

# NAST: The First Decade



National Academy of Science and Technology  
Republic of the Philippines  
1980

# **NAST: The First Decade**

Revised Edition



**National Academy of Science and Technology**  
**Republic of the Philippines**  
**1988**

**National Academy of Science and Technology**  
**DOST Administration Bldg.,**  
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## FOREWORD

*The first 10 years of any organization is always a momentous one in its history; specially so, in the case of academies of science which, by tradition, lasts for centuries.*

*I have been specially privileged to have been the President of the National Academy of Science and Technology (NAST) since its inception. I have played a key role in the implementation and expansion of its objectives; in establishing its rules and regulations; in formulating its operating procedures; and in shaping its practices and traditions. I have participated significantly in establishing linkages, domestically and internationally. Memoranda of Agreement were forged with foreign countries covering a large spectrum of needs in science and technology; and as its head, I represented the academy in major international scientific meetings and conferences.*

*During my incumbency, the needs of our Academicians and National Scientists were well attended. We succeeded in having the government extend to them monthly gratuities and honoraria for the rest of their lives, generous financial assistance for their medical needs, and various other benefits and recognitions they now enjoy.*

*For the Academy, it is heartwarming to note that our annual publication, "Transactions," is now the most significant scientific publication coming from this country; and our annual scientific conferences has earned the distinction of being the most prestigious scientific conference locally.*

*The Academy has actively participated in public discussions of national issues especially when it touches on science and technology. Its round table conferences has now become tradition; and the productivity and scholarship of its membership, as gauged by the number and quality of books they produced, has earned the respect of scientists abroad.*

*The National Academy of Science and Technology (NAST) looks forward with hope, optimism, and confidence; constantly aware of its role; and always in the service of our country and the whole of humanity.*

*Thank you.*

PAULO C. CAMPOS  
*President*

## ACKNOWLEDGMENT

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PAULO C. CAMPOS  
*President*

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# History

## **ESTABLISHMENT OF THE ACADEMY (1976-1978)**

Dr. Jose Rizal, the National Hero of the Philippines, extolled the Filipino genius thus:

Genius knows no country, genius sprouts everywhere, genius is like  
light, air, the patrimony of everybody, cosmopolitan like space, like  
life, like God.

In the late 1970s, the most illustrious scientific minds of the Philippines were finally organized in an academy of science. Inspired by such venerable institutions as the Royal Society of London, the Royal Society of Edinburgh, the Academie des Sciences in France, the Academy of Sciences in the Soviet Union, and the National Academy of Sciences in the United States, the Filipino scientists had long dreamed of an academy of science for outstanding scientists who have dedicated their lives to creative and scholarly work in the Philippines. In particular, the Filipino scientists foresaw the need for a body that would offer due recognition and provide incentives for scientific research and excellence. Thus, the National Academy of Science and Technology, also known as NAST or the Academy, was born in Metro Manila in early 1976. Since then, it has become the premier scientific society in the Philippines, counting among its membership some of the best and the brightest scientists in the country.

**Origins of the Academy.** The NAST originated as the brainchild of several scientists in the University of the Philippines (UP), the state university at Diliman, Quezon City. Among the notable members of this small group were Dr. Joventino D. Soriano, chairman, and Dr. Edito Garcia, Dr. Leopoldo V. Abis, Dr. Paz G. Ramos and Dr. Raul P. de Guzman, as members.

After a series of impromptu meetings held at the UP Office of Research Coordinator, the task of preparing a formal proposal for a science academy was assigned to Dr. Soriano, who led the initiative and had the facilities to draft what came to be known as the "UP proposal." He was then the director of the UP Office of Research Coordination, Acting Dean, U.P. Graduate School, and in-charge of the UP-NSDB Integrated Research Program of the National Science Development Board (NSDB), forerunner of the Department of Science and Technology, through which government agency the proposal for funding a science academy had to be coursed.

In May 1976, the proposal by the UP professors was submitted to Dr. Melecio S. Magno, who was at the time Chairman of the National Science Development Board (NSDB) with Cabinet rank. Chairman Magno fully endorsed the plan for a government-funded academy of science.

## ESTABLISHMENT OF THE ACADEMY

**Passage of the Enabling Legislation.** On October 6, 1976 a presidential decree creating the National Academy of Sciences was signed by President Ferdinand E. Marcos (P.D. 1003). This first decree was not implemented or published due to revisions immediately urged by leading academics from the social sciences, notably UP President Onofre D. Corpuz, a political scientist; National Economic and Development Authority Chairman Gerardo P. Sicat, an economist; UP Los Baños Chancellor Abelardo G. Samonte, a public administration expert; and Dr. Alfredo V. Lagmay, a psychologist.

The social scientists had objected to the restrictive provisions and title in the original decree (P.D. 1003) which made it impossible for certain categories of social scientists, technologists, and medical doctors with no graduate or doctoral studies to be a member of the proposed academy. Secondly, the title was deemed too elitist, hence the suggestion to add the term "technology" to the name of the academy.

Thus, on December 17, 1976 the enabling legislation was promulgated by President Marcos, amended as **Presidential Decree No. 1003-A**, "Creating the National Academy of Science and Technology." The two decrees — P.D. 1003 and P.D. 1003-A — were basically the same except for the title and the expanded membership. However, P.D. 1003-A came to be known as the enabling legislation which started the Academy.

It required the promulgation of a third presidential decree to finally place the Academy on its feet. Organization and funding problems delayed the implementation of P.D. 1003-A. Certain provisions in the enabling legislation had to be changed after two years had elapsed since its passage. Thus the full operation of the Academy required the passage of another presidential decree (P.D. 1557), which was approved on June 11, 1978.

**Objectives of the Academy.** The National Academy of Science and Technology (NAST), or the Academy, as originally embodied in P.D. 1003-A, was created to give recognition to outstanding achievements in science and technology and to provide meaningful incentives to those engaged in scientific and technological research. Thus was answered the long-felt need of organizing a group of distinguished men and women of science and of reawakening a keen interest in science and technology in the country.

Four objectives made crucial the establishment of the Academy. These objectives were to:

- Δ Implement the constitutional mandate to promote scientific research and invention as a priority in national development.
- Δ Provide meaningful incentives to those engaged in scientific and technological research.
- Δ Recommend to the President outstanding achievements in the sciences and technology for due recognition.
- Δ Help professionalize government scientific and technological research services.

In particular, the Academy was designated as the nominating body which shall choose the scientists to be accorded by the President the rank and title of "National Scientist," the highest award conferred by the government on a scientist.

**Membership in the Academy.** The Academy is composed of outstanding members of the scientific community of the country which serve as the reservoir of competent scientific and technological manpower for the country. Members are Filipino sci-

entists with doctoral degrees in any field of science from an accredited university who have demonstrated and earned distinction in independent research or significant innovative achievements in the basic and applied sciences. The doctoral degree requirement is waived in highly meritorious and exceptional cases. The sciences include agricultural, engineering, medical sciences, mathematics, physical, biological and social sciences. The prospective member is screened on the basis of his researches and published works in recognized scientific and technical journals.

The total membership is limited to 50 at any given time. Members to the Academy are nominated by at least three existing members and are approved by a majority of the full membership.

Membership in the Academy carries with it the title of "Academician" and various benefits and privileges, such as a monthly pension, medical benefits, free publication of scientific and technical works, travel support for attendance and participation in international conferences, and other incentives to promote scientific and technological achievement. Membership is for life unless terminated for cause or by voluntary resignation.

**Organization.** President Marcos appointed a committee of 10 scientists (representing the five major fields of science) upon recommendation of the NSDB Board of Governors. They constituted the screening committee to select the first members of the Academy. They were botanist Gregorio T. Velasquez; parasitologist Carmen C. Velasquez; animal scientist Francisco M. Fronda; health scientist Paulo C. Campos; health scientist Conrado S. Dayrit; economist José Encarnación, Jr.; psychologist Alfredo V. Lagmay; mathematician Bienvenido F. Nebres; statistician Tito A. Mijares; and physicist Gregorio Y. Zara.

On July 16, 1978, during formal ceremonies held at Malacañang Palace marking the occasion of the 20th anniversary of the National Science Development Board, President Marcos named the first ten members of the Academy. From them, three were proclaimed National Scientists and seven were named officials and members of the Executive Council of the Academy.

The first ten **Academicians** who were selected among 107 distinguished scientists and technologists in the country were as follows:

- **Paulo C. Campos, M.D.**, a nuclear scientist, endocrinologist and educator
- **Alfredo V. Lagmay, Ph.D.**, experimental psychologist
- **Cecilio F. Lopez, D. phil.**, linguistics expert
- **Tito A. Mijares, Ph.D.**, statistician and Executive Director of the National Census and Statistics Office
- **Juan S. Salcedo, Jr., M.D.**, former NSDB Chairman
- **Alfredo C. Santos, D. phil.**, pharmacologist
- **Dioscoro L. Umali, Ph.D.**, geneticist, plant breeder and top regional executive of the Food and Agriculture Organization
- **Carmen C. Velasquez, Ph.D.**, parasitologist
- **Gregorio T. Velasquez, Ph.D.**, phycologist
- **Gregorio Y. Zara, D.Sc.**, engineer and inventor.

Except for Dr. Umali who was on a foreign assignment, all Academicians were present and took their oath of office as the first group of NAST members before the President on July 16, 1978.

## ESTABLISHMENT OF THE ACADEMY

On the same occasion, President Marcos announced the first recipients of the National Scientist Awards, the nation's highest scientific decoration. For the first time, the Republic would honor its leading scientists not only with a Presidential citation and medal but also with a regular subsidy and other financial benefits. The first recipients of the National Scientist Awards were as follows:

- **Juan S. Salcedo, Jr., M.D.**  
Former NSDB Chairman and top government science adviser, for his contributions to the development of nutrition, public health and science policy
- **Alfredo C. Santos, Dr. phil.**  
For his contributions to the chemistry and pharmacology of Philippine medicinal plants
- **Gregorio Y. Zara, Ph.D.**  
For his contributions to aeronautical engineering, technology and education.



The President also announced the appointment of seven members of the NAST Executive Council who would be responsible for the administrative policies of the Academy. The members of the first NAST Executive Council were as follows:

- \* Paulo C. Campos
- \* Alfredo V. Lagmay
- \* Cecilio F. Lopez
- \* Tito A. Mijares
- \* Alfredo C. Santos
- \* Carmen C. Velasquez
- \* Gregorio Y. Zara

The NAST Executive Council members at once prepared to lay the ground for the operation of the Academy. Soon afterwards, the Council elected their set of officers. Dr. Paulo C. Campos was elected as the President. A topnotcher in the medical board exams, Dr. Campos has been noted for his pioneer medical work, teaching and administrative skills. Since 1978 he has served as President of this Academy, having been reelected twice by his peers.

The other officers elected were: Dr. Alfredo V. Lagmay, Vice-President, and Dr. Tito A. Mijares, Secretary. Rules and regulations of the Executive Council in conducting its business and meetings were also formulated.

With a Secretariat drawn from NSDB employees on a part-time basis, headed by Mr. Ricardo P. Venturina of the NSDB Chairman's Office, and only two full-time contractual employees, the Academy was initially housed in a small, shared office at the third floor of the NSDB Administration Building in Bicutan, Taguig, Metro Manila, near the South Superhighway.

Two weeks after the Malacañang presentation, the first ten members of the Academy met en banc to approve the rules and regulations implementing P.D. 1003-A on July 28, 1978. The rules and regulations covered provisions such as membership, administration, meetings, selection of National Scientists, annual report, and amendments.

With these necessary procedures in place, the Academy towards the latter part of 1978 began its task not only as a recognition body of outstanding achievements in science and technology as mandated but also as the premier academy of science in the country.

## THE FORMATIVE YEARS (1978-1981)

In its first three years of existence, the Academy accomplished its basic role as a recognition body of outstanding achievements in science and technology. Its Executive Council proceeded to tackle its other roles as science adviser, disseminator of scientific information, convener of scientific conferences, and a vehicle for closer cooperation among scientists both here and abroad.

**Organization.** Not yet a year old as an organized body, the Academy presented on May 29, 1979 the second and largest group of 13 new Academicians who were nominated and screened by the initial members. The new Academicians were as follows:

- Teodoro A. Agoncillo**, Litt.D. (hon.), historian
- Encarnacion Alzona**, Ph.D., historian
- José Encarnación, Jr.**, Ph.D., economist
- Pedro B. Escuro**, Ph.D., plant breeder
- Raymundo A. Favila**, Ph.D., mathematician
- Francisco M. Fronda**, Ph.D., agronomist
- Bienvenido O. Juliano**, Ph.D., chemist
- Melecio S. Magno**, Ph.D., physicist and science administrator
- Fe del Mundo**, M.D. pediatrician
- Geminiano T. de Ocampo**, M.D. ophthalmologist
- Eduardo A. Quisumbing**, Ph.D., taxonomist and orchidologist
- Jose N. Rodriguez**, M.D., leprologist
- Casimiro del Rosario**, Ph.D., physicist

Except for Agoncillo, Escuro and del Rosario who took their oath of office on separate occasions, the new Academicians were invested on May 29, 1979 at the Asian Institute of Tourism, Diliman, Quezon City.

This group was prominent not only in their scientific achievements but also because more than half of them became National Scientists within the relatively short period of eight years. Del Mundo and Quisumbing became National Scientists in 1980; De Ocampo, G.T. Velasquez and Del Rosario became National Scientists in 1982; Fronda and C. Velasquez in 1983; Alzona and Agoncillo in 1985; and Encarnacion in 1987.

The next year, on July 15, 1980, the NAST admitted seven scientists into its rolls. These seven new Academicians were as follows:

- Magdalena C. Cantoria**, Ph.D., botanist and pharmacologist
- Conrado S. Dayrit**, M.D., cardiologist and herbologist
- Emerita V. de Guzman**, Ph.D., plant physiologist
- Clara Y. Lim-Sylianco**, Ph.D., biochemist

- **Luz Oliveros-Belardo**, Ph.D., pharmaceutical chemist
- **Francisco O. Santos**, Ph.D., nutritionist-biochemist
- **Joventino O. Soriano**, Ph.D., cytologist and one of the originators of the idea creating the Academy.

Two of the Academicians earned the title of National Scientist within seven years: Francisco O. Santos three years later in 1983, and Oliveros-Belardo in 1987.

After the initial three-year surge in membership, which swelled the ranks of the Academy to thirty (or 60 of its limit), only a few scientists were admitted as new members in the succeeding years. On July 9, 1981 at the Philippine International Convention Center (PICC) during the 3rd Annual Scientific Meeting, three new Academicians were designated, as follows:

- **Clare R. Baltazar**, Ph.D., entomologist
- **Julian A. Banzon**, Ph.D., biophysical chemist
- **Amando M. Dalisay**, Ph.D., economist

The Executive Council elected in 1978 should have ended its term in 1981, by which time there were only five remaining members due to the deaths of Drs. Cecilio F. Lopez and Gregorio Y. Zara. Nominations of new members were submitted to the President, but because of the ongoing reorganization in the government, the appointment of new Executive Council members was held in abeyance. Thus, the incumbent Executive Council served an extended term until 1982 upon the advice given by the NSDB Legal Office.

After about three years of existence, the Academy moved in 1981 from Bicutan in the suburbs to its new office at the Paulino J. Garcia Memorial Hall in Herran (now Pedro Gil) Street, Manila. A previous convention site, the Garcia Hall was an appropriate venue for conferences as well as a home for the Academy. The NAST acquired audio-visual equipment and renovated the hall at a cost of ₱131,000.

With the Garcia Hall as its new headquarters, the Academy also envisioned a Science Moviehouse to cater for science information and dissemination, both at the popular and higher levels. Instructional and science films were planned to be shown weekly.

Part of the building would also have been turned into a Science Specialist Library. This library would have made available publications needed by Academicians in their research, as well as materials and related services needed by other scientists and the general public.

However, the Garcia Hall was demolished in 1983, less than two years after it was occupied by the NAST, to give way to the Pedro Gil Light Railway Station and the Philippine General Hospital building. Plans for a new Science Hall to house the Academy have momentarily been shelved due to lack of funds. Since 1983 the Academy has shared offices again with the National Science and Technology Authority (NSTA), the successor of the NSDB and which later became the Department of Science and Technology, at the Science Complex in Bicutan, Taguig, Metro Manila, near the South Superhighway.

**Recognition, Incentives and Awards.** Although the Academy nominated several Academicians for the National Scientist award, only five were approved by President Marcos in the first three years of the NAST. Apart from the three others previously mentioned, the President conferred the rank of National Scientist to two other Academicians during the closing ceremonies of National Science and Technology Week on July 19, 1980 at Malacañang. The new National Scientists awarded in 1980 were as follows:

□ **Fe del Mundo, M.D.**

Leading pediatrician, medical stateswoman, and the moving spirit behind the establishment of various pediatric institutions in the country.

□ **Eduardo A. Quisumbing, Ph.D.**

The authority on plant taxonomy, systematics and morphology, pioneer in studies on Philippine medicinal plants, and leading orchidologist.

In 1981 the Academy provided medical allowance for Academicians consisting of medical and hospitalization benefits of ₱10,000 to each member per annum. This was intended to subsidize the rising medical and hospitalization costs incurred by Academicians.

In the area of recognition, the Academy became the selection body for the newly-created Outstanding Young Scientist (OYS) Award of the NSDB, which have been given in the fields of physics, chemistry, mathematics, engineering, biological sciences, medicine, and social sciences. So on its second year, NAST, at its annual meeting, announced its newest project, the Outstanding Young Scientist (OYS) Awards, to start in 1980 and held yearly since then. Each awardee, who must be under 40 years of age at the predetermined cut-off date (a given day on the second week of July each year), received a Presidential Trophy and a ₱10,000 cash award.

The first recipients of the Outstanding Young Scientist Awards in 1980 were as follows:

- **Rafael D. Guerrero III, Ph.D.**, aquaculturist
- **Rufino H. Ibarra, Ph.D.**, nuclear physicist
- **Florian M. Orejana, Ph.D.**, fish processing expert
- **Ernesto M. Pernia, Ph.D.**, population and human resources expert
- **Alberto G. Romualdez, M.D.**, physiologist
- **Ernesto M. del Rosario, Ph.D.**, fermentology and enzyme chemist
- **Salcedo L. Eduardo, Ph.D.**, parasitologist
- **Thelma E. Tupasi, M.D.**, infectious diseases expert
- **Victoria F. Vicente, Ph.D.**, analytical chemist

The following year the awardees were:

- **Romeo M. Bautista, Ph.D.**, international economist
- **Paciente A. Cordero, Jr., D.Sc.**, marine biologist
- **Lourdes J. Cruz, Ph.D.**, toxicologist
- **Severino V. Gervacio, Ph.D.**, mathematician
- **Esperanza A. Icasas-Cabral, M.D.**, cardiologist
- **Ernesto P. Lozada, Ph.D.**, solid biofuels expert
- **Manolito G. Natera, Ph.D.**, physicist

Recognition by the Academy was not limited to Filipino scientists alone. In 1980 the NAST recommended an honorary doctoral degree and also conferred a special award on Lord Alexander Robertus Todd, the 1957 Nobel Prize laureate in chemistry for research with chemical compounds that are factors in heredity. Lord Todd, President of the Royal Society of London, the world's oldest science academy, had come for the signing of the RS-NAST agreement. On December 19, 1980, the University of the Philippines, upon the recommendation of the Academy, conferred upon him the degree of Doctor of Science (*honoris causa*). The next day, on December 20, 1980, the Academy likewise

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presented to Lord Todd a Special Science Award, the first and last such award given by the Academy in its first decade of existence.

**Advisory and Policy-Making Role.** In many countries, notably in Britain and the United States, a science academy plays an important role by becoming an adviser to the government and the science community. It is the body that the government turns to for disinterested advice on scientific appointments, on the scale and distribution of resources for research and education in science, and most of all in policy-making. Although it is not the prerogative of scientists to make policy decisions unless appointed to a decision-making position such as that of a cabinet office, the science academy can provide an important role in dispensing relevant scientific facts and technological implications.

From the start, it became NAST's concern to help in the formulation of science policies, science implementation and research management in such areas as the physical and natural sciences, biological sciences and social sciences.

To determine how it could best be of service to the scientific community as an adviser to government, the Academy began in 1979 to convene the first of a series of what were called roundtable conferences on various topics. These roundtable conferences were participated in by Academicians and other scientists and also government officials. From these roundtable conferences, the Academy advised on policy affecting science and technology, which reports were submitted to appropriate authorities through the Science Minister and NSDB Chairman. However, it was not until 1982 that the Academy was officially designated as the science adviser to the President and the Cabinet.

The roundtable conferences (RTCs) convened in 1979 were as follows:

△ *RTC on Nuclear Power Plant (July 17, 1979)*

The very first roundtable focused on the scientific and technological considerations of the proposed Bataan Nuclear Power Plant. Technical discussions were held on the advantage and disadvantages of nuclear energy for the Philippines, including source of materials, technical capability and environmental effects. Based on the conference, the Academy submitted the following conclusions:

1. In the foreseeable future, there seems to be no other feasible substitute for oil as a source of power other than nuclear energy.
2. The studies by the relevant institutions (Philippine Atomic Energy Commission, National Power Corporation, EBASCO and ENVIROSPHERE Synergistics Consultants, Inc.) and others in the Bataan Peninsula tend to show that Napot Point in Bataan is a safe place for a nuclear power plant.
3. Based on evidence presented by experts, there appears to be no design defect in the nuclear plant being constructed by Westinghouse.
4. Filipino scientists, engineers and technicians have the competence and capability to operate, service and maintain such a nuclear power plant.

△ *RTC on Perspective in the Biological Sciences (October 23, 1979)*

The Academy recommended to NSDB the dissemination through the national media of biological applied research results. The Academy also proposed the creation of a Philippine Council for Health Research whose primary purpose will be to harness the efforts of medical scientists towards more efficient and effective solutions to health problems. The health council will be an agency of the NSDB and will be responsible

for planning, setting of priorities, programming and monitoring researches in health and health-related studies in nutrition and family planning.

During the reorganization of the NSDB to the National Science and Technology Authority (NSTA) in 1982, the Philippine Council for Health Research and Development (PCHRD) was created as one of the NSTA agencies. This fulfilled the recommendations of the Academy.

