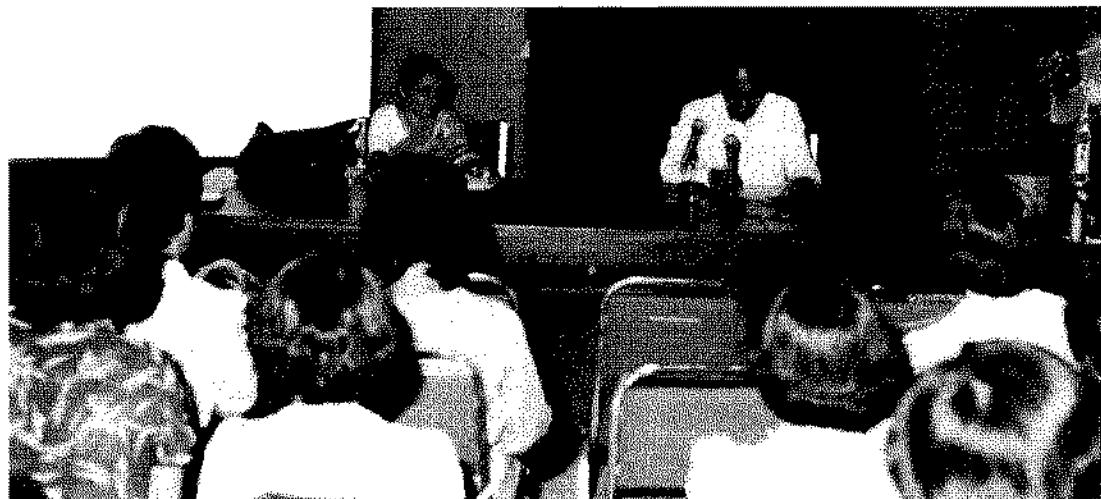
Three Indian scientists came to the Philippines on a three-week study visit under the exchange agreement between the Academy and the Indian National Science Academy (INSA) this year. They were Drs. Kubra Bano, Ramesh C. Tiwari and Anjana Mazumder.

Dr. Bano who is an eco-physiologist from the University of Agricultural Sciences, Bangalore, India was in the country from January 28 to February 15 to discuss with our scientists about vermiculture technology, especially the cultivation of earthworms for livestock feed. During her stay, she had meetings with vermiculture specialists/earthworm raisers and visited a number of institutes, especially those with vermiculture projects such as the Manila Earthworm Center, Bureau of Animal Industry, BIOTECH and the Central Luzon State University. She gave a lecture on vermiculturing and vermicomposting before researchers at the NSTA.

The next to visit was Dr. Tiwari who was here from April 21 to May 12. Dr. Tiwari, a soil fertility specialist, is connected with the Institute of Agricultural Sciences, Banaras Hindu University in Varanasi, India. While in the country, he shared experiences and findings he obtained relating to different aspects of soil fertility and its management. Some of his researches are on the inclusion of legumes in cropping sequence to economize the use of nitrogenous fertilizers, fertilizer management in sequential crop-

ping, crop residue management and green manuring and management of micronutrients. Dr. Tiwari met with soil experts at the International Rice Research Institute, UP at Los Baños, Gregorio Araneta University Foundation, Mariano Marcos State University and the Central Luzon State University. He also went to Iloilo City to visit the KABSAKA Project Management Unit of the Ministry of Agriculture which introduced a multiple cropping technology to rainfed lowland rice areas in Iloilo Province. During his visits to these institutes, Dr. Tiwari delivered lectures on soil fertility management and efficient use of fertilizer in drylands.

Dr. Mazumder is a biochemist from the Indian Institute of Chemical Biology, Calcutta, India. During her visit, from August 21 to September 7, she gave seminars on protein chemistry at the Department of Biochemistry of the College of Medicine, University of the Philippines. She also conducted some experiments with Dr. Milagrosa R. Martinez at the Institute of Biological Sciences, College of Arts and Sciences, UP at Los Baños on waste utilization by algae.



*Dr. Kubra Bano with Dr. Melecia S. Magno during a lecture at NSTA.*

**Nobel Laureate as  
Philippine Scientific  
Community Guest**

Professor Sir George Porter, 1967 Nobel Prize winner in chemistry, visited the country on May 6-9, 1985 at the instance of the Academy. His visit was in line with the Academy's effort to bring world renowned scientists to speak before the scientific community.

Prof. Porter who was recognized for important new development of very fast chemical reactions, delivered a lecture at UP Diliman's Dept. of Chemistry. He also received an honorary degree in science at the same university.

**The Contribution of  
Chemistry and the  
Chemical Industry  
to Mankind by Sir  
George Porter**

The following was his address during the conferment ceremonies:

I recognize that you invite me here as a representative of science and it is about this that I should speak. I love science and believe that increasingly the world is dependent on the efforts of scientists and technologists to solve its problems.

Science has, of course, *created* some of these problems. By prolonging life, it has created a population explosion. Even its chemical factories and its energy sources like nuclear reactors have had their accidents and killed a few people.

Throughout history, the lot of most mankind has been rather miserable. Until a few centuries ago it was real slavery and, into the last century, although legally free, most men and women had to labour so hard to earn a living that they were effectively slaves to their work. Different professions have had different approaches to this problem. As Max Perutz has put it "The priest persuades humble people to endure their hard lot, the politician urges them to rebel against it and the scientist thinks of a method that does away with the hard lot altogether."

No branch of science has done more or promise more in this connection, than chemistry. Man is himself a biochemical system living in a chemical world. His *health* has been improved out of all recognition by the introduction of drugs which have doubled his lifespan and made it possible for many handicapped people to lead a more normal life. His *wealth*, judged in terms of availability of necessities is, on the average, many times what it was even a few decades ago. The "green revolution", which was largely a chemical revolution made possible by the increased availability of fertilisers and the destruction of pests, by chemical herbicides, insecticides and fungicides, has made it possible to feed the whole world from the land presently under cultivation and still have a food surplus.

Although a food surplus is never a sufficient guarantee, it is a necessary condition for defeating starvation.

Only slightly lower on the scale of necessity are the plastics, fibres, detergents and paints which have made it possible for everybody to be well clothed (though not all may want it!) and to live in a bright, clean environment without having to employ labour of others to keep it so. This material wealth which has become so much part of everybody's life, often owes at least as much to chemistry as to the other technologies.

This is obvious with cosmetics, motor fuels, and dyestuffs but it is also true of electronic devices of every kind, and mechanical labour-serving appliances. Some of the largest manufacturers of heavy electrical equipment employ more chemists than physicists and, on the newer and lighter side, the *chip* is a highly purified chemical element treated with other elements in a very sophisticated, chemically pure environment.

As a chemist, I take a broad view of chemistry and define it as the study of the structure and behaviour of matter in terms of the units of which it is composed. I make no apology that this includes nuclear and particle physics as well as most of solid state science; after all chemists discovered the atomic and electrical structure of matter and had a very hard time, for several decades, convincing the physicists of their existence. Rutherford said chemistry was a branch of physics and was quite properly, rewarded with the Nobel Prize for chemistry. I make no apology, either, for including biochemistry, and biophysics as part of chemistry, in fact all the biosciences, except the macroscopic medical and behavioural sciences, are essentially the study of chemical structures and processes.

Chemistry has removed many of the main causes of extreme unhappiness, the sheer misery of pain for example. Who, today, would be brave enough to face an operation,

even the removal of a large tooth, without anaesthetics, originally introduced by Humphry Davy? And even the **necessity** for toothache is rapidly disappearing with improved knowledge of the chemical processes of decay, and the recognition of the damage which insufficient fluoride can do. The anti-fluoride lobby is, of course, one example of how people, sometimes with good intentions but usually ignorant of chemistry, can cause misery and suffering to millions of children, which may remain with most of their lives.

At the deeper level, much suffering has been caused throughout the ages by unwanted pregnancies. The social climate has changed to reduce its social stigma but the unwanted child is still as cause of much misery, for both parents and child, and the pill has removed much unhappiness from the world.

The green revolution, did exactly what the King of Brobdingnag of Gulliver's travels had asked for and "made two ears of corn or two blades of grass grow where only one grew before" and those who brought it about, according to the King, "would deserve better of mankind and do a more essential service for the country than a whole race of politicians put together." This was a proud achievement of chemistry, depending heavily on fertilisers and new insecticides, plant growth substances and the like. Since the war, the improvement of food productivity has been quite dramatic. In Britain, the same area of land yields twice as much wheat or potatoes, and the cow gives twice as much milk, using less land. Fewer farm workers on less land supply a larger and better fed population with less imports and £1500 million worth of exports of farm products.