△ *RTC on Perspectives in the Social Sciences (August 14, 1979)*

This roundtable discussed the problem of squatters in Metro Manila and in the country in general. It stressed that further attention by social scientists be given to the conditions and plight of squatters.

△ *RTC on Perspective in Mathematics, Physics and Chemistry (July 31, 1979)*

A fourth roundtable chose as its subject the development of doctoral programs in the fields of physics, mathematics, and chemistry. The roundtable led to the proposal that a consortium program be established for training Ph.D's in chemistry, physics and mathematics. Eventually such a program was started in three universities: UP Diliman, Ateneo and La Salle.

In 1980, the Academy passed a resolution to standardize scientific services in the country. This resolution became the forerunner of the present Career Scientific Service as passed by the previous legislature, the Batasang Pambansa, in Parliamentary Bill 851, "An Act Establishing a Career Scientific Service." Academicians have regularly been appointed as representatives of the Academy in the various screening committees for the NSDB (now the Department of Science and Technology) Scientific Career System.

Upon the assumption into office in 1981 of the new Science Minister and NSDB Chairman, Emil Q. Javier, the Academy conducted a fresh series of roundtable conferences on the formulation of science policies, science implementation, and research management in the physical and natural sciences, biological sciences, and the social sciences.

△ *RTC on Science Policies for the Physical and Natural Sciences (May 20, 1981)*

The conference was mainly a brainstorming session after which the members issued a list of objectives, guidelines and strategies on science policy.

*Objectives*

1. To create a proper environment for science.
2. To make science useful to the country.
3. To create the necessary potential for science development.
4. To implement more aggressive programs in the natural sciences.

*Guidelines*

1. Development of proper environment for scientific work.
2. More active participation of scientists in the formulation of common policies and strategies of various science groups.

*Strategies for implementation via*

1. Governmental agencies.
2. Policy-making body involving working scientists.

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### *Δ RTC on Science Policies for the Biological Sciences (June 10, 1981)*

The group came out with their own set of specific objectives, guidelines and strategies.

#### *Objectives*

1. To create a proper environment for scientific work.
2. To make science and scientific research useful to the country.
3. To create the necessary science policies.
4. To develop more aggressive programs in the biological sciences.

#### *Guidelines*

1. Development of a conducive environment for scientific work.
2. More active participation of scientists in the formulation and implementation of science policy.
3. A common strategy of various science groups.

#### *Strategies for implementation via*

1. A government ministry to act as an umbrella of the science community.
2. Involvement of working scientists in policy-making.
3. An increase in the appropriation for research to a minimum of 5% of the national budget.
4. Manpower and institutional development and utilization.
5. Information dissemination.
6. Research brainstorming sessions.
7. Creation of the Philippine Council for Health Research (which later became the Philippine Council for Health Research and Development) and other councils.

### *Δ RTC on the Social Sciences (May 26, 1981)*

The main objective of this roundtable was to discuss the unity of sciences, the structure of the organization of the scientific community, and to examine the policies of the government with respect to science expansion and the operation of scientific organizations in the country.

The social scientists agreed that there should be a policy of giving the scientists a voice in the formulation of policies and in the reorganization and organization of science agencies of the country. They also proposed the creation of the National Academy of Social Sciences which will preserve the fundamental independence of the social scientists who act as concerned critics of social policy.

In addition to the roundtable conferences, the Academy also conducted a study of minihydro and macrohydro power plants through an ad hoc study committee. With representatives from the National Power Corporation and the National Irrigation Authority, the dialogue examined the potentials of minihydro power plants for rural electrification. It was their conclusion that the costs (including site development, capital, operating and maintenance) to generate a unit of power from both the minihydro and the macrohydro power plants appeared to be relatively the same. In both cases, the largest cost went to the dam construction which accounted for about 80% of the total development costs. The transmission costs depended mainly upon distance of the power source from the center of demand.

Furthermore, it was found that there were communities which could not be served by existing and planned power generation facilities because of their distance from the power source, relatively low demand, and other economic reasons. In some of these communities, there are small water resources which could be tapped for minihydro power plants. The same communities, however, have important uses for these water resources like water supply for domestic needs, irrigation, fisheries, and maintenance of the ecology. To convert the water for power generation depends on the success with which a balance could be struck between the current use of the water to the community and its potential as a power source. However, good water sources for minihydro power plants are far from the centers of demand. Therefore, the study committee concluded that the minihydro power plants as a source of rural electricity was less feasible than the macrohydro power plants.

Apart from these Academy activities, member Academicians participated in various study committees or were invited as consultants in government agencies as representatives of the Academy or in their individual capacity as leading scientists.

**Role as Scientific Forum.** In addition to being a convenor of advisory conference, the Academy began to sponsor or co-host a number of scientific conferences and meetings, starting with its Annual Scientific Meeting (ASM) in 1979. These conferences established the Academy in another important role as a leading forum for the presentation of new findings, research and information by individual scientists, led by the Academicians themselves. To these scientific fora the Academicians and other scientists from both the Philippines and other countries were invited in order to present and discuss papers in their fields of specialization.

NAST held the first of its Annual Scientific Meeting on May 29-30, 1979 at the Asian Institute of Tourism at Diliman, Quezon City. This became a continuing venue for scientists in the country to present and discuss recent advances in science and technology. In welcoming the participants, NAST President Paulo C. Campos hailed the event as "a milestone in the history of science in this country." Dr. Campos noted:

*The idea of an academy of scientists has long ago been nurtured by our scientists and a few concerned statesman. In fact, some years ago an Academy of Science and the Humanities was formed and its roster included some of the most respected names in science in our country. For lack of material support, that academy hardly got off the ground. Most of the men and women who conceived and founded it have since been passed to the great beyond or have retired.*

Science Minister and NSDB Chairman Melecio S. Magno, after swearing in the second group of new Academicians, addressed the assembly in a keynote address entitled, "The Present-Day Commitment of the Scientists." Among Minister Magno's comments, he noted that:

*Science is not objective: science cannot claim to be at the same time a dispassionate search for truth and serve as a paradigm of human values.*

Seven scientific papers were presented at the 1st Annual Scientific Meeting in 1979, two in the health sciences and one each in mathematics, chemistry, economics and biology. Four of the presentors were Filipinos and three were foreigners. Representing both East and West, the conference speakers and their papers were as follows:

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Fe del Mundo, M.D., pediatrician	<i>"Clinical observations on dengue hemorrhagic fever among children in Metro Manila"</i>
Leonard J. Duhl, Ph.D., American, medical professor of the University of California in Berkeley	<i>"New dimensions of health"</i>
Bienvenido C. Juliano, Ph.D.	<i>"Relation of properties of starch and protein to eating quality of milled rice"</i>
José Encarnación, Jr., Ph.D.	<i>"Fertility behavior and labor force participation: a lexicographic choice model."</i>
Irving Eugene Wallen, Ph.D., director of the U.S. Environmental Protection Agency	<i>"Management of the environment"</i>
Bogdan Czaplinski, Ph.D., Polish, president of the World Federation of Parasitologists	<i>"On specificity of Helminths"</i>

The papers presented at the 1st Annual Scientific Meeting and subsequent ASMs have been published in the annual *Transactions* of the Academy, which is distributed to all Academicians, depository institutions, and a limited number of scholars both here and abroad.

The 2nd Annual Scientific Meeting of the Academy was held on July 15, 1980, this time at a bigger venue, the Philippine International Convention Center (PICC) at Roxas Boulevard, Manila. In keeping with the growing role and importance of the NAST, ten more papers were presented at the second scientific meeting, as compared to the previous year's meeting.

After the keynote address by NAST President Paulo C. Campos on "Population growth and human progress," the following scientists presented their papers on their fields of specialization:

### **Mathematical, Physical and Engineering Sciences**

Bienvenido F. Nebres, S.J., Ph.D.	<i>"Algebraically-closed groups (an application of Model Theory to algebra)"</i>
Luz Oliveros-Belardo, Ph.D.	<i>"Essential oils"</i>
Alfredo C. Santos, Dr.phil.	<i>"Phytochemical research and drug development"</i>
Jose R. Velasco, Ph.D.	<i>"In quest of certainty: an odyssey into the cadang-cadang problem"</i>

### **Biological Sciences**

Emerita V. de Guzman, Ph.D.	<i>"Embryo culture, callus growth and morphogenesis in vitro in coconut"</i>
Magdalena C. Cantoria, Ph.D.	<i>"Physiology and biochemistry of the volatile oils of Mentha species (Family Labiatae) grown in the Philippines"</i>

Filomena F. Campos, Ph.D. *“Sunflower research in the Philippines”*

**Health Sciences**

Clara Y. Lim-Sylianco, Ph.D. *“Antimutagenic effects of aflatoxin B-1  
aflatoxin G-1, dimethylnitrosoamine,  
metrinidazole, mitomycin C”*

Geminiano T. de Ocampo, M.D. *“Biological pathways”*

Fe del Mundo, M.D. *“Seroepidemiologic studies of three vaccine  
preventable viral diseases in Philippine  
urban and rural communities”*

**Social Sciences**

Encarnacion Alzona, Ph.D. *“Pardo T.H. de Tavera and Philippine  
historiography”*

The 3rd Annual Scientific Meeting of the Academy was held on July 9, 1981 at the PICC again. Only five papers were read, namely:

Julian A. Banzon, Ph.D. *“The coconut as a renewable energy source”*

Encarnacion Alzona, Ph.D. *“The Diary of Olivia Salamanca, M.D., 1889-  
1913”*

José Encarnación, Jr., Ph.D. *“Relative contribution of mixed variables  
to the variation of a regressand”*

Joventino D. Soriano, Ph.D. *“Chromosomal divergence in three natural  
populations of Corchorus olitorius  
Linn.”*

Alfredo V. Lagmay, Ph.D. *“Experimental desensitization to anger-  
producing stimuli”*

Finally, the Academy also sponsored, either by itself or in collaboration with other organizations, the following meetings and scientific conferences:

- \* International Conference on Energy and Environment, January 5-9, 1981, Manila.
- \* Coordinating Board Meeting of the UNESCO Microbiology Network, September 8-10, 1981, Manila.
- \* 15th CIOMS Roundtable Conference, September 12-16, 1981, Manila.
- \* Annual Symposium of the Division of Social Sciences, National Research Council of the Philippines (NRCP), November 6-7, 1981, Los Baños, Laguna.
- \* PhilAAs Annual Convention, December 11-12, 1981, Manila.
- \* Special Lecture by Dr. Rafael Salas, Chief of the United Nations Population Fund, December 8, 1981, at the Paulino J. Garcia Memorial Hall, Manila.

After this, the Executive Council of the Academy decided not to sponsor or co-host meetings for the time being other than the annual scientific meeting. Due to financial constraints, the Academy was forced to cut back on its conference budget.

**International Scientific Relations.** Efforts towards forging international links with other academies of science and similar organizations abroad were likewise started

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as early as 1978. Written into the NAST policy objectives was the commitment on international linkages aimed at:

- Δ Promoting collaborative effort among Filipino and foreign scientists through science and technology agreements.
- Δ Publishing literature for exchange materials with academies and libraries.
- Δ Encouraging and supporting participation of scientists in international conferences, seminars and workshops.
- Δ Sponsoring visits by foreign scientists to the Philippines.

No sooner had the Academy cleared its desk of organizational matters that it embarked on such a policy of promoting international scientific relations. In the first year of NAST in 1978, it became a co-host with the NSDB in receiving a delegation from the Chinese Academy of Sciences during their two-week visit to discuss an agreement on scientific and technical cooperation between the Philippines and the People's Republic of China. Three years later, on February 10-24, 1981, a delegation from the Chinese Academy of Social Sciences, headed by its Vice-President Huang Xiang, also paid the Academy a visit. The Academy gave a dinner in their honor where discussions for future scientific collaboration were made. The successful results of such technical diplomacy came later in 1986, when NAST signed a scientific agreement with the Chinese Academy of Sciences in Beijing, China.



But naturally, it was with the Royal Society of London, the premier scientific institution in Britain and the oldest in the world, that NAST developed particularly close relations. Soon after the Academy opened, in 1979, the spadework began for a cooperative agreement between the venerable Royal Society and the fledgling NAST, first with an exchange of letters and then through subsequent visits by members of the respective institutions.

In May 1979, during the visit of Dr. Ronald Keay, Executive Secretary of the Royal Society, Academy officials discussed with him the possibility of a science and technology agreement between the NAST and the Royal Society.

In April 1980, Dr. Paulo C. Campos, NAST President, visited Britain for a week upon the invitation of the Royal Society of London to establish personal contacts with British scientists and to discuss the proposed agreement between NAST and the Royal Society. While in London, the NAST President was also invited to visit another British science organization, the Royal Society of Edinburgh. In both England and Scotland, Dr. Campos took note of advanced research laboratories and botanical gardens and made his report to the Academy.

His tour was reciprocated by a three-week visit on November 1-21, 1980 of Sir Harrie Massey (Stewart Wilson), Vice-President of the Royal Society and noted physicist. During Sir Harrie's visit to the Philippines, the final negotiation for the RS-NAST Agreement were held. He also conducted special lectures on the following topics: "Problems on Science Policy," jointly sponsored by the NAST, NRCP and the NSDB; "Upper Atmospheric Physics," jointly sponsored by the Ateneo, UP and PAGASA, the weather agency; and "Physics Today," jointly sponsored by the UP and De La Salle University.

Shortly afterwards, the President of the Royal Society, Lord Alexander R. Todd, 1957 Nobel laureate in chemistry, came for the official signing of the Royal Society-NAST Agreement on December 20, 1980, with Dr. Campos and Lord Todd as the main signatories for their respective institutions. While in the country, Lord Todd was conferred an honorary doctoral degree by U.P. on December 19, upon the recommendation of the Academy, and also received the first Science Award of the NAST on December 20, the same day as the signing of the agreement.

With the approval of the agreement between the Royal Society and NAST, a regular channel of communication had been opened for scientific and technical cooperation between both countries through their premier science organizations. In subsequent years, exchange visits by Filipino and British scientists took place.

One year after the signing of the RS-NAST Agreement, the Academy welcomed the first recipient of the British exchange grant, Prof. Ralph Louis Wain, a noted plant physiologist. During his three-week visit on September 1-21, 1981, Professor Wain visited a number of research laboratories and conducted the following series of lectures: "The Hormonal Control of Plant Growth," for UP Diliman and UP Los Baños; "New Developments in Plant Diseases Control," for the NAST and UPLB; "Chemical Aspects on Crop Protection," for UPLB; and "Some Chemical Defense Mechanism in Plants", for UPLB and the Central Luzon State University.

Sending Filipino scientists to Britain on an exchange visit under the terms of the RS-NAST Agreement proved to be difficult for NAST to fulfill initially, first because of budgetary constraints and then the foreign exchange shortage and, because of it, the travel ban which requires government expense. It was not until 1983 that the Academy was able to send the first three scientists to Britain.

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Also in 1980, NAST initiated and hosted the visit of an Indian scientist, Dr. A.R. Verma, who represented the Indian National Science Academy (INSA). Negotiations similar to that with the Royal Society in London took place, although it was not until 1983 that the agreement was signed between NAST and INSA.

Another Asian regional link was forged when Dr. Sabana Kartasasmita, Minister of Research and Technology of Indonesia, visited the Academy in 1981. The Indonesian Science Minister compared notes with members of the NAST Executive Council on science and technology. Interestingly enough, on this occasion the Academy provided the advice and initiative for the formation of an academy of science in Indonesia.

Finally in 1981, Academy officials held discussions with representatives from the Philippine-American Academy of Science and Engineering, which is based in the United States, for future linkage between the two institutions.

Under the aegis of the Academy, Filipino scientists have been sent abroad or received travel support, and foreign scientists have had their visits to the Philippines sponsored or facilitated by NAST. Despite severe financial constraints, the Academy, in its first three years, sponsored or partly subsidized the foreign travel of five Academicians as part of its stated commitment to "encourage and support participation of scientists in international conferences, seminars and workshops." The beneficiaries of these travel grants in 1979-1981 were as follows:

\* Carmen C. Velasquez who attended the 15th Pacific Science Congress in the Soviet Union, August 15 to September 2, 1979, where she acted as convener of the International Committee Symposium on Natural Resources of Oceanic Islands (Fresh and Sea-water Resources) and read two papers entitled, "Effect of Changing Ecology on Some Invertebrates of Puerto Galera Bay," and "Contributions to the Ecology of Some Parasitic Helminths of Philippine Fishes."

\* Paulo C. Campos who presented a paper entitled, "La Ciencia Filipina 1972-76 y Mas Adelante," at the Roundtable Conference called by the Centro Iberoamericano de Cooperacion, Madrid, Spain on January 29 to February 1, 1979; and represented the Academy in the conference on Self-Help and Mutual Aid in Contemporary Society, Dubronik, Yugoslavia, on September 10-15, 1979. As a WHO Fellow, Dr. Campos also went on a scientific visit to New Zealand and Australia in December 1979.

\* Alfredo V. Lagmay who became the official voting representative of the Psychological Association in the 22nd International Congress of Psychology and the General Assembly of the International Union of Psychological Science, both held in Leipzig, German Democratic Republic, on July 6-12, 1980.

\* Fe del Mundo who presented a paper titled "Utilizing Mothers, Teachers and School Children for Some Aspects of Primary Health Care in Philippine Villages," at the 16th International Congress of Pediatrics, Barcelona, Spain, on September 8-13, 1980.

\* Paulo C. Campos who visited the United Kingdom in April 1980 to forge international linkages with the Royal Society of London.

\* Emerita V. de Guzman who attended the Workshop on the Improvement of Tropical Crops through Tissue Culture at Dacca, Bangladesh, on March 9-14, 1981 and read a paper entitled, "Tissue Culture Methods in the Propagation of Coconut and Bananas."

\* Alfredo V. Lagmay who represented the Academy at the 10th International Conference on the Unity of Sciences, at Seoul, Korea on November 9-13, 1981.

**Publications.** Finally, an academy of science is a disseminator of scientific information. In pursuance of this function, the Academy began laying down policies for its

publications. The Academy's *Newsletter* was published starting 1979 and became the forerunner of the *Academy News*, a quarterly journal of the activities of the Academy.

One of the results of the First Annual Scientific Meeting of the Academy was the publication of the conference papers in the annual *Transactions*, also starting in 1979. The annual *Transactions* of the Academy have contained the papers read during the annual meetings, thus making their proceeds more widely available in printed form.

In 1981, the Academy also decided to publish a *Yearbook*, featuring its activities, organization, and a directory of the Academicians.

In addition to these regular publications about the Academy, the selected papers of Dr. Geminiano T. de Ocampo, the prolific and multi-talented ophthalmologist and Rizalist were also published. Thus, the Academy began its commitment to publish selected works of member Academicians.

## EXPANSION OF THE ACADEMY'S ROLE (1982-1985)

Despite the serious financial crisis then prevailing in the Philippines which hampered the activities of the Academy, the years 1982-1985 generally marked an expansion of the role of NAST, particularly in the advisory and recognition functions. The severe cut-backs in its budget, due largely to the vagaries of the faltering Marcos administration, proved to be the major constraint to the work of the Academy. For example in 1982, the proposed budget of ₱5,032 million was halved upon approval to only ₱2,636 million. Thus, the Academy was forced to impose economies, especially in travel grants, publications and conferences. Despite these limitations, the Academy was moving towards for a bigger and more effective role in promoting scientific excellence and upgrading scientific performance nationwide.

**Organization.** The most important organizational changes in NAST during the next four years were the expansion of its advisory role, the election of new officers and members of the Executive Council, the amendment of its rules and regulations, the appointment of a new Executive Officer and the enlargement of its permanent administrative staff.

Although the Academy had been acting as an advisory body on science and technology since its establishment, it was only in July 1982 that it received a formal mandate as such. On that date, President Marcos issued **Executive Order 818**, effectively amending P.D. 1003-A, which formally appointed the NAST as an advisory body to the President and the Cabinet. The significant features of E.O. 818 were as follows:

- Δ The Academy shall serve as advisory body on science and technology to the President and his ministers.
- Δ The Academy may engage in programs in science and technology to promote scientific productivity.
- Δ The Academy shall have its own Secretariat and Administrative staff.

The year 1982 also marked the appointment of a new Executive Council to serve for a three-year term. The officers and members of the new Executive Council in 1982-1985 were as follows:

- \* Paulo C. Campos, President
- \* Melecio S. Magno, Vice-President
- \* Tito A. Mijares, Secretary
- \* José Encarnación, Jr.
- \* Carmen C. Velasquez
- \* Raymundo A. Favila
- \* Francisco O. Santos (until 1983)
- \* Dioscoro L. Umali (from 1983)

## EXPANSION OF ROLE

Dr. Campos was elected NAST President for a second term. The new Vice-President, Dr. Magno, had just finished his term as Science Minister and NSDB Chairman and now took his seat in the NAST Executive Council which he had helped to establish in 1978. Drs. Encarnación, Favila, and Santos were the new members of the Council. In 1983, Dr. Dioscoro Umali was appointed to the unexpired term of Dr. Santos upon the latter's death.

On July 12, 1985 the third set of Executive Council members were appointed by the President. For the first time, the general membership of the Academy had a hand in choosing the officers. In previous years, the officers had been selected by the Executive Council exclusively from among its members. However, starting in 1985, this procedure was modified into a more democratic form whereby the Academy as a whole elected the officers from among the members of the Executive Council.

The officers and members of the **Executive Council** from 1985-1988 were as follows:

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

NAST Executive Council 1985-1988



During the election for Executive Council officers, which was held at NAST headquarters in Bicutan, Metro Manila, Dr. Paulo C. Campos was elected President for the third consecutive term, while Dr. Melecio S. Magno was reelected as Vice-President and made Secretary at the same time. At this meeting it was also agreed that the officers of the Executive Council act as officers of the Academy.

The year 1982 marked the conversion of the NSDB, to which the NAST is attached, into the National Science and Technology Authority (NSTA), with offices at the sprawling Science Complex in Bicutan, Metro Manila. The Director General of this new agency was given the rank of Minister and made a member of the President's Cabinet. Due to this and other organizational matters and the expanding role of the Academy, a new set of rules and regulations had to be formulated. Upon the recommendation of a study committee, the Academy approved the amended rules and regulations in 1985.

In 1984 the Academy appointed the first full-time employees of NAST, which included the following: Ms. Stella Marie R. Ramos, Supervising Information Officer; Ms. Rosemarie S. Espino, Accountant; and a utility man. In 1985 was appointed the first Executive Officer, Mr. Romeo G. Cordoba; Ms. Estrella de Jesus, Administrative Officer; Ms. Imelda Huelgas, Cashier; and Ms. Luningning Samarita, Media Researcher – bringing the total fulltime staff of NAST to seven.

The Office of Budget and Management had approved these permanent civil service positions to implement the policies of the Academy on a day-to-day basis. Prior to this development, the NAST Secretariat was composed of NSDB or NSTA employees working in the Academy on a part-time or assignment basis. The appointment of a permanent staff to exclusively administer NAST affairs greatly facilitated the work of the Academy from 1985 onwards.

The Academy continued to annually elect new Academicians. Due to the limited total of 50 Academicians at any one time, membership continued to be jealously guarded and nominees were screened carefully by the Academy.

In 1982 two new **Academicians** were selected as follows:

- Benjamin D. Cabrera, M.D., parasitologist
- Emil Q. Javier Ph.D., geneticist, Director General of NSTA and Minister of Science.

In 1983 six new **Academicians** were selected as follows:

- Gelia T. Castillo, Ph.D., rural sociologist
- Jose O. Juliano, Ph.D., nuclear physicist and chemist
- Hilario D.G. Lara, Dr. P.H., epidemiologist
- Bienvenido F. Nebres, S.J., Ph.D., mathematician
- Faustino T. Orillo, Ph.D., plant pathologist
- Jose R. Velasco, Ph.D., plant physiologist

In 1984 no new Academician was selected since none of the nominees obtained the required majority vote of the Academy. However, in 1985, three new Academicians were selected out of a total number of 20 nominees.

These three new **Academicians** who passed the strict screening procedure in 1985 were as follows:

- Quintin L. Kintanar, M.D., Ph.D., environmental medicine
- Quirino O. Navarro, Ph.D., nuclear physicist
- Gregorio F. Zaide, Ph.D., historian

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**Recognition, Incentives and Awards.** The number of new National Scientists, the nation's highest scientific award, nearly doubled in 1982-1985 as compared to the previous year. Correspondingly, more new Outstanding Young Scientists Awards were also awarded in this period. In fulfillment of its expanding role in the recognition of scientific excellence, the Academy created seven Research Fellowships for Academicians.

At the closing ceremonies of the Science and Technology Week in July 1982, President Marcos invested three new National Scientists at Malacañang Palace, Manila. During the awarding ceremonies, the two National Scientists in 1981 (Dr. Fe del Mundo and Dr. Eduardo Quisumbing) were also formally awarded. The 1982 **National Scientists** were as follows:

- **Geminiano T. de Ocampo, M.D.**, noted ophthalmologist
- **Casimiro T. del Rosario, Ph.D.**, physicist and meteorologist
- **Gregorio T. Velasquez, Ph.D.**, distinguished psychologist and one of the originators of the idea creating the Academy.

In 1983 three new **National Scientists** were awarded by the President, upon the recommendation of the Academy, as follows:

- **Francisco M. Fronda, Ph.D.**, animal husbandry.
- **Francisco O. Santos, Ph.D.**, posthumous recognition for his contributions to human nutrition and agricultural chemistry.
- **Carmen C. Velasquez, Ph.D.**, internationally-known parasitologist.

The award to Dr. Santos was the first posthumous National Scientist Award given by the President.

No new National Scientists were awarded in 1984, despite the recommendations made by the Academy. However, the three Academicians who were recommended then were conferred the award of National Scientists by the President in the following year, 1985.

The three **National Scientists** in 1985 were as follows:

- **Teodoro A. Agoncillo, D. Litt. (hon.)** historian (posthumous award)
- **Encarnacion Alzona, Ph.D.**, historian
- **Hilario D.G. Lara, D.P.H.**, public health authority

The Academy had only been the selection body for the conferment of the Outstanding Young Scientist Awards until 1982, with the Science Minister and NSDB Chairman as the final arbiter of the prizes. However, in 1982, the annual OYS Awards, which continued to be given in recognition of outstanding young talent among scientists below 40 years of age, was formally made a regular program of the NAST. Altogether, 26 Outstanding Young Scientists were named in the period 1982-1985.

These **Outstanding Young Scientists** in 1982-1985 were as follows:

- **Carmelo A. Alfiler, M.D.**, pediatrician
- **Rodolfo P. Cabangbang, Ph.D.**, agronomist
- **Virgilio G. Enriquez, Ph.D.**, social psychologist
- 1982 ○ **Alejandro N. Herrin, Ph.D.**, economic demographer
- **Jose A. Marasigan, Ph.D.**, mathematician
- **William G. Padolina, Ph.D.**, natural products expert
- **Percy E. Sajise, Ph.D.**, ecologist
- **Benito L. Tanhecho, Ph.D.** medical electronics



*Outstanding Young Scientist 1982 with President Marcos and Science Minister Emil Q. Javier. L to R: Drs. Carmelo A. Alfiler, Rodolfo P. Cabangbang, Virgilio G. Enriquez, Jose A. Marasigan, William G. Padolina, Percy E. Sajise, Benito L. Tanheco and Alejandro N. Herrin.*



*President Marcos conferring on Dr. Hilario D.G. Lara the rank and title of National Scientist. Others in photo L to R: Dr. Encarnacion Alzona, Mrs. Teodoro Agoncillo and Dr. Melecio S. Magno.*



*Outstanding Young Scientist 1984 flanked by Dr. Fernando Bernardo on the left and Drs. Emil Q. Javier, Melecio S. Magno and Quintin L. Kintanar on the right. The OYS L to R: Drs. Eufemio T. Rasco, Filemon A. Uriarte, Roger Posadas, Evelyn Mae Tecson-Mendoza, Reynaldo A. de la Cruz and William T. Cbua.*

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- 1983
  - **Ponciano S. Halos, Ph.D.**, expert in endomycorrhizas
  - **Remigio M. Olveda, M.D.**, medical doctor
  - **Vicente B. Paqueo, Ph.D.**, economist
  - **Luzvisminda U. Rivero, D.Sc.**, inorganic chemist
  
- 1984
  - **William T. Chua, M.D.** medical doctor
  - **Reynaldo E. de la Cruz, Ph.D.**, expert in tree nuts
  - **Roger B. Posadas, Ph.D.**, physicist
  - **Eufemio T. Rasco, Jr., Ph.D.**, expert in vegetable crops
  - **Evelyn Mae Tecson-Mendoza, Ph.D.**, biochemist
  - **Filemon A. Uriarte, Jr., Ph.D.**, engineer
  
- 1985
  - **William D. Dar, Ph.D.**, agriculturist
  - **Ann Inez N. Gironella, Ph.D.**, statistician
  - **Jose A. Magpantay, Ph.D.**, physicist
  - **Corazon M. Raymundo, D.Sc.**, population expert
  - **Alumanda M. de la Rosa, Ph.D.**, radiation chemist
  - **Mediadora C. Saniel, M.D.**, expert in diarrheal diseases
  - **Amaryllis T. Torres, Ph.D.**, social psychologist
  - **Regalado M. Zamora, Ph.D.**, animal nutritionist

Due to the limited support for basic research in the country, the Academy went to the extent of supporting projects of five Academicians for the first time in 1983. These five research projects and the Academicians handling them were as follows:

\* **Clare R. Baltazar** – “Inventory of Philippine Insects.” A complete taxonomic study of Philippine butterflies comprising 1,651 species which, when published, will be the only source of information on the number and diversity of insect life in the Philippines.

\* **Fe del Mundo** – “Situational Survey of Neonates (0-28 days) in Underserved Philippine Communities.” A situational survey of neonates in underserved Philippine communities to determine the status of neonates in these areas, their care, the facilities and resources in the community, morbidity and mortality status, and to provide a more effective delivery of care to young babies.

\* **Joventino D. Soriano** – “Culture of *Nostoc* sp.” Induced mutations in *Nostoc* sp. in commercial quantities were developed in pilot beds in Bulacan and Batangas to test the suitability of culturing the edible and nitrogen-fixing algae in other places.

\* **Clara Y. Lim-Sylianco** – “Mutagenicity potential of decoctions, infusions, and expressions from *Thevetia peruviana* (Pers.) Merr.” To determine whether this medicinal plant is nonclastogenic and antimutagenic, thus a potential anticancer agent.

\* **Gregorio T. Velasquez** – two project studies: one on “Collection and Taxonomic Studies of the Bluegreen Algae in Natural Pollution,” the classification and identification of at least 20 species of bluegreen algae which are major sources of pollution; and another on “Bluegreen Algae in the Philippines,” completion of a manuscript of all researches on bluegreen algae in the Philippines and its preparation for publication.

In the area of incentives and in line with its stated policy of encouraging scientists to undertake research work, NAST launched a Research Fellow program in 1984. Although the decision on the program had been taken two years earlier, it was only in 1984 that the Academy could allocate the necessary resources for the Research Fellowship for Academicians.

The rationale for the Research Fellowship, as described in the Academy's "Description of Program/Projects 1984," noted the pressures faced by scientists in a developing country like the Philippines, viz.:

*The exodus of well-trained scientists to other parts of the world, particularly in the United States, is a phenomenon worth noting. Local private industry has taken many of them over into their staff to work on narrowly defined problems related to commercial products. Private practice and consultancy work have been of such profitability that some of our finest scientists have been emasculated of their potentialities for creative work by the routines of common problems and office. Even more seriously, our scientists have been attracted to high paying administrative positions where the exercise of authority and power have comfortable substitutes for actual scientific work.*

*The members of the Academy are all vulnerable, if they are not already in the toils of these influences, no less than their colleagues in the larger scientific community. And the government has not yet adequately provided against these competing forces that alienate them from their work.*

*Therefore, NAST has designed the Research Fellow Program to encourage researchers, particularly Academicians to engage in full-time research.*

The Academy thus created the Research Fellow Program in seven fields, initially, namely mathematics, physics, chemistry, solar energy, tropical medicine, biological sciences, and psychology. The contract period of the award is for three years, which may be renewed annually after a review. The incentive consists of an honorarium amounting to ₱5,000-10,000 per month.

The ten **Research Fellows** and their work since 1984 indicate the variety, importance and relevance of their researches that might otherwise not have been accomplished without the subsidy from the Academy, as follows:

- \* **Clare R. Baltazar.** Completion of an inventory of Philippine insects, leading to a publication of a book that will contain basic information of this field.
- \* **Raymundo A. Favila.** Preparation of a book manuscript entitled "Rectilinear Congruences with Generators in 1-1 Correspondence." This work represents an important contribution to mathematical research.
- \* **Alfredo V. Lagmay.** Preliminary study on "Attention Control under EEG-Alpha States." This work is of significance in various psychological and behavioral procedures involving the relaxation response.
- \* **Hilario D.G. Lara.** Manuscript of a book entitled "A Treatise in Research."
- \* **Melecio S. Magno.** Preparation of a syllabus entitled "Principles of Atmospheric

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Radiation” for a graduate course on atmospheric radiation with emphasis on tropical conditions.

\* **Luz Oliveros-Belardo.** Completion of two researches — namely, “Fragrance Materials in the Leaves of Philippine-Grown *Cymbogon martyni* (Reoxbl)” and “Volatiles from the Fruit of Peel Oil of *Diospyros discolor* Wild.”

\* **Joventino D. Soriano.** Research study entitled “Genetic Diseases on Inducted Mutations for Resistance to Sclerotium Root-Rot Diseases in Some Cultivated Plants.” This is a contribution to the knowledge of how genetic factors govern traits controlling resistance to disease as well as on the primary effects of gene changes.

\* **Clara Y. Lim-Sylianco.** To write a book entitled “Genetic Toxicology.”

\* **Carmen C. Velasquez.** Research project on “Parasitic Helminths of Inland and Coastal Water Fishes in the Philippines.” This work may lead to the prevention and control of fish diseases and zoonotic infections in the Philippines.

\* **Gregorio T. Velasquez.** Completion of several researches on Philippine algae, the final product of which will be a comprehensive book on Philippine algae.

**Advisory and Policy-Making Role.** In July 1982, NAST received the official mandate to act as an adviser to the President and the Cabinet through Executive Order 818, the details of which were discussed in the earlier section on Organization. Prior to this order, NAST also performed in an advisory capacity but on a limited and ad hoc basis. An example of this was the ad hoc research study on the relative technical and economic feasibilities of minihydro and macrohydro power plants, as was mentioned in the previous chapter.

With a newly-found confidence and the official designation as a science brain trust for the President and the Cabinet, the Academy organized a new series of roundtable conferences and a survey of important scientific issues and problems in 1982-1985. In 1984, the Academy began a survey of the issues and problems affecting science and technology which were presented in the series of roundtable conferences in 1985. Each Academician was assigned to write state-of-the-art papers in their field of specialization

### *State-of-the-Art Seminars*



*Dr. Soriano*



*Dr. C. Velasquez*

*State-of-the-Art Seminars**Dr. Baltazar**Dr. Cantoria*

to guide young researchers in their work and to serve as a review of promising research areas. By 1985, the biologists of the Academy had presented their state-of-the-art papers in a series of seminars. Specialists, as well as young scientists, were invited to discuss and react to the papers presented during the seminars.

The 1985 state-of-the-art papers in the Biological Sciences Division of the Academy were as follows:

1. **Current Efforts in Plant Eco-Physiology** by Jose R. Velasco, Ph.D.

A review of the effort in eco-physiology in the country in the past decade (1975-1984), the paper discussed two areas of weeds and their control, plant nutrition and fertilizer application.

2. **Fish Parasitology and Aquaculture Management in the Philippines** by 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** by Joventino D. Soriano, Ph.D.

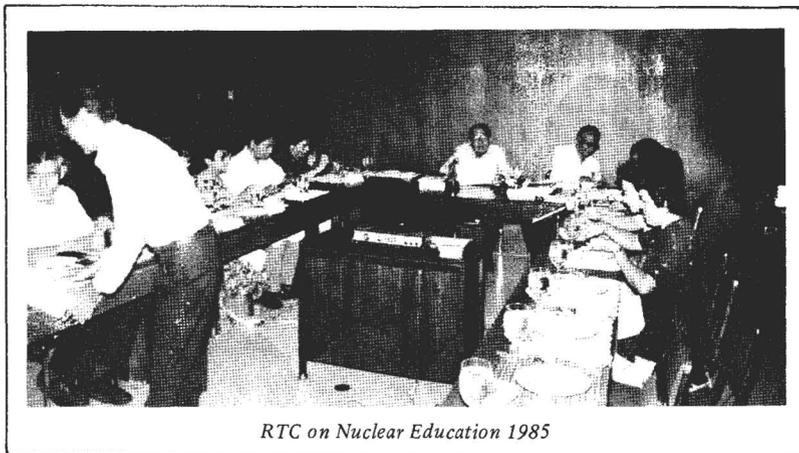
A presentation of the recent developments in seed irradiation research consisting of the use of pre- and post-irradiation treatments; proper management of the distribution of mutations; and the continuous or recurrent selection of mutants.

4. **Chemical Plant Taxonomy** by 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** by 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 period of 266 years.



In 1985 also, the Academy organized the second series of roundtable conferences (RTCs) participated in by Academicians and other scientists to guide government policy on specific and current problems in science and technology. These roundtable conferences and their results were as follows:

Δ *RTC on Nuclear Education and Information*

The importance of nuclear education and information was discussed by a group of scientists concerned about the problem. From their discussion, the group issued the following recommendations:

- In view of the nuclear arms race and the continuing threat to peace that more sophisticated weapons of destruction pose to the security and well-being of all mankind, education about military uses and nuclear power and information concerning nuclear power and nuclear war must reach all Filipinos.
- Policy and decision-makers must be enjoined to contribute their utmost to the avoidance of conflicts and the peaceful resolution of these conflicts, the reduction of arms, and above all, 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 the media.

In August 1983, the Academy hosted the visit of Prof. C.R. Rao, the world-renowned Indian statistician. During his two-week visit, Professor Rao helped to develop and run a Ph.D. program in statistics at the consortium involving UP Diliman and Los Baños, Ateneo University and La Salle University. On August 3, 1983 he was conferred an honorary D.Sc. degree by UP Diliman upon the recommendation of the Academy. Professor Rao also exchanged views with members of the Philippine Statistical Society on the role of statistics in national development. His visit was in connection with the earlier 1979 RTC on doctoral studies in mathematics.

**Scientific Forum.** The Academy continued to provide a forum which discussed the state of science and science policies in the country. Academicians, as well as scientists

from the university and the science community, participated in four Annual Scientific Meetings and one special commemorative lecture held from 1982-1985.

The number of papers presented at the Annual Scientific Meetings of the Academy showed the growing importance and membership of the NAST. These scientific papers, which have been preserved in published form in the annual *Transactions* of the Academy, are described in further detail in the boxed list.

The following table indicates the scientific papers presented at the 1982-1985 annual meetings:

1982 4th Annual Scientific Meeting	14 papers presented
1983 5th Annual Scientific Meeting	20 papers presented
1984 6th Annual Scientific Meeting	18 papers presented
1985 7th Annual Scientific Meeting	23 papers presented

In 1983, the **4th Annual Meeting** was held in the Science Complex at Bicutan, Metro Manila, rather than at the PICC in Roxas Boulevard. On July 9, 1983 Dr. M.S. Swaminathan, Director-General of the International Rice Research Institute, was the guest speaker. Improving through the years, the **5th Annual Meeting** boasted 20 scientific papers read by National Scientists, Academicians, Outstanding Young Scientists, and other scientists in the country.

The **6th Annual Scientific Meeting** was held on July 12, 1984 at the UP Law Center and PCED Hostel at Diliman, Quezon City in order to bring the discussions closer to the scientists. Keynoted by UP Diliman Chancellor Ernesto G. Tabujara, it was one of the best-attended meetings of the Academy.

At the **7th Annual Scientific Meeting** held again at the PICC on July 18, 1985, twenty-three (23) scientific papers were presented by scientists. These annual meetings were attended by some 400 researchers in various fields of science.

**List of Papers Presented at the 4th-7th Annual Scientific Meetings**

**4th Annual Scientific Meeting**

July 15, 1982, Philippine International Convention Center, Manila

*Mathematical, Physical and Engineering Sciences*

- |                         |   |
|-------------------------|---|
| Ely A.R. Ouano, Ph.D.   | “Pollution control as a catalyst for more efficient process: the palm oil industry as an example” |
| Julian A. Banzon, Ph.D. | “Decarboxylation of the fatty acids of coconut oil”   |

*Biological Sciences*

- |                               |   |
|-------------------------------|---|
| Jose R. Velasco, Ph.D.        | “The response of rice to light”   |
| Ofelio R Exconde, Ph.D.       | “The quest for the control of Philippine corn downy mildew”   |
| Carmen C. Velasquez, Ph.D.    | “Accidental human philophthalmiasis in the Philippines”   |
| Joventino D. Soriano, Ph.D.   | “Pesticide-induced chromosomal aberrations and inheritance of viable seedling mutations in sorghum” |
| Rafael D. Guerrero III, Ph.D. | “Induced androgenic sex reversal as a population control method for tilapias”                       |

*Health Sciences*

- |                             |   |
|-----------------------------|---|
| Patrocinio S. Santos, Ph.D. | “The antibiotic and antitumor activities of selected Philippine Thallophytes”                                       |
| Fe del Mundo, M.D.          | “Linking hospitals with the community and medical reorientation relevant to primary health care in the Philippines” |

*Social Sciences*

- |                           |  |
|---------------------------|--|
| Alfredo V. Lagmay, Ph.D.  | “The reinforcement of behavior: theoretical and practical issues in an experimental concept” |
| Encarnacion Alzona, Ph.D. | “Three letters of Apolinario Mabini”   |
| Romeo M. Bautista, Ph.D.  | “The 1918-85 tariff changes and effective protection of manufacturing industries”            |

Ernesto M. Pernia, Ph.D. "The performance and prospects of small and intermediate size cities in the Philippines"

**5th Annual Scientific Meeting**

July 9, 1983, Executive Lounge, NSTA Administrative Bldg., Bicutan, Taguig

*Mathematical, Physical and Engineering Sciences*

Severino V. Gervacio, Ph.D. "A structural characterization of finite topological graphs"

Julian A. Banzon, Ph.D. "Projections on the coconut as source of liquid fuel"

Luz Oliveros-Belardo, Ph.D. "Essential oil of *Dipterocapus grandiflorus* Blanco: chemistry study of its energy content"

Lourdes V. Cruz, Ph.D. "Conotoxins acting on the acetylcholine receptor: a review"

Victoria A. Vicente, Ph.D. "Recent trends in electroanalytical chemistry"

Ernesto J. del Rosario, Ph.D. "Laboratory scale production of cellulase glucoamylase and alpha-amylase"

William G. Padolina, Ph.D. "Studies in the biometanation of rice straw"

*Biological Sciences*

Joventino D. Soriano, Ph.D. "Influence of chromosome number on caffeine inhibition of DNA repair"

Alfredo V. Lagmay, Ph.D. "Experiments on pacing under fixed-ratio and variable-interval schedules of reinforcement"

Paciente A. Cordero, Ph.D. "Assessment of the sea vegetable resources and potentials in Panay Island"

Rafael D. Guerrero III, Ph.D. "A comparative study of the cage culture of *Tilapia nilotica* x *Tilapia aurea* hybrid in Laguna de Bay"

Florian M. Orejana, Ph.D. "The use of appropriate technology in fish processing"

## EXPANSION OF ROLE

### *Health Sciences*

- Fe del Mundo, M.D. "Rubella antibody status of adolescent girls in the Philippines: rural, urban community (1981-1982)"
- Geminiano T. de Ocampo, M.D. "Strategy for medical research in the Philippines"
- Benjamin D. Cabrera, M.D. "A comparative study on the effect of mass treatment of children on the total prevalence of soil-transmitted Helminthiasis in two communities, Mindoro, Philippines"
- Clara Y. Lim-Sylianco, Ph.D. "Mutagenicity and clastogenecity potential of an antiamoebic drug"
- Esperanza A. Icasas-Cabral, M.D. "Migration, modernization and hypertension blood pressure levels in four Philippine communities"
- Carmelo A. Alfiler, M.D. "Clinical spectra of primary glomerulopathy: a comparative analysis based on 102 biopsied children"