Similar success stories are to be found in most other countries, including the developing ones.

How did mankind welcome these achievements? Did everybody thank the chemist and congratulate him on what had been done for the benefit of mankind? Well not really! A decade or two ago, a period of increasing depression began throughout the world of science and technology. The "post industrial revolution" was discovered. Rachel Carson's book, "The Silent Spring", was followed by Alvin Tofler's "Future Shock", Theodore Roszak's "Making of a Counter Culture" and many others in similar vein. The Club of Rome extrapolated the rapid technological growth of time to show the obvious: that anything which continues to grow indefinitely eventually runs out of steam. All technology became suspect and none more suspect than chemistry. Quite quickly the idea of "Better living through Chemistry", promoted by the Dupont Company and generally accepted, was transformed into an association of chemistry, in the public mind, with pollution, world shortages and the inequities of the multinational corporations.

Many of the essentials to the green revolution, such as insecticides, became primarily, in the layman's mind, destroyers of life although the high yields depended on these substances as much as upon fertilisers because food plants have to compete with weeds and pests, viruses and fungi. Without these pesticides and weed killers, the production of grain would fall by nearly a half in three years and we would have a famine of catastrophic proportions, like the Irish potato famine, which was caused by fungal infection. This is the prospect for so called "organic farming". DDT is no more toxic to man than is aspirin and less so than the organic phosphates and carbamates which superseded it. It eliminated plague and typhus and, less completely, malaria, from most parts of the world.

The memory of how the people of the world suffered without science is soon lost, and,

for younger people, was never known. With the help of the media, they see only the remaining problems and human errors, some of which we can solve and prevent but some of which we shall always have to live with. Is it ethically more justified to take life by intentionally doing nothing than by some positive action which unintentionally causes death? We can introduce safer motor cars up to a point, eventually the only way to further safety is to give up your car, and most people decide that the risk is worth it, even though it is the second most important of untimely death in the developed countries.

If anybody thinks that these attitudes are becoming a thing of the past, let me quote from an article by Peter Simple in his column "The way of the world" in the Daily Telegraph, 27/3/85. He was commenting on the remarks made by the Bishop of Durham in his maiden speech of the House of Lords, in which the Bishop, surprisingly, chose as his subject the importance of training for the new technology by a "general insistence on literacy and numeracy. "It is clear" said the Bishop, "that to have the sort of collaboration that is required between the arts, social sciences, applied science and so on, they must be able to develop in the artist a sense of what it is to be numerate". Peter Simple's response to this was vitriolic. He harked back to the Leavis and Snow controversy and said "He" (the Bishop) might have questioned it, in the name both of his region and of truly human life and truly human life and civilisation. He might have asked his fellow peers, at least, to pause for a moment in their worship of that received wisdom and look about them at the world it has made for us and the **worse** world it is making for our children.

There is little encouragement here for those who are trying to give our children a better life, and a better understanding of the world in which it has to be lived. They have to be if they have to learn to walk and propel food to their mouths. A little later, they ask questions about their world which are almost all scientific ones.

Science is part of us. It is just knowledge, knowledge of the natural world and ourselves. The opposite of science, and the only alternative, is ignorance. All children are born scientists.

My place of work is the Royal Institution. It has two objectives which, it seems to me, are the most important in our modern civilisation. The first is to advance knowledge by research, and that needs little justification. The second is to inform all people about the world in which they live and how it works; that is, to tell them about the great advance of science — to popularise science.

The popularisation of science is not always popular, especially among the scientists. The ignorance of science among the general public is deplorable and leads to many misunderstanding. But it is often the scientist himself who is to blame. He sometimes likes to pretend that it is far too difficult to explain even the simplest scientific truth to people who have not worked as hard as he to get a professional qualification in science. Partly because of this, there are many who feel that science is a remote, technological and rather inhumane subject, far removed from the deeper meaning of life, from the arts, from philosophy, from religion and so forth. I do not subscribe to this view. Let's look at them in turn.