### *Social Sciences*

- Amando M. Dalisay, Ph.D. "Agrarian reform revisited: some policy implications"
- Alejandro N. Herrin, Ph.D. "Demographic impact of rural development progress: the case of rural electrification in Misamis Oriental, Philippines"

### **6th Annual Scientific Meeting**

July 12, 1984, PCED Hostel, University of the Philippines, Diliman, Quezon City

### *Mathematical and Physical Sciences*

- Severino V. Gervacio, Ph.D. "Cycle graphs"
- Juan Ferrer, Ph.D. "Acoustic emission"
- Luzvisminda U. Rivero, Ph.D. "The charge transfer bonds of bis-N, N' diphenylthioeradiclorocobalt (II) complex as an indicator of electron transfer reactions"
- Clara Y. Lim-Sylianco, Ph.D. "Antimutagenic effects of some inorganic biochemical system"
- Ernesto J. del Rosario, Ph.D. "Chromatographic analysis in carbohydrates in coconut water"
- Julian A. Banzon, Ph.D. "The coconut palm as a source of firewood"

*Biological Sciences*

- |                               |   |
|-------------------------------|---|
| Rodolfo P. Cabangbang, Ph.D.  | “Multi-adversity resistance breeding procedure in cotton in the Philippines”  |
| Joventino D. Soriano, Ph.D.   | “Mutagenic response of peanut ( <i>Arachis hypogaea</i> L.) to fast neutrons”   |
| Rafael D. Guerrero III, Ph.D. | “Studies on the culture of earthworms for animal feed and fertilizer in the Philippines”                                      |
| Ponciano S.M. Halos, Ph.D.    | “Increasing the efficacy and safety of Butachlor and its, 2, 4-D mixture in direct wet-seeded rice ( <i>Oryza sativa</i> L.)” |
| Gregorio T. Velasquez, Ph.D.  | “Collection and taxonomic studies of the bluegreen algae and general pollution”   |
| Paciente A. Cordero, Ph.D.    | “Husbandry of seaweeds: a socio-economic issue”   |
| Florian M. Orejana, Ph.D.     | “Quality assurance in the fish processing industry”   |
| Fe del Mundo, M.D.            | “Bacteria identified in diarrheal stools of early childhood and sensitivity tests, Metro Manila (1980-1982)”                  |
| Benjamin D. Cabrera, M.D.     | “Effects of treatment regimen on reinfection of soil transmitted helminthiasis in the Philippines”                            |

**7th Annual Scientific Meeting**

July 18, 1985, Philippine International Convention Center

*Mathematical, Physical and Engineering Sciences*

- |                                  |  |
|----------------------------------|--|
| Julian A. Banzon, Ph.D.          | “Quantitative aspects in the saponification of oil by cold process”  |
| Luzon Oliveros-Belardo, Ph.D.    | “Preliminary study on the essential oil of <i>Canarium luzonicum</i> (Blume) A. Gray as a possible supplement to diesel oil” |
| Ernesto J. del Rosario, Ph.D.    | “Continuous-flow fermentation of sugar into ethanol using immobilized yeast”   |
| Bienvenido O. Juliano, Ph.D.     | “Factors affecting the nutritional value of rice protein”  |
| Evelyn Mae Tecson-Mendoza, Ph.D. | “Galactomannan metabolism in developing normal and makapuno coconut endosperm”   |

EXPANSION OF ROLE

Clara Y. Lim-Sylianco, Ph.D.	“Mutagenecity potential and clastogenecity potential of Gusathion A., Carvil and Lannate”
Victoria A. Vicente, Ph.D.	“A 6800-Microprocessor-based potentiometric stripping analyzer”
Roger Posadas, Ph.D.	“Modern formulations of covariant physical theories”
Severino V. Gervacio, Ph.D.	“N-cycle block design graphs”
Filemon A. Uriarte, Jr. Ph.D.	“A predictive model for cadmium concentration in water reservoirs”
<i>Biological Sciences</i>	
Gregorio T. Velasquez, Ph.D.	“The technology of research in the blue-green algae and relevance to Philippine economy”
Paciente A. Cordero, Ph.D.	“Phytoplankton population, a component to the potentially productive municipal waters of Estancia, Iloilo”
Rafael D. Guerrero III, Ph.D.	“Effect on breeder size on fry production of Nile tilapia in concrete pools”
Joventino D. Soriano, Ph.D.	“Intraspecific karyological differences and phenotypic variations in sorghum”
Magdalena C. Cantoria, Ph.D.	“Notes on two Mentha hybrids grown in the Philippines
Jose R. Velasco, Ph.D.	“Boron deficiency in adobe-derived soils of Eastern Cavite
Eufemio T. Rasco, Ph.D.	“Breeding for low-input cultivars of vegetable crops”
<i>Health Sciences</i>	
Fe del Mundo, M.D.	“Pseudomonas infection in hospitalized infants and children in Metro Manila, 1984”
William T. Chua, M.D.	“Mechanisms and timing of diastolic in electrical heterogeneity in diseased human ventricle”
Benjamin D. Cabrera, M.D.	“Reinfection and infection rates of ascariasis in relation to seasonal variation”

*Social Sciences*

Gelia T. Castillo, Ph.D.	“Women in rice farming systems”
Vicente P. Paqueo, Ph.D.	“An econometric analysis of some aspects of Philippine education”
Alejandro N. Herrin, Ph.D.	“Demographic trends and economic crisis”

Apart from these annual meetings, the Academy sponsored one special conference to honor the late National Scientist Casimiro T. del Rosario, physicist and meteorologist, who died in 1982. In April 1983, the Casimiro del Rosario Memorial Lecture was held at the UP Natural Science Research Center at Diliman, Quezon City in coordination with PAGASA, the weather agency, and with Dr. Magno, NAST Vice-President and himself a physicist, as chairman. The Academy invited the wife and daughter of the late National Scientist from Cebu to attend the lecture. Several papers in meteorology were read and discussed during the affair.

**International Scientific Relations.** During the years 1982-1985, the Academy pursued more avenues of forging international scientific relations despite severe financial constraints which led to budget reductions and a travel ban on Filipino officials going abroad. The best-implemented and most productive international scientific linkage was that of the Royal Society of London. At the same time, the Academy concluded new scientific agreements with the Indian National Science Academy (INSA) and the Deutsche-Forschungsgemeinschaft (DFG) or West German Research Council in 1983. Negotiations for an arrangement with the Chinese Academy of Sciences were also continued, and the possibility of a Southeast Asian regional academy explored. In 1984 the NAST became a founding member of the Federation of Asian Scientific Academies and Societies (FASAS) and agreed to host the next meeting of the FASAS Executive Council and the International Conference on Science Policy, both to be held in Manila in July 1988.

The Royal Society of London sent many visitors to the Philippines in 1982 to 1985, but the economic crisis and travel ban in the country hampered NAST from fully reciprocating their visits. Despite this limitation, there were many fruitful exchanges between Filipino and British scientists during this period.

In 1982 the Royal Society of London sent two of its scientists – Professors M.E.D. Poore and G.E. Hemmen – who collaborated with Filipino scientists on a study of rain forest ecology in Southeast Asia. The two British scientists were joined by counterparts from the UPLB College of Forestry and the Bureau of Forest Development in making trips to possible experimental sites in the country. The NAST Executive Council held several meetings at which UPLB Forestry Dean Celso Lantican was present to facilitate the study. Unfortunately, the project fell through because no suitable site was found.

In August 1983, also under the same agreement, NAST received another visitor from the Royal Society – Prof. G.M. Hughes, Ph.D., of the Research Unit of Comparative Animal Respiration, University of Bristol. The purpose of his visit was to invite Filipino scientists to train his research unit on comparative cell respiration. Professor Hughes visited several research institutions, including a field trip to Laguna de Bay. He also gave a lecture on the structure and function of fish gills in relation to their respiration function at the UP Diliman Department of Zoology.

## EXPANSION OF ROLE

Also in 1983, Dr. John Michael Wilson, Fellow of the Royal Society, became the first recipient of the fellowship visit under the RS-NAST agreement. Also from the School of Plant Biology, University College of North Wales, Bangor, Dr. Wilson conducted fundamental research at the ASEAN Postharvest Training and Research Center, UP Los Banos, Laguna, on the prevention of chilling-injury in tropical fruits, thus extending their storage life. He trained scientists at the center on chlorophyll fluorescence analysis of ripening fruits, a new technique to determine the onset of the ripening process before the visible yellowing and softening occur.



*Sir George Porter as he lectures at UP Diliman.*

In May 1985, another Nobel laureate from the Royal Society came – Professor Sir George Porter, the 1967 Nobel Prize winner in chemistry and widely known for his researches on very fast chemical reactions. Sir George has been associated with a number of British universities and research institutions, including the universities of Cambridge and Sheffield. To the fourteen honorary D.Sc. degrees he had received, another one was added when the University of the Philippines awarded him a similar honor upon the recommendation of the Academy. Echoing the words of Dr. Rizal in the 19th century, Sir George declared on this occasion that:

*Science is international – there is no such thing as British science or American science or Filipino science, and free interchange and discussion between scientists of all nations in something we must all strive to attain.*



*Signing of the Memo of Agreement between NAST and INSA. Drs. Campos and Sharma sign the agreement. Mr. S.K. Sabni of INSA and Mr. Romeo G. Cordoba of NAST assist.*

Three Filipino scientists were supported by NAST in their travel to Britain under the memo of agreement with the Royal Society. More could have been sent had it not been for the financial crisis and travel ban on government personnel, especially after the Aquino assassination. Enrique T. Ona, M.D., of the Kidney Center of the Philippines and Medical City in Pasig went on a month-long study visit in England starting September 1983 to learn recent advances in kidney and liver transplant, particularly in the use of Cyclosporin A in the laboratory of Prof. R.Y. Calne at the Cambridge University Clinical School.

Dr. Joventino D. Soriano, professor of botany at UP Diliman, had a month-long training starting November 19, 1983 at the Nottingham University in England on the subject of cell fusion, a genome engineering technique. Likewise, Dr. Soriano visited various research institutions and universities, among them the University of Edinburgh, University of Leicester, John Innes Institute, and Rothamsted Experimental Station.

## EXPANSION OF ROLE

The third Filipino scientist to visit London under the RS-NAST agreement was Dr. Clare R. Baltazar, Academician and Professor of Entomology at UP Los Baños. In March to May 1984, Dr. Baltazar went to London to complete a research on the inventory of Philippine insects. In Britain, she consulted leading entomologists and related references at the British Museum of Natural History.

In 1982, the Academy explored the possibility of concluding science agreements with India and West Germany, which were to occur in 1984, two years later. Also in 1982, three Academicians – Dr. Paulo C. Campos, Dr. Alfredo C. Santos, and Dr. Carmen C. Velasquez – attended a meeting of ASEAN scientists in Kuala Lumpur, Malaysia, to explore the formation of a Southeast Asian association of scientists.

The NAST agreement with Indian scientists produced many useful exchanges. It will be recalled that in 1980, Dr. A.R. Verma of the Indian National Science Academy (INSA) visited the country for negotiations with NAST on a science agreement. On July 18, 1983 the President of INSA, Prof. A.K. Sharma, came to the Philippines to sign the memo of agreement. With him were Prof. T.N. Khoosso, Secretary of the Indian Government on environmental protection, A.K. Bose and Dr. A.K. Sahni, Executive Secretary and Assistant Executive Secretary of INSA, respectively.

Under the **NAST-INSA agreement** the first recipient was Prof. B.K. Bachhawat of the Indian Institute of Chemical Biology, Calcutta. He came to the Philippines in October 1984 to attend a symposium on plant proteins and toxins and the Council meeting of the Federation of Asian and Oceanian Biochemists of which Prof. Bachhawat was also President. He also visited different research institutions.

In 1985, the Academy welcomed three more visiting Indian scientists on 21-day visits each. Dr. Kubra Bano, Department of Zoology, College of Biological Sciences and Humanities, University of Agricultural Sciences, Bangalore, came on January 28 to February 2, 1985. Dr. Bano visited a number of research institutions dealing with earthworm technology for animal feed and fertilizer. She also gave lectures on (1) technology for cultivation of earthworms for livestock feed, and (2) vermiculture and vermicomposting.

On April 21 to May 12, 1985, Dr. R.C. Tiwari came from the Department of Soil Science and Agricultural Chemistry, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. Dr. Tiwari visited some research institutions where he discussed the research achievements and projects relating to different aspects of soil fertility and its management such as inclusion of legumes in cropping sequence to economize the use of nitrogenous fertilizers. In various universities and institutions which he visited, he also delivered a series of lectures on fertility management in dryland areas.

Dr. Anjana Mazumder from the Indian Institute of Chemical Biology, Calcutta, visited the country on August 2 to September 7, 1985. She conducted research and a series of discussions in protein chemistry and procedures for waste utilization by algae in research institutions such as the Department of Biochemistry, University of the Philippines and the Institute of Biological Sciences, UP Los Baños, Laguna.

Although negotiations with NAST's West German counterpart began later than with INSA, the agreement with the Deutsche Forschungsgemeinschaft (DFG) or German Research Council followed soon after the NAST-INSA accord. The DFG is a government-funded collegial body financing various research institutions, universities, individual scientists and scholars inside and outside of West Germany. In March 1983, the Academy received the DFG Director for International Affairs, Dr. Joachim Wiercimok, for the

negotiation of the agreement. The NAST proposal to DFG had been realized through the help of Dr. Reuben N. Navarro, Science Attache in Bonn.

NAST President Paulo C. Campos and Vice-President Melecio S. Magno travelled to Germany to sign the NAST-DFG agreement with DFG officers on December 12, 1983 in Bonn.

In 1984, the Academy received and compared notes with three German scientists who visited the Philippines for a consultancy job at the National Institute of Geological Sciences, UP Diliman.

The relations of NAST with Chinese Academy of Sciences in Beijing started as early as 1978 when the Academy was founded. At that time, the NAST co-hosted the visit of Chinese scientists to the country. Three years later, in 1981, NAST received a delegation from the Chinese Academy of Social Sciences, and discussions on future collaboration were made at an Academy dinner in their honor.

In 1982 the Chinese Academy of Sciences sent the Academy a proposal on a scientific agreement whose main features were: (1) exchange of scientists for short visits, lectures, and participation in scientific work on joint research projects; (2) holding of joint symposia or conferences; (3) exchange of scientific information, books, journals, microfilms, seeds and plant seedlings, and photographs; and (4) encouraging direct liaison and scientific cooperation between institutes and universities.

For its part, NAST in 1984 sent a new draft agreement to the Chinese Academy embodying the main features of the above agreement but with more specific clauses and proposals.

On a broader, regional front, NAST became one of the founding members of the Federation of Asian Scientific Academies and Societies (FASAS) when it was inaugurated at New Delhi, India, in October 1983 under the auspices of the Indian National Science Academy. The aims of the Federation are:

1. To advance scientific research and technological advancement in Asia.
2. To facilitate dissemination of scientific information.
3. To provide scientific and technological services.
4. To enhance scientific and technological education.
5. To promote the scientific transfer in the culture and society.
6. To promote collaborative scientific research and technological development among the member-nations.

In December 1984, Dr. Paulo C. Campos, as NAST President and FASAS Council member representing the Philippines, attended its first Executive Council meeting at Kathmandu, Nepal with the Royal Nepal Academy of Science and Technology as host. The FASAS governing body met to discuss the activities of the federation for the next five years, namely: (1) training workshops; (2) FASAS Newsletters; (3) low-cost publications; (4) an Asian Journal of Science and Technology; (5) regional scientific reports; and (6) inclusion of other science academies or societies of the Asian region.

Prior to the Kathmandu meeting, FASAS had already offered training workshops to be held in India, as follows:

- (1) Geophysical Methods for Resources, to be held in Hyderabad, India.
- (2) Enzyme Engineering at the Institute of Chemical Biology in Calcutta, India.
- (3) Use of Photo-Voltaic System for Energy Applications, to be held in Bangalore, India.

## EXPANSION OF ROLE

**Publications.** Other than the regular offerings of the Academy, the quarterly *Academy News* and the annual *Transactions*, no special publications were issued in 1982-1985 due to financial limitations.

## REAFFIRMATION OF ROLE AND COMMITMENT (1986-1988)

On the eve of its 10th anniversary, NAST membership continued to be jealously guarded as the Academy reaffirmed its primary role of being the highest scientific recognition body in the country, and its other roles as an advisory brain trust for the President and the Cabinet and a scientific forum for recent advances in science and technology. In particular, the Academy made great strides as the highest science adviser of the government on the occasion of the drafting of the new Constitution in 1986 and when the new Congress began to formulate new laws for the Republic in 1987. Despite financial difficulties and administrative adjustments brought about by the dramatic political turnover in the Philippines, especially after the People Power Revolution on February 22-25, 1986, the Academy, like the country as a whole, has remained stable and discovered new-found confidence and reason for optimism about the future. Fittingly enough, the Academy will celebrate its 10th anniversary in July 1988 with a series of three conferences, including the International Conference on Science Policy.

**Organization.** The new administration of President Corazon C. Aquino ushered in some important changes to the science component in government. In 1986, Dr. Emil Q. Javier was replaced by Dr. Antonio V. Arizabal as the new Science Minister and NSTA Chairman. The following year, in 1987, was another reorganization period in the science community. As embodied in Executive Order 128, approved on January 30, 1987, the NSTA became the Department of Science and Technology (DOST), with its head now known as the Science Secretary and with the Academy as an attached agency of the DOST.

Although no new Academicians were selected in 1986, there were eight new Academicians invested in 1987. Due to the deaths of some previous members, this brought the total number of living Academicians to thirty-nine (39), by June 1988. The latest group of new Academicians in 1987 were as follows:

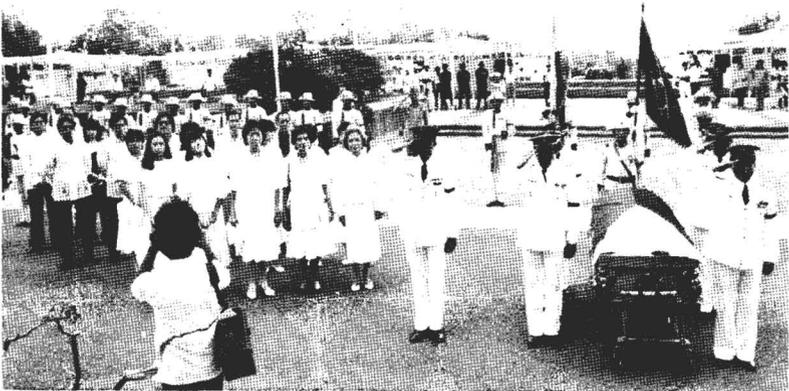
- **Solita F. Camara-Besa, M.D.**, medical educator and researcher
- **Filomena F. Campos, Ph.D.**, cytogeneticist
- **Lourdes J. Cruz, Ph.D.**, biochemist
- **Edito G. Garcia, Ph.D., M.P.H.**, parasitologist and one of the originators of the idea of creating NAST
- **Carmen Ll. Intengan, Ph.D.**, nutritionist
- **Dolores A. Ramirez, Ph.D.**, biochemist and cytogeneticist
- **Benito S. Vergara, Ph.D.**, plant physiologist
- **Prescillano M. Zamora, Ph.D.**, plant anatomist and morphologist.

Finally, the internal organization of NAST underwent some important changes. Due to the retirement of Mr. Romeo G. Cordoba in July 1987, the Academy appointed a new

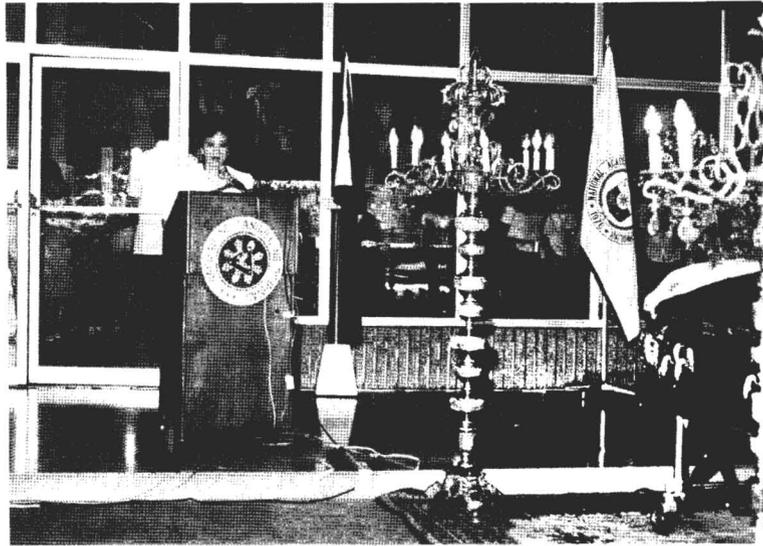
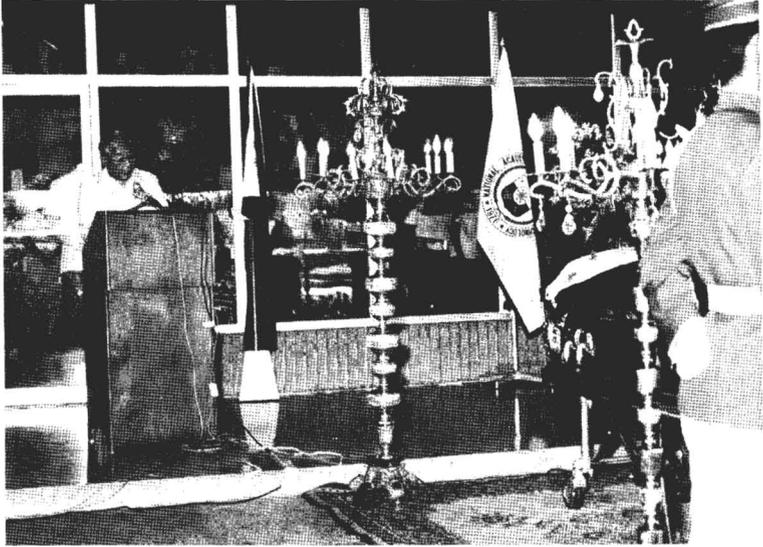
REAFFIRMATION OF ROLE

Executive Director, Dr. Cesar P. Madamba, formerly a UP Los Baños professor, to oversee the day-to-day operations of the Academy. Dr. Madamba's appointment on February 15, 1988 and that of two other office assistants brought the total full-time staff of NAST to seven (7).

*Military honors at the state funeral of National Scientist Francisco M. Fronda.*



*Science Secretary Antonio V. Arizabal and President Corazon C. Aquino delivering their eulogy at the state funeral of National Scientist Geminiano T. de Ocampo.*



## REAFFIRMATION OF ROLE

**Recognition, Incentives and Awards.** In 1986-1987 four new National Scientists were named by President Aquino upon the recommendation of the Academy, and seventeen new Outstanding Young Scientists were selected by the Academy.

The two new **National Scientists** in 1986 were as follows:

- **Julian A. Banzon, Ph.D.**

Scholar, professor and biophysical chemist, noted for his expertise in coconut.

- **Dioscoro L. Umali, Ph.D.**

Plant breeder, educator, research organizer, and development administrator and science statesman, noted for his plant breeding work, stewardship of the UPLB College of Agriculture, and rural development work as FAO Regional Director for Asia and the Pacific.

The two **National Scientists** in 1987 were as follows:

- **Luz Oliveros-Belardo, Ph.D.**

Chemist, scholar and researcher, noted for her work on Philippine herbal and medicinal plants.

- **José Encarnación, Jr., Ph.D.**

Economist, educator and economic planner, noted for his contributions to economic theory and his work on the UN Committee for Development Planning, as chairman of the Council for Asian Manpower Studies, and as professor and dean of the UP School of Economics.

As part of the exceptional benefits granted to National Scientists, the Academy arranged for the state funerals of several National Scientists who passed away during this period. In 1986, state funerals were arranged for the late Dr. Francisco M. Fronda and Dr. Eduardo A. Quisumbing. In 1987, similar arrangements were made for the late National Scientists Dr. Geminiano T. de Ocampo and Dr. Hilario D.G. Lara.

The seventeen new **Outstanding Young Scientists** in 1986-1987 were as follows:

- \* **Edwin A. Benigno, Ph.D.**, pest biometry expert
- \* **Ida F. Dalmacio Ph.D.**, food scientist
- \* **Ma. Conception C. Lizada, Ph.D.**, biochemist
- 1986 \* **Ernesto S. Luis, Ph.D.**, food chemist
- \* **Manolo G. Mena, Ph.D.**, mining engineer
- \* **Glorina N. Pocsidio, Ph.D.**, zoologist
- \* **Danilo M. Yanga, Ph.D.**, physicist
- \* **Ruperto P. Alonzo, M.A.**, economist
- \* **Dante B. Canlas, Ph.D.**, macroeconomist
- \* **Rene P. Felix, Ph.D.**, mathematician
- \* **Miguel D. Fortes, Ph.D.**, marine plant ecologist
- 1987 \* **Ruben M. Gapasin, Ph.D.**, plant pathologist
- \* **Wilfredo I. Jose, Ph.D.**, biochemical engineer
- \* **Felino P. Lansigan, Ph.D.**, statistician
- \* **Reynaldo C. Mabesa, Ph.D.**, food processing expert
- \* **Manuel F. Montes, Ph.D.**, economist
- \* **Linda S. Posadas, Ph.D.**, physicist

In 1987-1988, the Academy continued to support its ten Research Fellows, five of whom were conducting basic research and five were writing books (for their work, see previous chapter).



*1986 OYS Awarding Ceremonies*



As a further incentive to Academicians, the Academy purchased 43 books and subscribed to 33 international journals which were needed in research but unavailable in any major institution in the country. These acquisitions became part of the Specialist Science Library project of the Academy.

**Advisory Role.** The impact of the Academy's influence on scientific policy became more evident in recent years, especially during the drafting of the 1986 Constitution.

## REAFFIRMATION OF ROLE

The Academy also tackled important scientific issues of the day through several roundtable conferences and through public statements issued by the Academicians. Finally, in 1987, after the new Congress (to whom the legislative power now solely devolved) started sessions to formulate new legislation for the Republic, the Academy extended its services to the solons as the outcome of its mandated role as science adviser to the government.

During the framing of the new Constitution by the Constitutional Commission (Con-Com) on June 1 to October 15, 1986, the Academy exerted a prominent role in advising



*1987 OYS Awarding Ceremonies*



the commissioners on the constitutional provisions for science and technology. This was accomplished in two ways: (1) by the submission of state-of-the-art statements in the five major fields of science, and (2) by members of the Academy participating in the committee authorized to make the draft of the science provisions for the new Constitution.

Upon the request of the Constitutional Commission, the Academy prepared state-of-the-art statements in the major fields of science, namely:

- **Social Sciences**
- **Health Sciences**
- **Agricultural Sciences**
- **Biological Sciences**
- **Physical, Mathematical and Engineering Sciences**

The main conclusions of these reports are more fully described in the boxed sections.

### **State-of-the-Art Statement on the Social Sciences**

*According to this report, the output of social science research in the Philippines is low relative to the potential. There are many well-trained social scientists who could make significant contributions to their field but fail to do so because the professional reward system does not favor basic research. Part of the problem lies in the fact that faculty salaries in real terms amount to only half of what they were twenty years ago, forcing many potential researchers to work on lucrative but short-term consultancies rather than on long-term but sacrificial research. Another part of the problem lies with the central administration of universities which offer higher honoraria for administrative work than for research publications. NAST attempts to correct this emphasis by recognizing research productivity rather than administrative accomplishment.*

### **State-of-the-Art Statement on the Health Sciences**

*The health sciences are a relative strong discipline in the Philippines because of the accessibility of health institutions, medical schools and hospitals. During the American Occupation and immediately after World War II, we had good research laboratories and good teaching institutions. However, in the last decade, when the opportunities for training abroad (especially in the United States) became more prohibitive, the quality and quantity of medical research gradually deteriorated. Whereas we were one of the best in health care immediately before World War II, we have gradually fallen behind as compared to other Southeast Asian countries. At present, much remains to be desired in medical education and the quality of medical services. The same can be said in paramedical and other health services.*

### **State-of-the-Art Statement on the Agricultural Sciences**

*In the last ten years, the importation of rice has been minimized, the mango industry has successfully been developed, and the prawn industry has flourished because of advances in agricultural research in the Philippines. However, the development of agricul-*

ture in rural areas is stymied by insurgency and the lack of stability, which are partly due to poverty. This problem can be alleviated by appropriate agro-industrial activities in the rural areas. There is also a need to increase researches in tropical fruits, coconut and sugarcane. Similarly, more research is needed in farming systems and farm-agricultural input substitutes for fertilizers and pesticides. Marketing systems such as cooperatives, central processing, marketing, and monitoring of demands should be improved. Research on the pricing policy of agricultural commodities, especially rice and corn, is greatly needed.

### **State-of-the-Art Statement on the Biological Sciences**

*The activities in the 20th century give us an insight on the rapid developments in the field.*

*Tissue culture or mericulture, a relatively recent technique, is now being used in the cloning of plants and animals. In plants, superior stocks are now propagated using the technique. In this country, the efforts of the late Dr. Emerita V. de Guzman on the tissue culture of "macapuno" coconut has resulted in the production of high percentage of macapuno nuts, an expensive commodity in the Philippines.*

*Biochemical analysis of medicinal plants have generated valuable information as to their profitable uses in this country.*

*Biotechnology during the past decade has brought a revolution in the study of gene structure and function. Genes now can be isolated and their nucleotide sequence determined. Also, the coding region can be modified by directed mutagenesis or by gene fusion. This new technology which is referred to as recombinant DNA technology or genetic engineering, offers a great commercial potential. Commercial agencies abroad are actively engaged in this profitable biological knowledge.*

*However, assessment of certain risks of deliberate release into the environment of certain genetically engineered organisms should be our concern. Rules and regulations should also be included in the propagation and distribution of the products obtained.*

*Effective environmental and ecological studies should be the preoccupation of the contemporary scientists and technologists. However, taxonomic and systematic studies should continue before organisms start disappearing due to man's reckless meddling with nature for profit. Of necessity, we need more qualified manpower.*

*Enhanced incentives and facilities should be part of the program of government and private institutions not excluding schools and universities. Environmental education is a must at all levels to attain progress.*

*An office for dissemination of information should provide the data base for research programs to minimize duplication of efforts.*

*Support should be provided for an integrated approach to environmental problems. Science tax of 2% from commercial agencies may provide a source of necessary funds.*

**The State-of-the Art Statement on the Physical, Mathematical and Engineering Sciences**

*The Physical, Mathematical and Engineering Sciences Division would recommend the following:*

1. *To implement the reorganization in the Department of Science and Technology (DOST) especially regarding the Council for Advanced Science and Technology Research and Development and the Advanced Science and Technology Institute.*
2. *To implement the Career Scientific Service.*
3. *To continue and expand the training of scientists and engineers. The Division feels that there is a need to focus on science education at all levels, train teachers, and procure sufficient science facilities.*
4. *To set up stronger institutes whose set-up could be independent or dependent on a mother institution.*

**Science and Technology Provisions in the 1973 Constitution**

*SEC. 9. (1) The State shall promote scientific research and invention. The advancement of science and technology shall have priority in the national development.*

\*\*\*\*\*

*(3) The exclusive right to inventions, writings, and artistic creations shall be secured to inventors, authors, and artists for a limited period. Scholarships, grants-in-aid, or other forms of incentives shall be provided for specially gifted citizens.*

**Science and Technology Provisions in the 1986 Constitution**

*Sec. 10. Science and technology are essential for national development and progress. The State shall give priority to research and development, invention, innovation, and their utilization; and to science and technology education, training, and services. It shall support indigenous, appropriate, and self-reliant scientific and technological capabilities, and their application to the country's productive systems and national life.*

*Sec. 11. The Congress may provide for incentives, including tax deductions, to encourage private participation in programs of basic and applied scientific research. Scholarships, grants-in-aid, or other forms of incentives shall be provided to deserving science students, researchers, scientists, inventors, technologists, and specially gifted citizens.*

*Sec. 12. The State shall regulate the transfer and promote the adaptation of technology from all sources for the national benefit. It shall encourage the widest participation of private groups, local governments, and community-based organizations in the generation and utilization of science and technology.*

*Sec. 13. The State shall protect and secure the exclusive rights of scientists, inventors, artists, and other gifted citizens to their intellectual property and creations, particularly when beneficial to the people, for such period as may be provided by law.*

The second and more important contribution of the Academy to the making of the new Constitution was its active participation in the drafting of the provisions on science and technology. Drs. Paulo C. Campos and Melecio S. Magno, NAST President and Vice-President respectively, became members of the Ad Hoc Inter-Agency Committee on Science and Technology for the Proposed New Constitution which drafted the science provisions. The draft provisions were presented to and edited by the Academy en banc before being finally submitted to and accepted by the Constitutional Commission. The recommendations of the Academy were incorporated into the final provisions of the **1986 Constitution** as Article XIV, Sections 10-13.

Compared to the 1973 Constitution, the 1986 Constitution contains longer and more specific sections on science and technology. The comparative provisions of the 1973 and the 1986 Constitutions are shown in the boxed section.

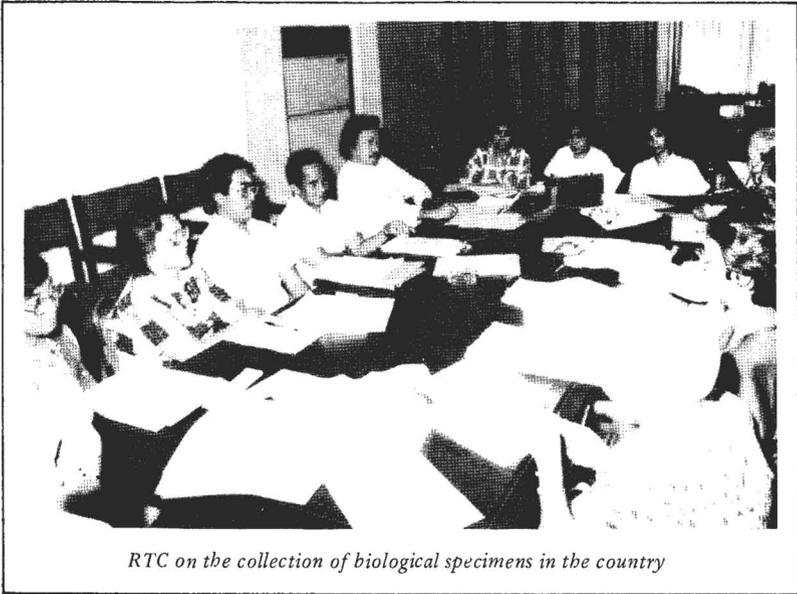
The Academy was instrumental therefore in enshrining the development of science and technology as a principle of national interest in the new Constitution.

The collection by foreigners of biological specimens in the country, the state of the dairy industry in the Philippines, and the effects of radiation on human beings were the three major issues tackled during the roundtable conferences held in 1986.

Δ *RTC on Guidelines for the Collection of Biological Specimens*

This RTC arose from the observation of many biologists about the lack of national policy and guidelines for the collection of biological specimens in the country by foreign scientists and collectors. Many foreign scientists come to the country with the specific purpose of collecting plant and/or animal specimens that will serve as scientific references in their institutions abroad. Some of the collectors contact local scientists for assistance in the procedure of collecting these specimens, but many also enter the country without making official arrangements. Often, they amass huge collections of these specimens and take them away from the country indiscriminately. The situation is deplorable because valuable biological resources are being plundered to the extent that many of them are endangered with extinction. Although there are existing laws and regulations governing environmental protection, they are vague and not specific as regards the collection of natural history specimens.

In response to this problem, the Academy, in cooperation with the Association of Systematic Biologists of the Philippines, created a committee composed of Academicians and representatives from concerned agencies such as the National Museum, Bureau of Forest Development (BFD), and the Bureau of Fisheries and Aquatic Resources (BFAR). The Committee's tasks were to consolidate all existing laws and regulations on environmental protection and to formulate a system and guidelines for the collection



*RTC on the collection of biological specimens in the country*

of plant and animal specimens for scientific and systematic references. The effort produced the following:

- (1) A code of conduct for collectors of biological specimens in the Philippines
- (2) Instructions for foreign scientists intending to collect biological specimens in the Philippines, and
- (3) Application and agreement forms.

These documents contain all the procedures for and rules governing the collection of biological specimens in the country. When these are approved, they will be printed and distributed to all concerned offices, including Philippine embassies and consulates abroad.

Δ *RTC on Dairy Development Strategies in the Philippines*

The state of the dairy industry in the Philippines came to the attention of the Academy. Despite the launching of numerous programs and projects aimed at increasing local milk production through government and private sector involvement, the growth and development of the dairy industry appear to have been static. Thus, the Academy, in cooperation with the UPLB Dairy Training and Research Institute (DTRI), held a series of workshops – the first in UP Los Baños, the second at the NSTA Executive Lounge, and the third at PCARRD in Los Baños – in order to develop dairy development strategies in the Philippines. These workshops were participated in by the government and private sectors, and the problems of the dairy industry as well as courses of action to be taken were identified.

The recommendations in technology, production and marketing were presented to the Secretary of Agriculture and Food during a symposium held for the purpose on April 2, 1987 at the UP Asian Institute of Tourism.

REAFFIRMATION OF ROLE



*NAST Vice President Melecio S. Magno welcomes participants.*



*Mr. Kartar Singh delivers the Indian dairy experience.*



*Multi-sectoral conference on dairy development strategies in the Philippines*





*Symposium on Dairy Development Strategies April 2, 1987, Asian Institute of Tourism*



□ *RTC on Radiation and Its Effects on Human Beings*

Because of the problems arising from the Chernobyl nuclear accident, the Academy held a roundtable conference on December 4, 1986 to discuss the subject of radiation and its effects on human beings. Experts in this field were invited to present their views as regards nuclear radiation effects. The participants recommended that the Academy create a permanent Committee to continually review the effects of radiation and its consequences.

## REAFFIRMATION OF ROLE

In preparation for the International Conference on Science Policy (see next section), which will be held by the Academy in July 1988, a series of roundtable conferences from March to May 1988 were called to consider a number of related topics. These topics were: (1) science perspectives in policy-making, legislation and funding; (2) science perspectives in education and culture; (3) science perspectives in health; (4) science perspectives in the basic sciences and advanced technological research and (5) science perspectives in environmental conservation and management.

Finally, the Academy as the top scientific adviser of the government, Academicians began to issue statements in the form of press releases or resolutions touching on major scientific issues of the day. It was a health index of the country's return to full democracy when some of the Academy's public comments advised a different course of action than that taken or proposed in government policy or legislation. During meetings of the Executive Council or the Academy as a whole, Academicians have continue to discuss important topics and the state of science and technology. Occasionally, their comments are made available to the public or to relevant organizations when issued by the Academy as a whole or by individual Academicians, led by Dr. Paulo C. Campos.

In 1987 the Academy released a statement calling for a stronger population policy and a more effective family planning program.

In April 1988, the Executive Council issued two press statements on education and on the manufacture of soaps and detergents. The Academy advised delay in implementing the government plan to open free public secondary education starting the next school-year, June 1988. Without competent teachers and suitable facilities, the Academy was of the opinion that the new batch of secondary schoolchildren may receive inadequate education. Secondly, NAST also voiced its opposition to the passage of a House of Representatives Bill approving the use of non-biodegradable alkyl benzene rather than the native coconut products in the local production of soap and detergents.

**Scientific Forum.** The Academy maintained and expanded its role as the leading scientific forum in the country by continuing to sponsor the Annual Scientific Meetings in 1986 and 1987, by initiating a monthly Science Literacy Forum in January 1988, and

*RTC on Science Perspectives in Education and Culture. At the rostrum is Rep. Nikki Coseteng.*



*RTC on Science Perspectives in Policy-Making, Legislation & Funding*



*RTC on Science Perspectives in Environmental Conservation and Management*

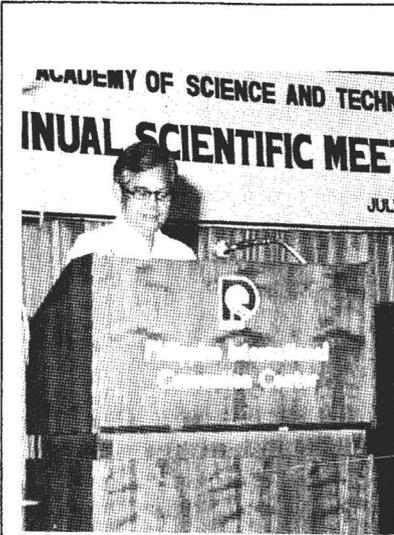


by hosting the International Conference on Science Policy and the Executive Council meeting of the Federation of Asian Scientific Academies and Societies (FASAS) in July 1988.

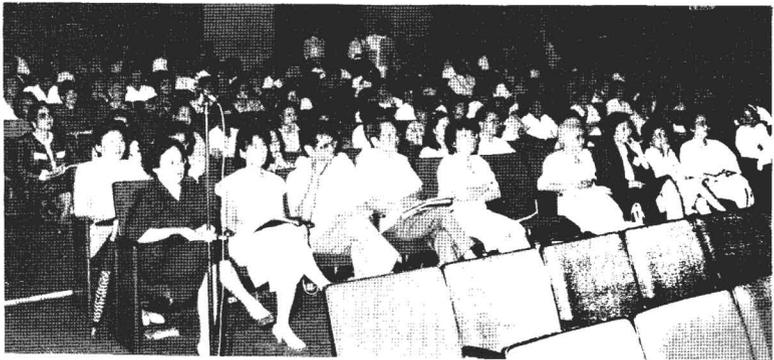
The 8th and 9th Annual Scientific Meetings of the Academy continued to yield a rich harvest of scientific papers, with 19 and 37 papers presented respectively in the two ASMs. The presentors and their scientific papers at the meetings are listed in the next section.