The arts are different. The artist says "this is how I see it" whilst science says "this is how it is". Ultimately, however, they can be connected. Great insight in science requires imagination and some dreaming. But, unlike the arts, science must later be subject to reason so that a common understanding can be obtained between all people.

Philosophy is indistinguishable from science. Science is natural philosophy, the rest must be therefore, I suppose, unnatural philosophy.

Religion seems quite different, but even here, there is a common purpose. The great religions have, like science, always sought to discover and interpret the purpose of life. The first chapter of Genesis was an early brave attempt at a theory of evolution and cosmology.

Science is knowledge; it puts immeasurable possibilities into our hands, for good or ill. Just as the discovery of iron led to swords as well as ploughshares, so any scientific discovery can be used for good or for evil purposes. If mankind is intrinsically good, as we must hope he is, all will be well and he will benefit immensely from his new knowledge. If he is not, then there is nothing that we can do for him, with or without his science.

In the developing countries, science is not merely helpful, it is essential if they are to achieve anything like the standard of living of the more developed countries. With science this *can* be achieved. There is enough food for all, merely better distributions is necessary. Our second essential requirement, energy, is more difficult, and even the maintenance of our present food supplies, depends on energy.

There is *not* enough energy to go round for the burgeoning populations of the world, especially since, if they wish for European standards, each individual must, on the average, be given about five times what he gets at the present time and the population must be inevitably double, which means ten times the present energy requirement. This is one of the challenges for science in the twenty-first century and I am confident that it can be solved, mainly by using the renewable source of energy which has sustained us from the beginning of life on earth, the sun.

I have spoken about this before. It is partly to be attained by better agriculture, and Manila is a leader in this through the research of such people as Dr. M.S. Swaminathan of the International Rice Research Institute. And it will be attained also through the development of chemical and physical methods for the capture and storage of solar energy.

Unfortunately, although natural photosynthesis is, as always will be, our principal or only source of food. Its efficiency, as a source of fuel, is very low — worse than 1%. It is, therefore, important to look for better sources because even if we can afford the increasing costs, fossil fuels will be gone in a few generations.

Man needs energy as heat (or more usually here, cold which also needs energy), also needs electricity and stored chemical energy, i.e. fuel. This last one, fuel, is the prime requirement, the others are then obtained from it when needed..

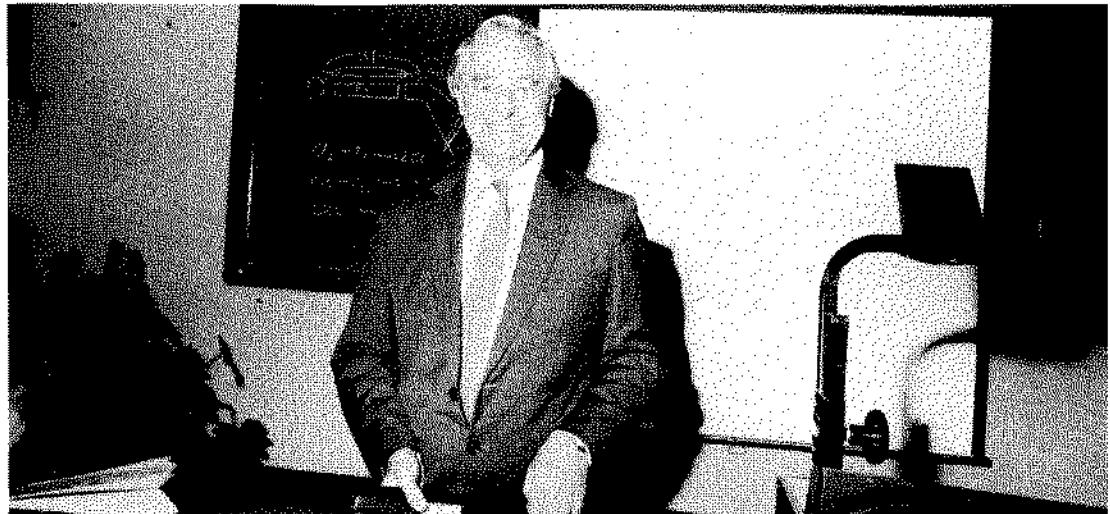
Photosynthesis, the source of all our fuels at present, is really the splitting of water by sunlight, to give hydrogen and oxygen. Chemists can now do this artificially but many problems and challenges remain. Very recently, the use of amorphous silicon to make photovoltaic cells has become possible in a continuous process, making rolls hundred of feet long with solar efficiencies approaching 10% and with the possibility of 30% in future. They can be used to make hydrogen from water, and could be economically competitive with oil power within few years.

With this efficiency, we can visualize a future scenario where man's two principal requirements, food and fuel are provided, for all mankind by the sun, and the amount of land needed to make the fuel would only be 3% of that used to grow food. And of course, this could be useless desert land.

If this projection is correct, solar photocells and photochemistry will become the largest industry of tomorrow, just as the oil industry is the largest today. It is a great challenge to scientists and technologists of all countries.

Here you are very fortunate in that the sun shines on you most of the time, certainly more fortunate than we are in Britain, and I hope that the scientists of this country will play a leading part in exploiting this clean and abundant source of energy for their own country and therefore for the benefit of the whole of mankind.

**"In the developing countries, science is not merely helpful, it is essential if they are to achieve anything like the standard of living of the more developed countries."**



Sir George Porter takes a pose from his lecture at UP Diliman.

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### **Biological Sciences**

*Gregorio T. Velasquez, Ph. D.*

- The Technology of Research in the Blue-Green Algae and Relevance to Philippine Economy. *Trans. Nat. Acad. Sci. and Tech. (Phil.)* 7: 119-121.

*Joventino D. Soriano, Ph. D.*

- Intraspecific Karyotype Differences and Morphological Variations in Sorghum. *Trans. Nat. Acad. Sci. and Tech. (Phil.)* 7: 69-83.
  
- Induction of Useful Mutations in Peanut (*Arachis hypogaea* L.) Proc. Int'l. Sympo. Mutation Breed. *In Vitro* Biotech. Beijing 1985 (in press).
  
- Efficient Induction of Mutations Through Seed Irradiation. State-of-the-Art Seminars Biological Sciences Division, NAST (in press).

*Jose R. Velasco, Ph. D.*

- Current Effort in Plant Eco-physiology. State-of the Art Seminars, Biological Sciences Division, NAST (in press).
  
- Boron Deficiency in Adobe-Derived Soil of Eastern Cavite. *Trans. Nat. Acad. Sci. and Tech.* 7: 105-116.

*Carmen C. Velasquez, Ph. D.*

- Cestodes from Philippine Freshwater Fishes (in press).
  
- Parasitic Helminths of Fishes in Integrated Animal-Fish Farms in the Philippines (in press).
  
- Philippine Science Encyclopedia: Biological Sciences (in press).

*Magdalena C. Cantoria, Ph. D.*

- Notes on Two *Mentha* Hybrids Grown in the Philippines. *Trans. Nat. Acad. Sci. and Tech. (Phil.)* 7: 27-45.

*José Encarnación, Jr., Ph. D.*

- Consistency Conditions for Group Decisions. *Trans. Nat. Acad. Sci. and Tech. (Phil.)* 6: 183-190.
- Becker on the Interaction Between Quantity and Quality of Children. *Phil. Journal of Economics and Business* 21: (1 & 2): 113-115.

*Gelia T. Castillo, Ph. D.*

- Women, Water and Sanitation, in *Women Issues in Water and Sanitation* IDRC 236e Proceedings Series, pp. 85-98.

*Gregorio F. Zaide, Ph. D.*

- *The World: Conceptual-Chronological Approach.* Published by the National Book Store and approved textbook by the Ministry of Education, Culture and Sports, 4th Year in Public and Private Schools. 201 printed pages, illustrated (English Edition).
- *Ang Daigdig.* Filipino Edition. 277 printed pages, illustrated. Published by the National Book Store.

**Agricultural Sciences**

*Faustino T. Orilla, Ph. D.*

- The Phytopathogenic Fungi: Man's Formidable Adversary. *Philippine Agriculturist (in press)*.

**Health Sciences**

*Benjamin D. Cabrera, M. D.*

- Vector Mosquitoes of *Wuchereria bancrofti* at Bicol Region in the Philippines. I. Transmission Capability. *Japan J. Exp. Med.* 52(2): 61-65.

**Academician  
Update**

*Acad. Cabrera*

- Recipient, *Diamond Jubilee Professorial Chair Lecture*, Institute of Public Health U.P. Manila.