*1986 Annual Scientific Meeting*





*1987 Annual Scientific Meeting*



REAFFIRMATION OF ROLE

**8th Annual Scientific Meeting**

July 8, 1986, Philippine International Convention Center

*Plenary Papers*

- Bienvenido O. Juliano, Ph.D. "Rice and corn technology in the Philippines"
- Quintin L. Kintanar, M.D., Ph.D. "Environmental impact assessment of development projects in the Philippines – some experiences"

*Mathematical, Physical and Engineering Sciences*

- Ernesto J. del Rosario, Ph.D. "Ultrafiltration of fish processing wastes using polyamide membranes"
- Alumanda M. de la Rosa, Ph.D. "Radiation-induced cellulose degradation"
- Jose R. Velasco, Ph.D. "Beryllium in adobe-derived soil of Cavite"
- Juanita C. Mamaril, Ph.D. "Methods of extraction of plant growth hormones in coconut water I:UV characterization"
- Roberto N. Padua, Ph.D. "Median estimates of regression"
- Severino V. Gervacio, Ph.D. "Generalization of chromatic number"

*Biological Sciences*

- Salcedo L. Eduardo, Ph.D. "The life cycle of *Orthocoelium scoliocoelium* (Fischöeder, 1904) Yamaguti, 1971 (Paramphistomidae: Orthocoeliinae) in the Philippines"
- Magdalena C. Cantoria, Ph.D. "The identification of *Zingiber purpureum* Rosc."
- Rafael D. Guerrero III, Ph.D. "The use of ammonia as fish toxicant for management of freshwater ponds"

*Agricultural Sciences*

- Regalado G. Zamora, Ph.D. "Vitamin and acid supplementation of diets for growing-finishing pigs"
- Dolores A. Ramirez, Ph.D. "Genetics of makapuno: a genetic tumor of the coconut endosperm"
- Julian A. Banzon, Ph.D. "The coconut as a solar energy collector: planting geometries"

*Health Sciences*

- Fe del Mundo, M.D. "Low birth weight neonates and surrounding factors: a situation study in communities of 11 health regions of the Philippines (1983-85)"

Benjamin D. Cabrera	“Epidemiological aspects of human Cathaemasiasis in the Philippines (a newly discovered parasitic infection)”
Mediadora C. Saniel, M.D.	“Prospective study of diarrheal disease of infants and young children of a peri-urban community: morbidity patterns, risk factors, and etiologies”
<i>Social Sciences</i>	
José Encarnación, Jr., Ph.D.	“A simple solution to the Strotz consistency problem”
Alejandro N. Herrin, Ph.D.	“Changing economic environment and the welfare of low income groups in the Philippines”
<b>9th Annual Scientific Meeting</b>	
July 15, 1987, Philippine International Convention Center	
<i>Plenary Paper</i>	
Conrado S. Dayrit, Ph.D.	“On aging, old age and senility”
<i>Mathematical, Physical and Engineering Sciences</i>	
Eliezer A. Albacea, Ph.D.	“A flexible peephole optimization method for intermediate codes”
Arturo L. Concepcion, Ph.D.	“Distributed control using a hierarchy of coordinators”
Rene P. Felix, Ph.D.	“Sublattices of orthogonal lattices”
Severino V. Gervacio, Ph.D.	“On the lexicographic order of the n-permutations”
Roberto N. Padua, Ph.D.	“A generalized asymptotic theory of L-estimates”
Mariano B. de Ramos, Ph.D.	“Sample size determination in postharvest experiments”
Danilo M. Yanga, Ph.D.	“Stationary property of an arbitrary fermionic function and chiral U (1) anomaly in stochastic field quantization”
Patrocinio Sevilla-Santos, Ph.D.	“Oxytetracycline production in coconut water”
Julian A. Banzon, Ph.D.	“Solid fuels from the coconut”
Clara Y. Lim-Sylianco, Ph.D.	“Inhibitory effects of somatic and germ cell genotoxicity of nitrosamines”

REAFFIRMATION OF ROLE

<i>Biological Sciences</i>	
Paciente A. Cordero, Ph.D.	“Observation on the sea vegetable algae of Panay Island, Central Philippines”
Belen Morallo-Rejesus, Ph.D.	“The insecticidal actions of some indigenous plants with special reference to Makabuhai ( <i>Tinospora rumphii</i> Boerl.)”
Salcedo L. Eduardo, Ph.D.	“Zoogeographical affinities of Paramphistomids ruminants”
Leuvina M. Tandug	“Biomass prediction equations for giant ipil-ipil ( <i>Leucaena leucocephala</i> ) (Lam.) de Wit”
Joventino D. Soriano, Ph.D.	“Interspecific relationships in Genus <i>Oryza</i> of the Southeast Asia-Pacific Region”
Annabelle A. Herrera, Ph.D.	“Spermatogenesis in <i>Tilapia nilotica</i> : an ultrastructure study”
Armando A. Andaya, Ph.D.	“In vitro hepatic microsomal activation of chlorine-substituted naphthoquinone pesticide dicholone in channel catfish ( <i>Ictalurus punctatus</i> L.)”
Asuncion K. Raymundo, Ph.D.	“Utilization of protoplast fusion in genetic analysis and stress improvement in antibiotic producing microorganisms”
Teresita Espino, Ph.D.	“Production of antiserum and initial hybridomas against papaya ring spot”
Debbie O. Co, Ph.D.	“Identification of a cloned methionine biosynthetic gene of the Cyanobacterium <i>Synechococcus</i> PCC7942 by heterologous DNA hybridization”
<i>Agricultural Sciences</i>	
Philbert S. Bonilla	“Genotype-environment interaction in flue-cured tobacco ( <i>Nicotiana tabacum</i> L.)”
Ernesto C. Bumatay	“A study on the <i>Gliricidia sepium</i> germplasm collection in VISCA”
Bonifacio F. Cayabyab, Ph.D.	“The development of a monitoring system for corn borer <i>Ostrinia furnacalis</i> (Guenee) Pyralidae: Lepidoptera”
Samuel O. Dalmacio, Ph.D.	“Corn pathology research of Pioneer Corporation in the Philippines”
Benito S. Vergara, Ph.D.	“Raising the yield potential of rice”
Reynaldo R. Javier	“Effects of adventitious root removal on the growth of flooded tropical pasture legumes”

*Science Literacy Forums of the Academy, 1988*



Geronima B. Medina

“Residual effects of corn (*Zea mays* L.) residue on succeeding crops under different tillage levels”

Emmanuel R. Tiongco, Ph.D.

“Critical time for the occurrence and development of tungro infection in the field”

Leonila D. Tolentino

“Planting date-related factors on the growth of cotton in Batac, Ilocos Norte”

Le Trong Trung, Ph.D.

“Appropriate feeding strategy involving untapped feed resources: the key to accelerate meat and milk production in the tropics”

<i>Health Sciences</i>	
Quintin L. Kintanar, M.D., Ph.D.	“Health hazards in the plastic industry: problems in risk assessment”
Fe del Mundo, M.D.	“Trends in the health and nutrition of Filipino children 0-19 years in the decade 1973-1983”
Rodolfo P. Florentino, M.D.	“Proposed weight and height standards for 0-19 year-old Filipino children”
Benjamin D. Cabrera, M.D.	“An attempt to eradicate ascariasis and hookworm infection in an island in Sorsogon”
Alejandro N. Herrin, Ph.D.	“Economic and demographic adjustments to economic stress: the case of urban poor”
Amaryllis T. Torres, Ph.D.	“The Filipina looks at herself”

Starting in January 1988, the Academy convened a monthly **Science Literacy Forum** to improve science literacy in the Philippines. The monthly forum has included as participants scientists, publishers, editors and science writers. The goal of these press conferences is to raise the consciousness of the general public through feature stories about science and technology in the mass media.

Finally, the Academy expects the largest gathering of scientists in the country for the **10th Annual Scientific Meeting** and a fair number of foreign scientists for the **International Conference on Science Policy**, as well as the **Executive Council Meeting of the Federation of Asian Scientific Academies and Societies (FASAS)** – all three conferences to be held at the Philippine International Convention Center (PICC), Roxas Boulevard, Manila, on July 12-14, 1988. These conferences will take place during the celebration of Philippine Science Week and the 10th Anniversary of NAST.

The three conferences constitute the most important attempt by NAST to fulfill its commitment of providing a venue for scientists to discuss research results and other developments in science and technology, and also to thresh out policies relating to science and technology in this country and abroad.

**International Scientific Relations.** In 1986 to 1988 the Academy signed the scientific agreement with the Chinese Academy of Sciences and continued to host and exchange visits of scientists through the auspices of the Royal Society, the Indian National Science Academy (INSA), and the German Research Council (DFG). Important scientific linkages were also maintained through the FASAS.

On November 3, 1986, Dr. Paulo C. Campos, NAST President, finally signed the scientific agreement with the **Chinese Academy of Sciences** in Beijing. The agreement has similar features with that of the other NAST agreements, as follows:

- (1) Exchange of postdoctoral scientists in the natural sciences and technology for the purpose of conducting research or study visits.
- (2) Joint collaborative work.
- (3) Exchange of research findings and publications.

*Signing of the Memo of Agreement between NAST and the Chinese Academy of Sciences in Beijing*



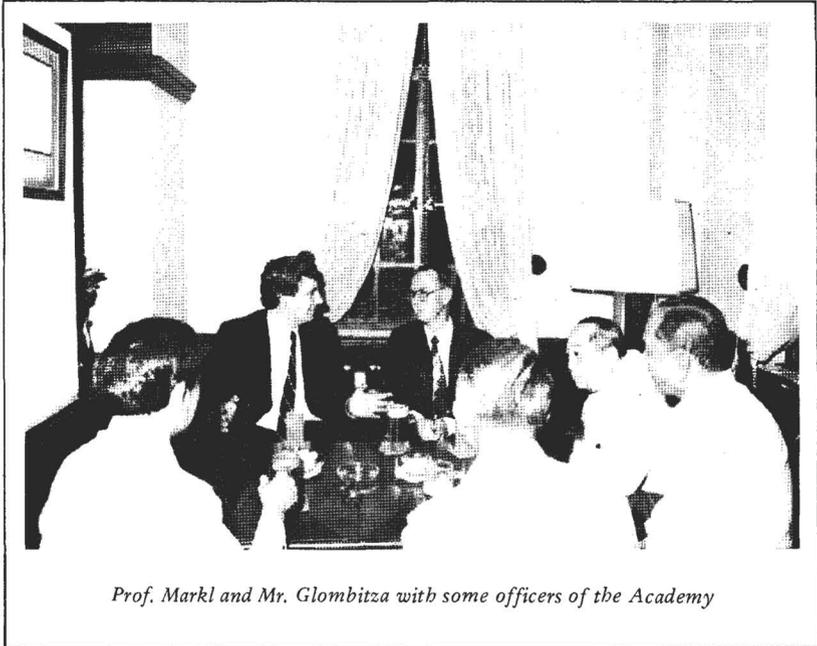
*Visit of the President of the Deutsche Forschungsgemeinschaft*



*Clockwise: Dr. Magno, Prof. Markl and Mr. Glombitza*

## REAFFIRMATION OF ROLE

On March 18-27, 1986 the Academy received Dr. J. Jayaraman, a biochemist from the Madurai Kamajrai University, India, under the NAST-INSA agreement. Dr. Jayaraman visited a number of research institutions and gave special lectures in his field of specialization, membrane biochemistry and pesticide metabolism.



*Prof. Markl and Mr. Glombitza with some officers of the Academy*

Under the West German agreement, the Academy hosted the visit of Dr. Hubert Markl and Mr. Jost-Gert Glombitza, the President and the Asian-Pacific Affairs Director respectively of the German Research Council (DFG) on September 4-7, 1986. Their visit explored ways of a more effective implementation the NAST-DFG agreement. They also met with scientists from UP Diliman and UP Los Baños and explored the possibilities of increasing the number of Filipino scientists going to Germany either for a study visit or a fellowship.

Under the Royal Society-NAST agreement, Dr. Magdalena C. Cantoria, Academician and UP Manila Professor of Pharmacy, went on a week-long study visit to England on November 28 to December 5, 1987 to view some research laboratories and to confirm the taxonomy of a Philippine zingiber.

However, the Academy continued to be beset with the problem of limited funds, especially for foreign travel purposes. At present, the travel funds of the Academy have been granted to augment the recipient's personal or institutional sources and are available only to Academicians and not other scientists.

In 1986, NAST President Paulo C. Campos attended the meeting of the FASAS Executive Council in Beijing, China and in 1987, he attended the same FASAS meeting in Thailand and the North-North and South-South Conference in Beijing, China, the

*Visit of the President of the Deutsche Forschungsgemeinschaft*



*With UPLB officials*

latter being sponsored by the Third World Academy of Sciences and the Chinese Academy of Sciences. In connection with these visits, Dr. Campos finalized arrangements for the FASAS Council meeting in Manila in July 1988.

**Publications.** In the last three years, the Academy has issued, or scheduled to be printed, its largest number of publication. As of June 1988 the Academy has approved the following publications:

- *Academy News* (quarterly)
- *Transactions* (annual)
- *State-of-the-Art Papers (Biological Sciences)*
- *Proceedings: Multi-Sectoral Conference on Dairy Development Strategies*
- *NAST: The First Decade*
- Dr. Encarnacion Alzona, *Fragmentos*
- Dr. Paulo C. Campos, *Selected Papers*
- Dr. Clara Y. Lim-Sylianco, *Genetic Toxicology*
- Dr. Fe del Mundo, *Selected Papers*
- Dr. Geminiano T. de Ocampo, *Memoirs*
- Dr. Gregorio T. Velasquez, *Phycological Research in the Philippines*
- Dr. Gregorio F. Zaide, *Biographical Dictionary of the Philippines.*



*Dr. Paulo C. Campos and Dr. Melcio S. Magno with members of the FASAS Executive Council in Beijing*

**Looking Forward**

## LOOKING FORWARD

Much of the Academy's first decade has been devoted to developing a program that would give the scientist his or her place of honor in society. Western, industrialized countries have fulfilled this function at least for two reasons: the recognition of the scientist's historical role in economic and industrial development that has contributed immeasurably to the attainment of the highest standards of living the advanced countries have ever experienced and the world has ever known; and the scientist's individual trait of favoring social esteem, particularly the esteem of colleagues and the science community, over, say, that pursuit of material goals.

NAST as a collegial body has accorded the scientist, in particular the senior scientists, this recognition through a system of peer selection, in which absolutely no doubt is cast upon its socially determined character. More than that, NAST has granted actual material rewards — gratuities and non-cash benefits such as those related to health and as well as to research fellowships. This is a recognition of the economic insecurities associated with employment in the academe and government research agencies, where practically all scientific researches are conducted.

Looking ahead now, with this program in place, NAST's recognition function will consider the interest of the younger scientists in the future. As the President of the Royal Society of London puts it: "... every effort should be made to keep down the average age of its members; too many academies have lost their influence by becoming clubs for the aged. Youth and vigour are necessary . . . [Given that other requirements are met] an academy should also seek out promising young scientists and ensure that they are given adequate support to develop their research potential.

One bane that afflicts Third World science communities is social isolation — the isolation of the scientist from the mainstream of scientific ideas, discoveries and trends that unceasingly flow from the world's great centers of scientific research. Facilitation in this area has been made through scientific communication, for instance, learned journals and scientific literature. But there is no substitute for personal contact and institution-to-institution arrangements. The Academy will move towards forging working linkages with its international counterparts beyond the present four national academies — the Royal Society of London, the Indian National Science Academy, the German Research Council and the Chinese Academy of Sciences — that the Academy has exchange programs with.

One of the finest traditions of the world's most prestigious academies center on their role as formulators of national science policies. The Academy will strengthen its capabilities in this area, an objective that should be realizable and feasible since, to begin, its Charter delineated its membership to be "composed of outstanding scientists to serve as a reservoir of competent scientific and technological manpower for the country."

This aim can be accomplished through a number of ways, for instance, building up organizational and planning capabilities to harness the highly developed human resources that the Academy has access to. The question may be asked: Will its recommendations — e.g., draft science policies — be adopted by the government?

There is no sure and easy answer to this very relevant question. It can be answered in this manner: To the degree that the Academy which as it is now is the highest and most

## LOOKING FORWARD

prestigious recognition body in science and technology, can transform its enormous potential into a force that is at once capable, cogent and credible, so can it influence the passage of socially responsive, science-related legislation. It can do this effectively only when the Academy possesses the independence that encourages responsible and unbiased pursuit of truth in all its scholarly and scientific endeavors. A *sine qua non* in this regard is fiscal and budgetary as well as administrative autonomy that is inherent to all centers of intellectual endeavours in democracies the world over.

**The National Academy  
of  
Science and Technology**



## ROLE OF THE NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY

### *Thrusts/Objectives*

#### A. Advisory services

- Δ to act as an advisory body to the President and Cabinet secretaries; to various government agencies and other institutions.
- Δ to promote free scientific inquiry and communication as well as improvement of the scientific climate in the country through relevant policy recommendations.

#### B. Promotion and recognition of scientific and technological efforts and achievements

- Δ to give recognition to outstanding achievements in science and technology.
- Δ to provide meaningful incentives to those engaged in research.
- Δ to promote scientific productivity.

#### C. International linkages

- Δ to promote collaborative effort among our scientists and their colleagues abroad through science and technology agreements.
- Δ to come out with publications which are used as exchange materials with science academies and libraries; acquisition of international scientific journals, technical books and other library materials.
- Δ to encourage and support participation of scientists in international conferences, seminars and workshops.

## ORGANIZATION

The National Academy of Science and Technology (NAST) is composed of members called *Academicians*. This general membership which shall not exceed fifty (50) at any one time is the policy making body of the Academy.

There are at least two meetings of the Academy a year: an annual meeting held on the last Thursday of February and a special meeting on the last Thursday of May. Other special meetings of the Academy may be called by the President of the Academy, by the Executive Council, or by 20% of the members of the Academy.

An Academician belongs to one of the following divisions of the Academy:

- I. Mathematical, Physical and Engineering Sciences
- II. Biological Sciences
- III. Social Sciences

## ORGANIZATION

### IV. Agricultural Sciences

### V. Health Sciences

The general administration and direction of the affairs of the Academy are vested in an Executive Council of seven members appointed by the President of the Philippines for a term of three years. It has the following powers and duties:

- a. To exercise general administration and direction of affairs of the Academy;
- b. To recommend general policies for the approval of the Academy;
- c. To recommend programs/projects to the Academy;
- d. To present to the Academy nominations for membership, including pertinent information about the nominees, after making the necessary study;
- e. To present proposed nominees for National Scientist to the Academy for its consideration and recommendation to the President of the Philippines;
- f. To recommend to the Academy for its consideration an annual budget of expenditures for submission to the Department of Budget through the Department of Science and Technology;
- g. To recommend to the Academy benefits, privileges, and incentives extended to Academicians and National Scientists;
- h. To recommend to the Academy changes in the rules and regulations; and
- i. To exercise other powers and perform other duties in accordance with Section 3 of Presidential Decree 1003-A.

The President, Vice-President, and Secretary of the Academy are elected by the general membership from members of the Executive Council for the duration of their current membership in the Executive Council. They are also referred to as the Bureau.

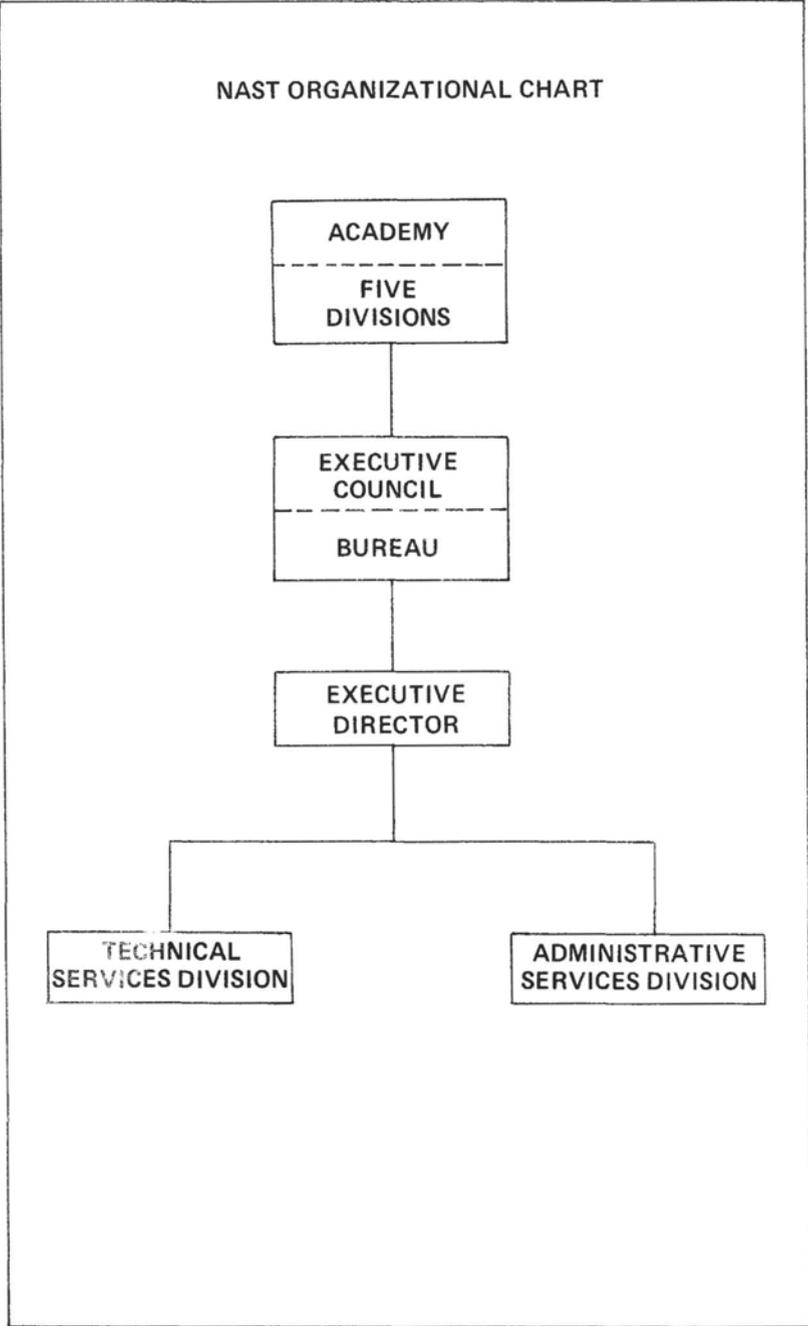
Regular meetings of the Executive Council are held every 2nd Thursday of the month. In between these meetings, the Bureau meets to consider urgent matters which will be subsequently confirmed by the Executive Council during a meeting.

An Executive Director heads the NAST Secretariat which implements decisions of the Executive Council, and attends to the day-to-day affairs of the Academy. The Secretariat consists of two divisions: Technical Services Division and Administrative Services Division.

The Secretariat of the Academy is located at the 1st Floor, Department of Science and Technology (DOST) Building, Taguig, Metro Manila, Philippines.

The Academy is an attached agency of the Department of Science and Technology (DOST) and serves as an advisory agency to the Department.

NAST ORGANIZATIONAL CHART



*Executive Council*

1985-1988

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

*Past Executive Council*

1982-1985

Dr. Paulo C. Campos	-- President
Dr. Melecio S. Magno	-- Vice-President
Dr. Tito A. Mijares	-- Secretary
Dr. José Encarnación, Jr.	-- Member
Dr. Raymundo A. Favila	-- Member
Dr. Francisco O. Santos	-- Member
Dr. Carmen C. Velasquez	-- Member

1978-1982

Dr. Paulo C. Campos	-- President
Dr. Alfredo V. Lagmay	-- Vice-President
Dr. Tito A. Mijares	-- Secretary
Dr. Cecilio F. Lopez	-- Member
Dr. Juan S. Salcedo, Jr.	-- Member
Dr. Alfredo C. Santos	-- Member
Dr. Carmen C. Velasquez	-- Member

*Division Chairmen*

Mathematical, Physical and Engineering

Sciences	-- Dr. Melecio S. Magno
Biological Sciences	-- Dr. Carmen C. Velasquez
Social Sciences	-- Dr. José Encarnación, Jr.
Agricultural Sciences	-- Dr. Dioscoro L. Umali
Health Sciences	-- Dr. Paulo C. Campos

*National Scientists*

Teodoro A. Agoncillo, Litt.D. (*honoris causa*)\*  
 Encarnacion Alzona, Ph.D.  
 Julian A. Banzon, Ph. D.\*  
 Luz Oliveros-Belardo, Ph.D.  
 José Encarnación, Jr. Ph.D.  
 Francisco M. Fronda, Ph.D.\*

## ORGANIZATION

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.\*

Juan S. Salcedo, Jr. M.D., D.Sc. (*bonoris causa*)\*

Alfredo C. Santos, Dr. phil.

Francisco O. Santos, Ph.D.\*

Dioscoro L. Umali, Ph.D.

Carmen C. Velasquez, Ph.D.

Gregorio T. Velasquez, Ph.D.\*

Gregorio Y. Zara, D.Sc.\*

Alfredo V. Lagmay, Ph.D.

### *Academicians*

Teodoro A. Agoncillo, Litt.D. (*bonoris causa*), History\*

Encarnacion Alzona, Ph.D., History

Clare R. Baltazar, Ph.D., Systematic Entomology

Julian A. Banzon, Ph. D., Biophysical Chemistry\*

Benjamin D. Cabrera, M.D., MPH, Medical Parasitology and Public Health

Solita Camara-Besa, M.D., M.S., Biochemistry

Filomena F. Campos, Ph.D., Plant Breeding/Cytogenetics

Paulo C. Campos, M.D., Medicine

Magdalena C. Cantoria, Ph.D., Botany

Gelia T. Castillo, Ph.D., Rural Sociology

Lourdes J. Cruz, Ph.D., Biochemistry

Amando M. Dalisay, Ph.D., Economics\*

Conrado S. Dayrit, M.D., Pharmacology/Cardiology

José Encarnación, Jr. Ph.D., Economics

Pedro B. Escuro, Ph.D., Genetics and Plant Breeding, D. Sc. (*bonoris causa*)

Raymundo A. Favila, Ph.D., Mathematics

Francisco M. Fronda, Ph.D., Animal Husbandry\*

Edito G. Garcia, M.D., M.P.H., Parasitology

Emerita V. de Guzman, Ph.D., Plant Physiology\*

Carmen Ll. Intengan, Ph.D., Nutrition

Emil Q. Javier, Ph.D., Plant Breeding and Genetics

Bienvenido O. Juliano, Ph.D., Organic Chemistry

Jose O. Juliano, Ph.D., Nuclear Chemistry

Quintin L. Kintanar, M.D., Ph.D., Environmental Medicine

Alfredo V. Lagmay, Ph.D., Experimental Psychology

Hilario D. G. Lara, M.D., Dr. PH, Public Health\*

Clara Y. Lim-Sylianco, Ph.D., Biochemistry and Organic Chemistry

Cecilio F. Lopez, Dr. phil, Philippine Linguistics and Oriental Studies\*

Melecio S. Magno, Ph.D., Physics

Tito A. Mijares, Ph.D., Statistics

Fe del Mundo, M.D., Pediatrics

\*Deceased.

Quirino O. Navarro, Ph.D., Nuclear Chemistry  
Bienvenido F. Nebres, S.J., Ph.D., Mathematics  
Geminiano T. de Ocampo, M.D., Ophthalmology\*  
Luz Oliveros-Belardo, Ph.D., Pharmaceutical Chemistry  
Faustino T. Orillo, Ph.D., Mycology  
Eduardo A. Quisumbing, Ph.D., Plant Taxonomy, Systematics and Morphology\*  
Dolores A. Ramirez, Ph.D., Biochemical Genetics  
Jose N. Rodriguez, M.D., Leprology\*  
Casimiro del Rosario, Ph.D., Physics  
Juan S. Salcedo, Jr. M.D., Nutrition and Public Health  
Juan S. Salcedo, Jr. M.D., Nutrition and Public Health\*  
Francisco O. Santos, Ph.D., Agricultural Chemistry\*  
Joventino D. Soriano, Ph.D., Cytogenetics and Mutation Research  
Dioscoro L. Umali, Ph.D., Plant Breeding and Genetics  
Jose R. Velasco, Ph.D., Plant Physiology  
Carmen C. Velasquez, Ph.D., Parasitology  
Gregorio T. Velasquez, Ph.D., Phycology  
Benito S. Vergara, Ph.D., Plant Physiology  
Gregorio F. Zaide, Ph.D., History\*  
Prescillano M. Zamora, Ph.D., Plant Anatomy – Morphology  
Gregorio Y. Zara, D.Sc., Engineering and Inventions\*  
Ricardo M. Lantican, Ph. D. Plant-Breeding

## Membership in the Academy

To be elected Academician is a recognition itself. It is a *peer* recognition.

A Filipino *scientist* may become a nominee to the Academy if formally endorsed by at least three Academicians. Credentials of a nominee are then reviewed by the Committee where his field of specialization falls, the Executive Council and the general membership under a prescribed screening period. A nominee may eventually join the roster of Academicians if he obtains more than 50% of the votes of the full membership of the Academy and after a formal investiture.

As embodied in the NAST Charter, a *scientist* is defined as an individual who has earned a doctoral degree in any field of sciences in an accredited University and has demonstrated and earned distinction in independent research or significant innovative achievement in the basic and applied sciences, including agricultural, engineering, and medical sciences, in mathematics and in the social sciences as manifested by his published works in recognized scientific and technical journals. The doctoral degree requirement may, however, be waived in highly meritorious and extremely exceptional cases.

The total membership of the Academy shall not exceed fifty (50) at any one time. This number may be increased by a two-thirds vote of all the members and approval thereof by the President of the Philippines.

Membership in the Academy carries with it the title *Academician* and the following benefits and privileges:

- A monthly gratuity;
- Medical/hospitalization benefits;
- Free publication of scientific and technological works;
- Travel support for attendance and participation in international conferences; and
- Such other incentives financial or otherwise, designed to promote scientific effort and achievement.

Membership in the Academy shall also be for life unless terminated for cause, by voluntary resignation or by loss of Filipino citizenship. An Academician may be separated for cause by a majority vote of the full membership at a special meeting called for the purpose.

With the original 10 members, the Academy has elected a total of 52 Academicians but only 39 of these are living. In 1979, the biggest batch of Academicians was elected totalling 13. Although election of new members is a yearly event, there were also years, 1984 and 1986, when no one among the nominees got the required votes to become an Academician.

# **The Academicians**

## ACADEMICIANS

Year	Academicians	Speciality	Remarks
1978	Paulo C. Campos, M.D.	Medicine	
1978	Alfredo V. Lagmay, Ph.D.	Experimental Psychology	
1978	Cecilio F. Lopez, Dr. phil.	Philippine Linguistics and Oriental Studies	deceased
1978	Tito A. Mijares, Ph.D.	Statistics	
1978	Juan S. Salcedo, Jr., M.D.	Nutrition and Public Health	deceased
1978	Alfredo C. Santos, Dr. phil.	Physical Chemistry	
1978	Dioscoro L. Umali, Ph.D.	Genetics and Plant Breeding	
1978	Carmen C. Velasquez, Ph.D.	Parasitology	
1978	Gregorio T. Velasquez	Phycology	deceased
1978	Gregorio Y. Zara, D. Sc.	Engineering and Inventions	deceased
1979	Encarnacion Alzona, Ph.D.	History	
1979	Teodoro A. Agoncillo, Litt.D. (h.c.)	History	deceased
1979	José Encarnación, Jr., Ph.D.	Economics	
1979	Pedro B. Escuro, Ph.D.	Genetics and Plant Breeding	
1979	Raymundo A. Favila, Ph.D.	Mathematics	
1979	Francisco M. Fronda, Ph.D.	Animal Husbandry	deceased
1979	Bienvenido O. Juliano, Ph.D.	Organic Chemistry	
1979	Melecio S. Magno, Ph.D.	Physics	
1979	Fe del Mundo, M.D., M.A.	Pediatrics	
1979	Geminiano T. de Ocampo, M.D.	Ophthalmology	deceased
1979	Eduardo A. Quisumbing, Ph.D.	Plant Taxonomy, Systematics and Morphology	deceased
1979	Jose N. Rodriguez, M.D.	Leprology	deceased
1979	Casimiro del Rosario, Ph.D.	Physics	deceased
1980	Luz Oliveros-Belardo, Ph.D.	Pharmaceutical Chemistry	
1980	Magdalena C. Cantoria, Ph.D.	Botany	
1980	Emerita V. de Guzman, Ph.D.	Plant Physiology	deceased
1980	Conrado S. Dayrit, M.D.	Pharmacology, Cardiology	
1980	Francisco O. Santos, Ph.D.	Agricultural Chemistry	deceased
1980	Joventino D. Soriano, Ph.D.	Cytogenetics and Mutation Research	
1980	Clara Y. Lim-Sylianco, Ph.D.	Biochemistry and Organic Chemistry	
1981	Clare R. Baltazar, Ph.D.	Systematic Entomology	
1981	Julian A. Banzon, Ph.D.	Biophysical Chemistry	deceased
1981	Amando M. Dalisay, Ph.D.	Economics	deceased
1981	Benjamin D. Cabrera, M.D., M.P.H.	Medical Parasitology and Public Health	
1982	Emil Q. Javier, Ph.D.	Plant Breeding and Genetics	
1983	Gelia T. Castillo, Ph.D.	Rural Sociology	
1983	Jose O. Juliano, Ph.D.	Nuclear Chemistry and Physics	

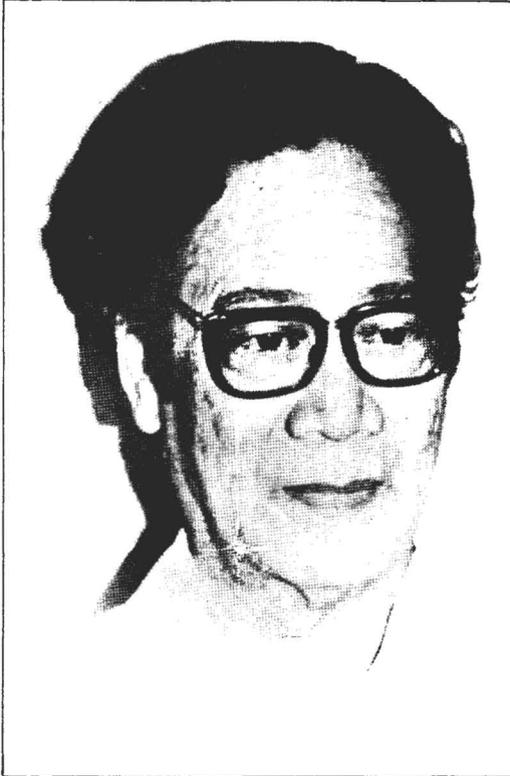
## ACADEMICIANS

1983	Hilario D.G. Lara, M.D., Dr. P.H.	Public Health	deceased
1983	Bienvenido F. Nebres, S.J., Ph.D.	Mathematics	
1983	Faustino T. Orillo, Ph.D.	Mycology	
1983	Jose R. Velasco, Ph.D.	Plant Physiology	
1985	Quintin L. Kintanar, M.D., Ph.D.	Environmental Medicine	
1985	Quirino O. Navarro, Ph.D.	Nuclear Chemistry	
1985	Gregorio F. Zaide, Ph.D.	History	deceased
1987	Solita Camara-Besa, M.D., M.S.	Biochemistry	
1987	Filomena F. Campos, Ph.D.	Plant Breeding/Cytogenetics	
1987	Lourdes J. Cruz, Ph.D.	Biochemistry	
1987	Edito G. Garcia	Medical Parasitology	
1987	Carmen Ll. Intengan, Ph.D.	Nutrition	
1987	Dolores A. Ramirez, Ph.D.	Biochemical Genetics	
1987	Benito S. Vergara, Ph.D.	Plant Physiology	
1987	Prescillano M. Zamora, Ph.D.	Plant Anatomy-Morphology	
1988	Ricardo M. Lantican, Ph.D.	Plant Breeding	

**Teodoro A. Agoncillo Litt. D. (*honoris causa*) Philippine History**

Ph.B., University of the Philippines, 1934

M.A., University of the Philippines, 1935



Considered as a radical historian, Prof. Agoncillo had been a major influence in Philippine historiography, which reflects the Filipino point of view, from the 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 on history. Among his books are: *Ang Kasaysayan ng Pilipinas*; *The Revolt of the Masses: The Story of Bonifacio and the Katipunan*; *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 him the title *University Professor*, the highest academic appointment in any university.

**Encarnacion Alzona, Ph.D. History**

B.S., M.A., University of the  
Philippines, 1913-1918

A.M., Radcliffe College, Harvard  
University, 1920

Ph.D., Columbia University, 1922



Eminent historian and mentor to a generation of other eminent historians while a professor of history at the University of the Philippines. A prolific writer, some of her historical writings have already become classics, particularly her *A History of Education in the Philippines*. For her *El Legado de España a Filipina*, she received the Lone Prize awarded by the II Congress de Hispanistas de Filipinas in 1954.

Dr. Alzona has the distinction of the first woman Ph.D. in the Philippines. She has practically received every distinguished award the country can bestow upon her.: Apolinario Mabini Centennial Award (1964), Rizal Centennial Award (1961), Republic Cultural Heritage Award for historical writing (1966) and Rizal Pro Patria Medal of the Republic of the Philippines (1971).

**Clare R. Baltazar, Ph.D. Systematic Entomology**

B.S.A. (Entomology), University of the Philippines, 1947

M.S. (Economic Entomology), University of Wisconsin, 1950

Ph.D. (Systematic Entomology), University of Wisconsin, 1957



Dr. Baltazar has consistently maintained outstandingly high standards of achievement throughout her academic life. Her numerous publications on Philippine insects especially on *Philippine Hymenoptera* are very significant to science for they lay the groundwork for future biological control in the Philippines. Her book *Philippine Insects* is the first authoritative text

on Philippine insects. Other important contributions of Dr. Baltazar to science are the discoveries of 8 and one subgenus of Hymenoptera and 108 new species of the Philippine parasitic wasps.

For these achievement, Dr. Baltazar is well recognized here and abroad. In 1980, she received the Rizal Patria Award in entomology.

**Julian A. Banzon, Ph.D. Biophysical Chemistry**

B.S. (Chemistry), University of the Philippines, 1930

Ph.D. (Biophysical Chemistry), Iowa State University, 1940



Dr. Banzon has done a great deal of work on local materials especially coconut as the renewable source of chemicals and fuels. His work on the production of ethyl esters from sugarcane and coconut is the first study on fuels from these crops. He also devised some novel processes noteworthy among these is the extraction of residual coconut oil by chemical, rather than by physical process.

For these and many more significant scientific works, Dr. Banzon has been accorded honors and citations notably: Distinguished Service Award, Integrated Chemist of the Philippines, Inc. (1980), Chemist of the Year Award, Professional Regulation Commission (1978) and the PHILSUGIN Award for research, Crop Society of the Philippines, 1976.

**Benjamin D. Cabrera M.D., M.P.H. Medical Parasitology  
and Public Health**

M.D., University of the Philippines, 1945

M.P.H., Tulane University, 1950



Dr. Cabrera has more than a hundred scientific publications concerning medical parasitology and public health. For his work on filariasis, Dr. Cabrera received the Philippine Legion of Honor, a Presidential Award in 1966. With the elucidation of the epidemiology and life cycles of filarial parasites,

preventive measures in the form of drug treatment of human cases as well as measures against mosquito vectors can be implemented. Dr. Cabrera also worked on the control of ascariasis. With the model he proposed, hazards produced by these soil-transmitted helminths can be reduced.

**Solita F. Camara-Besa M.D., M.S. Biochemistry**

M.D., University of the Philippines, 1938

M.S. (Biological Chemistry), University of Michigan, 1940



Dr. Camara-Besa is a medical educator and researcher. She has worked on the sodium and potassium content of Philippine foods and established standards useful in the preparation of diets. Her series of 8 papers on cholesterol levels in relation to diets of various segments of the Filipino population which are very important epidemiological

basic data on Filipino give an idea of the importance of fats and cholesterol in the epidemiology of atherosclerosis among Filipinos.

Some of Dr. Camara-Besa's researches were award winning. She was a Barbour Scholar, University of Michigan from 1939-1940 and is member of various honorary and learned societies.

**Filomena F. Campos, Ph.D. Plant Breeding/Cytogenetics**

B.S. (Botany), University of the Philippines, 1951

M.S. (Plant Genetics), University of Minnesota, 1954

Ph.D. (Plant Breeding/Cytogenetics), University of Maryland, 1958



Dr. Campos is recognized for her contributions to cotton research in the Philippines leading to the development of a package of technology on cotton production achieved in relatively short period of three (3) years. She is also noted for deep involvement in research on the sunflower, a very promising source of edible oil and livestock

feed.

In recognition of her achievement, Dr. Campos received the following awards: PhilAAS Gregorio Y. Zara Scientists Award (1973), Ayala Award (1974) and as one of the Outstanding Filipino Scientists, Presidential Award for public service (1976) and Woman of the World Award (1983).

**Paulo C. Campos, M.D. Medicine**

M.D. University of the Philippines, 1946

Postgraduate, Johns Hopkins School of Medicine, 1953-1958

Harvard School of Medicine, 1953-1958

Oak Ridge Institute of Nuclear Medicine, 1958



Noted for his work on nuclear medicine. As a health scientist, Dr. Campos authored/co-authored 75 scientific publications some of which were award winning. His researches namely: (1) Observation on Some Parameter 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.

**Magdalena C. Cantoria, Ph.D. Botany**

B.S. (Pharmacy), University of the Philippines, 1947

M.S. (Botany), University of the Philippines, 1951

M.S. (Pharmacy), Massachusetts College of Pharmacy, 1955

Ph.D. (Botany), University of Chicago, 1961



With pharmacy and botany as background, Dr. Cantoria's researches dealt particularly on the morphology, physiology and biochemistry of drug plants. She has done basic studies on the pharmacognosy of agar, rauwolfia, datura, mint and *Piper* species.

For her paper on the morphology and anatomy of *Rauvofia vomitoria* Afz., Dr. Cantoria re-

ceived the Edwin Leigh Newcomb Award in pharmacognosy given by the American Foundation for Pharmaceutical Education in 1954 and again in 1962 (with Edward S. Mika) on the growth and development of *Datura stramonium* L. She is also recipient of Phi Sigma awards for marked distinction in biology, 1951 and Most Outstanding Phi Sigman, 1977.

**Gelia T. Castillo, Ph.D. Rural Sociology**

A.B. (Psychology), University of the Philippines, 1948

M.S. (Rural Sociology), Pennsylvania State University, 1958

Ph.D. (Rural Sociology), Cornell University, 1960



Dr. Castillo's publications are major and definitive works on Philippine agricultural and rural development. Her book *All in a Grain of Rice* is the first book written by a Filipino about the Filipino farmer's response to new technology. Another book, *Beyond Manila*, has been cited as an in-depth and analytical study of the actual problems and needs of the rural areas in relation to countryside development. The totality of Dr. Castillo's research undertakings has given us

much needed insights on our own rural development effort and our attempt to reach the farmer and the rural poor.

As an outstanding rural sociologist, Dr. Castillo is recognized internationally. For her contribution as a social scientist, she was presented the Rizal Pro Patria Award (1976), Distinguished Alumnus Award of the UP Alumni Association (1975) and the Distinguished Alumnus Award of the UP College of Agriculture (1979).

**Lourdes J. Cruz, Ph.D. Biochemistry**

B.S. (Chemistry), University of the Philippines, 1962

M.S. (Biochemistry), University of Iowa, 1966

Ph.D. (Biochemistry), University of Iowa, 1968



Dr. Cruz has made significant contributions to the biochemistry of toxic peptides from the venom of fish-hunting *Conus* marine snails. Her studies led in part to the biochemical characterization of over 50 biologically active peptides from *Conus* venom, and the development of conotoxins as biochemical probes for examining the activities of the brain.  $\omega$ -Conotoxin is now one of the most widely used tools for studying neuronal calcium chan-

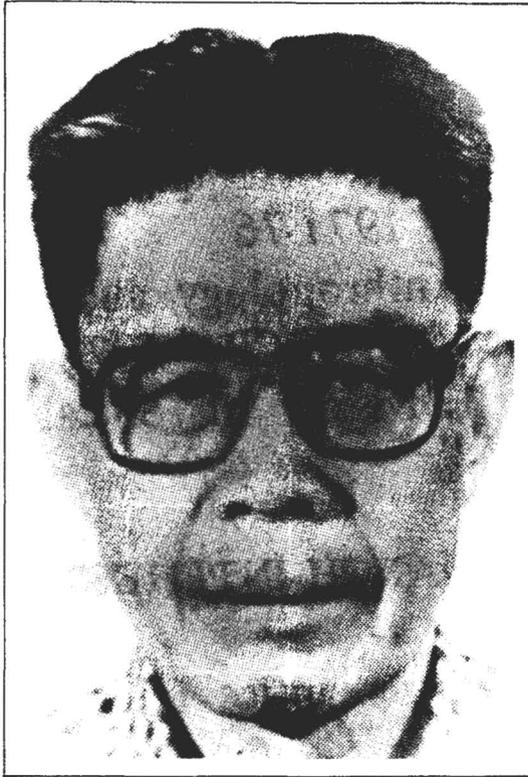
nels, and  $\mu$ -conotoxin is the reagent of choice in neuroscience when muscular activity must be controlled to examine events at the synapse.

For her achievement in science, Dr. Cruz is recipient of the NAST Outstanding Young Scientist Award (1981), the NRCP Achievement Award in Chemistry (1982) and the Outstanding Women in the Nation's Service Award (Biochemistry) (1986).

**Amando M. Dalisay, Ph.D. Economics**

B.S.A., University of the Philippines, 1937

M.A., Ph.D. (Economics), Harvard University, 1942, 1946



Dr. Dalisay had done pioneering work on economic policy for Philippine agriculture; consistent in-depth studies and field practices on agricultural and rural development in the country since 1954. His book, *Agricultural and Rural Development in the Philippines (Post-War Period)* defines the setting and the various factors or forces that influence agricultural and rural devel-

opment in the early post-war period. His paper *Values in Policy Formulation for Rural Development* presents the role of our social values in providing direction to the formation of public policies for rural development.