*Acad. Castillo*

- Recipient, *Professional Award in Social Sciences*, International Social Science Honor Society of Pi Gamma Mu, Alpha Chapter, U.P. Diliman, April 11, 1985.
- Recipient, Award of Distinction in Rural Sociology, College of Arts and Sciences Alumni Association Diamond Jubilee Celebration of the Liberal Arts Program, June 15, 1985, U.P. Diliman.
- *1984 Outstanding Researcher Award.* U.P. 77th Foundation Day, Recognition Day Program, June 18, 1985, Diliman, Quezon City.

- Visiting Scientist at IRRI for a year beginning November 15, 1985 to assist in the development and coordination of a 6-country research network' on Women in Rice Farming Systems.
- Chaired an ad hoc committee on the Review of the Agriculture Food and Nutrition Sciences (AFNS) Division Program of the International Development Research Centre (IDRC) of Canada.

*Acad. Dayrit*

- Recipient, *Distinguished Teacher Award* of the Philippine Heart Association, 1985.
- Recipient, *Professional Achievement Award in Medicine*, University of the Philippines Alumni Association, 1985.
- Recipient, *Most Outstanding Phi Award* of Phi Kappa Mu Fraternity of the UP College of Medicine, 1985.
- Head of Delegation, Third Study Team on Herbal Medicine to the People's Republic of China, October 19 to November 2, 1985.

*Acad. Encarnación*

- Participant, Seminar on Scientific Cooperation Between the Friedrich Ebert Foundation and the U.P. School of Economics, May 4-10, 1985, Bonn, Federal Republic of Germany.
- Presented a paper, Fifth World Congress of the Econometric Society, August 17-20, 1985, Cambridge, Mass.

*Acad. Escuro*

- Participant, International Rice Genetics Symposium, May 27-31, 1985, IRRI Los Baños.

*Acad. Favila*

- NAST Fellow in Mathematics for 1985.

*Acad. B. Juliano*

- Recipient, NRCP 1985 Achievement Award in Cereal Chemistry.
- Participant, Lectures on Rice Grain Quality, China National Rice Research Institute, Hangzhou, June 23-July 3, 1985.
- Presented a paper, XIIth International Congress of Nutrition, Brighton, UK, August 19-31, 1985.
- Presented a paper, 1985 Starch Science and Technology Conference, Orlando, Florida September 19-21, 1985.
- Presented a paper, 71st Annual Scientific Meeting American Association of Cereal Chemists, Inc., Orlando, Florida, September 22-26, 1985.

- Presented a paper, 35th Annual Conference, Royal Australian Chemical Institute Cereal Chemistry Division, Sydney, September 30-October 3, 1985.

*Acad. J. Juliano*

- Appointed President and General Manager, Interphil Laboratories, Inc.

*Acad. Lim-Sylianco*

- Recipient, UNEP Fellowship, 4th International Conference on Environmental Mutagens, Stockholm, Sweden, June 24-29, 1985.

*Acad. Magno*

- Completed 22 chapters of unit on physics and mathematics of *Science and Technology*, a project of NSTA.

*Acad. del Mundo*

- Official Representative of the Philippines, Board of Directors Meeting of the International Association for Maternal and Neonatal Health (IAMANEH), Berlin, Germany, September 8-13, 1985.

*Acad. Oliveros-Belardo*

- Recipient, *Distinguished Leadership Award for Achievements in the Field of Chemistry*, American Biographical Institute at North Carolina, USA, August 1985.
- NAST Research Fellow in Chemistry for 1985.

*Acad. Orillo*

- Recipient, Don Andres Soriano, Jr. Professorial Chair in Plant Pathology, January 31 to December 31, 1985.

*Acad. Soriano*

- Presented a paper, Int'l. Symposium on Mutation Breeding, Beijing, China October 1985.
- NAST Research Fellow in Biology for 1985.

*Acad. Velasco*

- Elected President of the Imus Institute, September 20, 1985.

*Acad. C. Velasquez*

- Member, Scientific Program Committee, The First Asian Fisheries Forum for 1985-86.

*Acad. G. Velasquez*

- Honored and received the *Order of the Oblation*, Dean's List, June 18, 1985.

# **Academy News**

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