Dr. Dalisay was recipient of the Distinguished Alumnus Award for economics and public service, UP College of Agriculture in 1973.

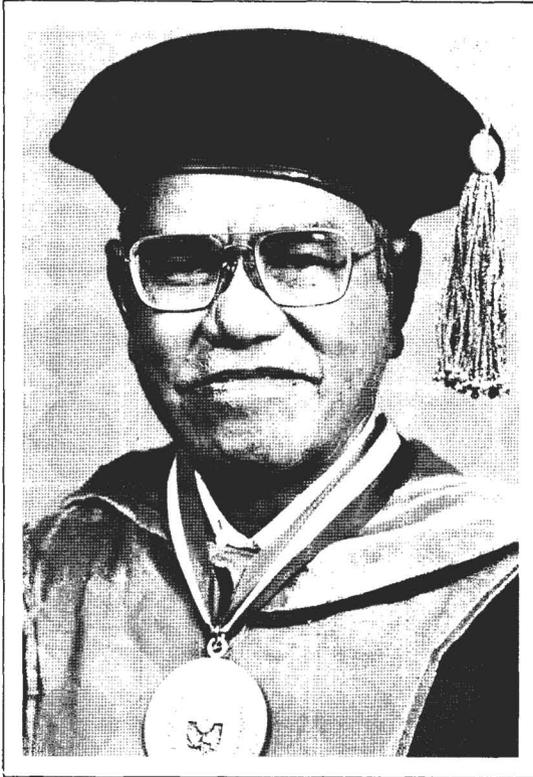
**Conrado S. Dayrit, M.D. Pharmacology, Cardiology**

M.D., University of the Philippines, 1943

Postgraduate, University of Michigan Medical School, 1946-1947

Cornell University, 1947-1948

Kansas University Medical Centers, 1963



A medical practitioner, researcher, professor in clinical pharmacology and cardiology, Dr. Dayrit has authored/co-authored more than 70 scientific articles published here and abroad. He also edited/chaired the First and Second Edition of Drug Index, 1965, 1967 and the First Edition of the Philippine Formulary, 1978.

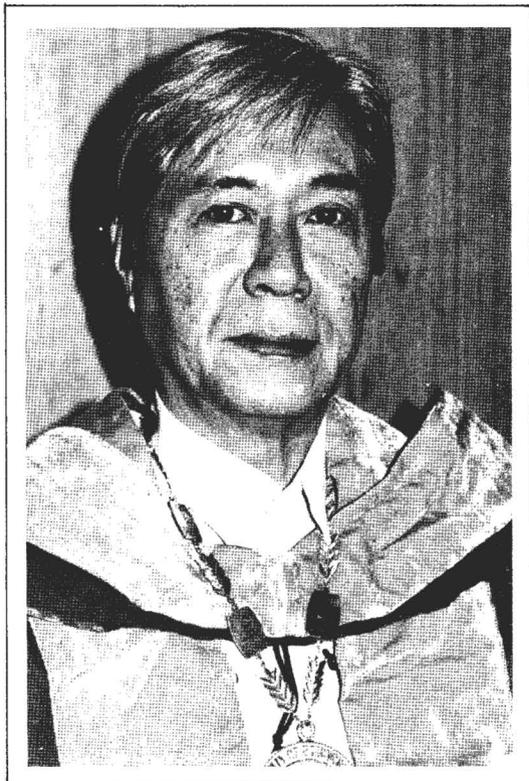
Dr. Dayrit is recipient of the

Republic Cultural Heritage Award in 1963. He is also thrice recipient of First Prize in Research award for basic sciences and a First Prize in Research award for clinical research from the Manila Medical Society. In 1977, the Philippine Association for the Advancement of Science presented him the Gregorio Y. Zara award in Applied Science.

**José Encarnación, Jr., Ph.D. Economics**

Ph.B., M.A. (Philosophy), University of the Philippines, 1950, 1954

A.M., Ph.D. (Economics), Princeton University, 1958, 1960



Noted economist, a theorist with interests also in the policy area. Professor and Dean, School of Economics of the University of the Philippines.

Dr. Encarnación is the first Filipino to publish in an economic journal of international standing. His contributions to economic theory have appeared in major journals in

England and the United States.

In recognition of his contributions to economics, Dr. Encarnación is recipient of several awards notably: Distinguished Scholar award from the University of the Philippines (1968), Philippines' Ten Outstanding Young Men award (1963) and Miguel Cuaderno Chair in political economy, since 1969.

**Pedro B. Escuro, Ph.D. Genetics and Plant Breeding**

B.S.A. (Agronomy), University of the Philippines, Los Baños, 1952

M.S. (Plant Breeding), Cornell University, 1954

Ph.D. (Genetics and Plant Breeding), University of Minnesota, 1959



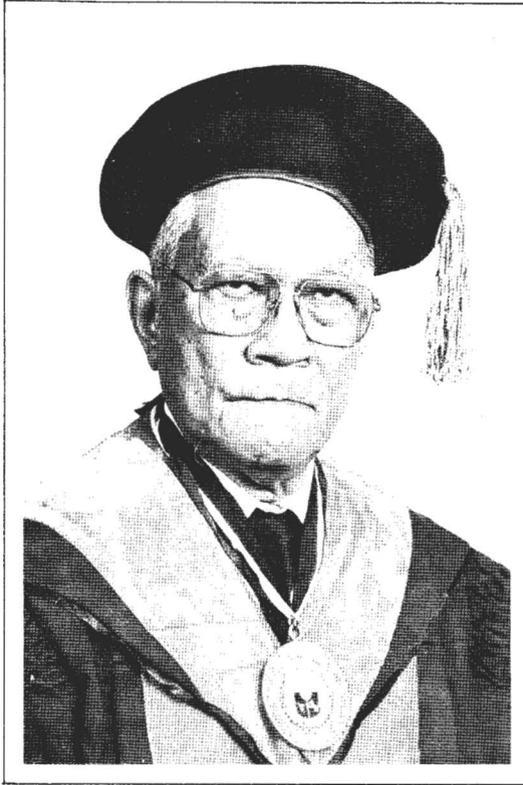
Dr. Escuro has made significant contributions to rice breeding, as plant breeder Professor extension worker and consultant in agricultural projects. He provided leadership in the development, isolation, and release of nine Seed Board rice varieties: Milpal 4, HBD-2, Azmil 26 and C-22 (upland) and C-18, C4-63, C4-137, C-168 and C-12 (lowland).

Dr. Escuro has 18 honors and awards to his name. These include

two Presidential awards, Presidential Plaque of Merit for outstanding accomplishments in rice improvement (1967) and Rizal Pro Patria award for outstanding contribution to rice breeding and genetics. He is also recipient of the University of the Philippines Distinguished Professional award in agriculture (1973), and D. Sc. (honoris causa 1974) and the 1974 Ayala award in agricultural science.

**Raymundo A. Favila, Ph.D. Mathematics**

A.B., M.A., Ph.D., University of California, Berkeley, 1933, 1935, 1939



One of the pioneers in mathematics in the Philippines, Dr. Favila contributed significantly to the advancement of mathematics and mathematics education in the country. He has done basic studies such as on stratifiable congruences and geometric inequalities and has co-authored textbooks in algebra and trigonometry.

After obtaining his Ph.D. in mathematics with Phi Beta Kappa

honors at UC Berkeley, Dr. Favila decided to come back to the country to join the faculty of the University of the Philippines. He became full professor in 1957 and was appointed Professor Emeritus of Mathematics when he retired in 1976. For his contribution to mathematics and mathematics education, he received the 1974 Distinguished Professional award in mathematics.

**Francisco M. Fronda, Ph.D. Animal Husbandry**

B.S.A., University of the Philippines, Los Baños, 1919

M.S., Ph.D., Cornell University, 1920, 1922



Having devoted over six decades of his life to teaching, research, and extension services, Dr. Fronda contributed immensely to the development of poultry industry not only in the Philippines but in Asia region as well. In recognition of his pioneering contributions, he was cited as the "Father of Poultry Science in the Philippines" by the Philippine Association of Animal Science, 1980; and "Father of Thai

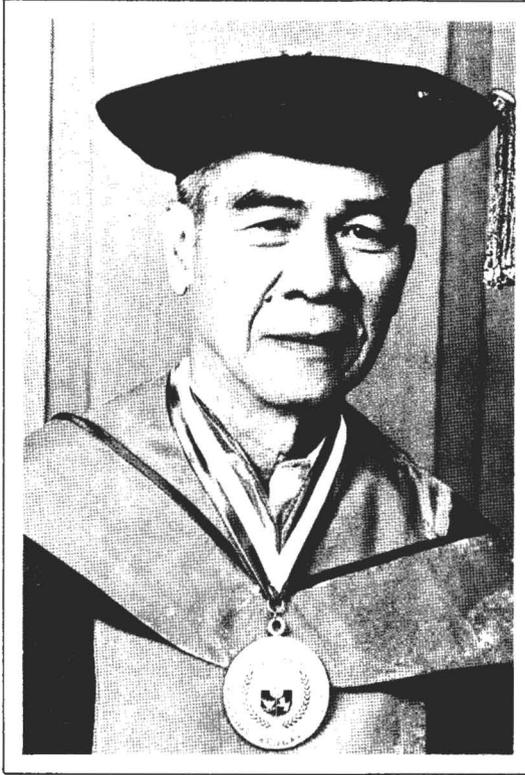
Poultry Industry" honor presented by Her Royal Highness, the Crown Princess of Thailand, 1982.

Dr. Fronda has no less than 500 scientific articles of great value in the development of poultry and livestock industry. He also authored a textbook in *Poultry Science Production* for students in agriculture and co-authored a series of books entitled "Let Us Raise Series" for secondary and elementary pupils.

**Edito G. Garcia, M.D., M.P.H. Parasitology**

M.D., University of the Philippines, 1949

M.P.H., Harvard University, 1956



Dr. Garcia, Professor of Parasitology at the U.P. Institute of Public Health, has done work in the areas of immunology and parasitic infections. Since 1979, Dr. Garcia has been conducting studies on the immunology of *Schistosomiasis japonica* especially on the development of vaccines. A hypothesis has been developed which enabled Dr. Garcia and his associates to identify an immunologic mechanism which leads to granuloma modulation and

consequently disease abatement in schistosomiasis. To date 18 scientific papers on the progress of this research have been published in foreign journals and a vaccine against infection is being developed.

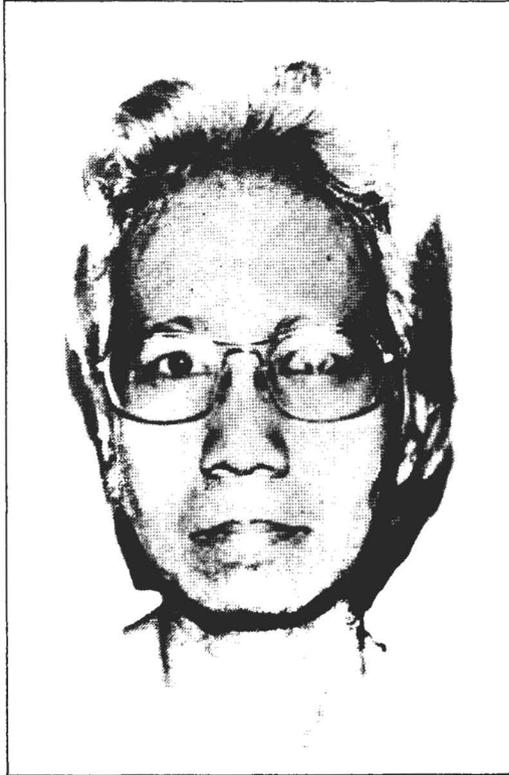
Dr. Garcia's most important awards include: Distinguished Alumnus award for medical research, U.P. (1977), San Miguel Brewery Professorial Chair (1982) and the NRCP Achievement award for research on immunology (1984).

**Emerita V. de Guzman, Ph.D. Plant Physiology**

B.S. (Botany), University of the Philippines, 1953

M.S. (Plant Physiology), Cornell University, 1956

Ph.D. (Plant Physiology), Cornell University, 1961



An outstanding contribution of Dr. de Guzman is her series of work on the growth and development in vitro of the *makapuno* coconut embryo. As a result of this effort, she has revolutionized the old ratio of the makapuno-bearing nuts in the tropics which produce only 3-5 makapuno nuts in every receme bearing 14-19 nuts. Dr. de Guzman produced 100% all makapuno-bearing

ing in the raceme.

For these significant studies, Dr. de Guzman received recognition: Rizal Pro Patria award, 1976; SEARCA Professorial Chair in Plant Physiology, 1974-1976; Outstanding Scientist award of the Philippine Association for the Advancement of Science, 1976; Professional award for agriculture of the UP Alumni Association, 1977.

**Carmen Ll. Intengan, Ph.D. Nutrition**

B.S. (Pharmacy), Manila Central University, 1935

A.B. (Chemistry), University of Southern California, 1938

M.S. (Food and Nutrition), Columbia University, 1948

Ph.D., Columbia University, 1961



Dr. Intengan has contributed to the advancement of nutrition in the country as a researcher and science administrator, having served as the director of the Food and Nutrition Research Institute from 1974-1980.

Awards for Dr. Intengan include:

Presidential award for outstanding contribution in basic nutrition research in the past decade (1957), FIDA Ten Outstanding Women award (1967), Presidential award of merit for science (1968), and the NCRP Achievement award (1983).

**Emil Q. Javier, Ph.D. Plant Breeding and Genetics**

B.S.A., University of the Philippines, 1960

M.S.A. (Agronomy) University of Illinois, 1964

Ph.D. (Plant Breeding), Cornell University, 1969



The most outstanding virtue of Dr. Javier as a scientist is his ability to conceive and put into action realistic approaches to the problems that confront tropical agriculture in a developing country. Aware of the small farmer's limited resources, he has always directed his researches toward developing practical methods of improved crop production, using cheap, indigenous inputs. Based on his experiment of introducing legume into native Imperata pastures with minimum or no tillage, a national pasture develop-

ment program was launched in 1972 premised on the minimum or no tillage establishment of adapted legumes on native pastures with application of phosphorous.

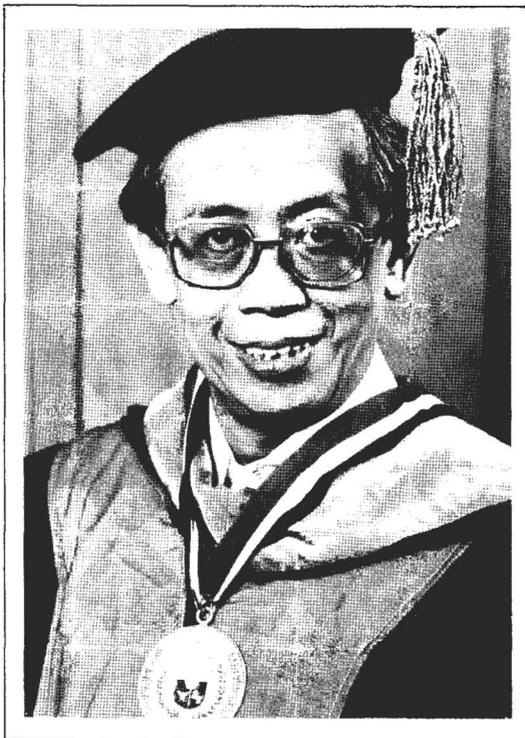
Dr. Javier is recipient of Rizal Pro Patria award in agriculture (1975), SEARCA Professorial Chair in forage and pasture technology (1974-75), Ten Outstanding Young Men (TOYM) award in agriculture (1975) and the UP Alumni Association Professional Achievement award in agriculture (1980).

**Bienvenido O. Juliano, Ph.D. Organic Chemistry**

B.S.A., University of the Philippines, Los Baños, 1955

M.Sc. (Organic Chemistry), Ohio State University, Columbus, 1958

Ph.D. (Organic Chemistry), Ohio State University, Columbus, 1959



After obtaining his Ph.D. with straight A's, at the age of 22, Dr. Juliano consistently demonstrated excellence in research. At age 42, he had already more than a hundred scientific articles mostly published in international journals. His researches concern properties of starch and protein and other grain constituents in relation to grain quality of rice. For instance, he showed that amylose content of starch is the major determinant of eating quality of milled rice in Asia and highly negatively cor-

related with stickiness of cooked rice.

Dr. Juliano is member to a number of learned societies and professional organizations including the American Association of Cereal Chemists and recipient of: Ayala award in physical science, 1974; Ten Outstanding Young Men (TOYM) award for science, 1964; Rizal Pro Patria award of the Republic of the Philippines, 1976; and University of the Philippines Distinguished Alumnus award, 1977.

**Jose O. Juliano, Ph.D. Nuclear Chemistry and Physics**

B.S.A. (Agricultural Chemistry and Mathematics),

University of the Philippines, 1952

M.S. (Electrochemistry and Chemical Engineering),

Louisiana State University, 1954

Ph.D. (Nuclear Chemistry and Physics),

University of California, 1957

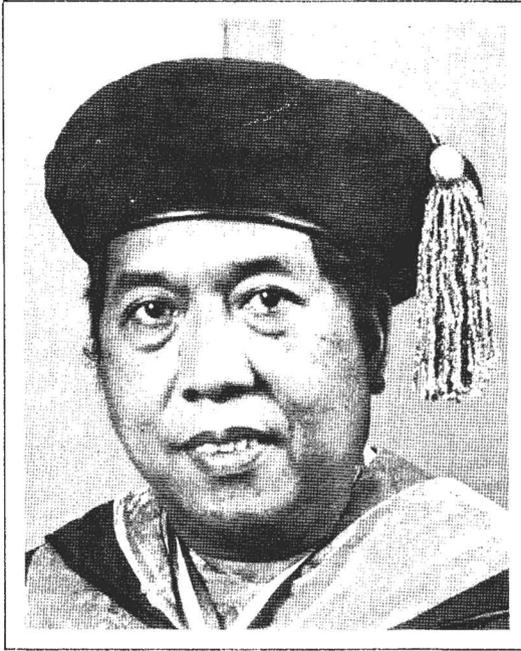


Dr. Juliano is known for his researches in nuclear chemistry and physics. Noteworthy of his published research works which total 50 are (1) Rapid and Non-destructive Analysis of Sulfur and Calcium by Radioactivation and Photoneutron Counting (2) Disintegration of Iron-52 and Iron-53. His contributions have helped

attain increased understanding of nuclear science.

In 1959, Dr. Juliano was one of the recipients of the TOYM award for his contribution in nuclear science. He is also member of the American Nuclear Society, American Physical Society and the American Chemical Society.

**Quintin L. Kintanar, M.D., Ph.D. Environmental Medicine**  
M.D., University of the Philippines, 1961  
Ph.D. (Environmental Medicine), Johns Hopkins University, 1969



Dr. Kintanar has 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 hypolipidemia induced by orotic acid thus assisting in the clarification of the molecular mechanisms of lipo-protein biosynthesis. He also pioneered in the pharmacological screening of Philippine plants using multidimensional observation techniques.

In the 60's, Dr. Kintanar received

the Burke award for excellence in cardiovascular medicine and the Republic Heritage award. 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; and First Prizes in the PMA-Abbot award and the 1979 NSDB Researcher of the Year. In 1981, Dr. Kintanar received the UP Alumni Association Professional Achievement award in science.

**Alfredo V. Lagmay, Ph.D. Experimental Psychology**Ph.B. *cum laude* (Philosophy), University of the Philippines, 1947

M.A. (Philosophy), University of the Philippines, 1951

Ph.D. (Experimental Psychology), Harvard University, 1955



Dr. Lagmay pursued a lot of studies relating to experimental analysis of behavior, behavior modification, relaxation and related states, and hypnosis.

In recognition of his work, the University of the Philippines awarded him a Professorial Chair in Psychology (1973-75). He is also member of prestigious learned societies here and abroad including the International Council of Psycho-

logists, American Psychological Association and the International Association of Applied Psychology.

In 1984, he received the Distinguished Service award for significant contributions to psychology and the social sciences by the Association for Anthropological Diplomacy, Politics and Society and in cooperation with the Association of Third World Anthropologists.

**Hilario D.G. Lara, M.D., Dr. P.H. Public Health**

M.D., University of the Philippines, 1919

M.P.H., Johns Hopkins University, 1923

Dr. P.H., Johns Hopkins University, 1923



Dr. Lara devoted more than fifty years of his life to the pursuit, dissemination and application of knowledge pertaining to epidemiology and prevention as well as control of disease, promotion and conservation of health, sanitation of environment and proper coordination for efficient use of resources for these purposes.

Dr. Lara organized and devel-

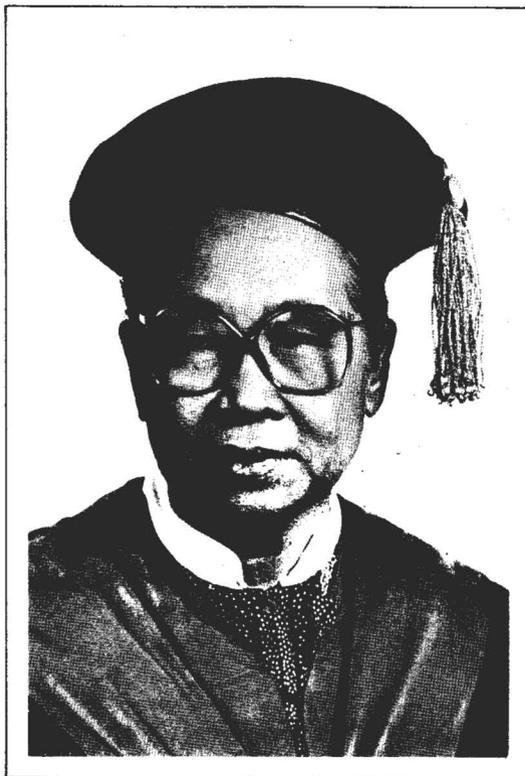
oped the now Institute of Public Health, University of the Philippines, and was instrumental in the establishment of the National Research Council of the Philippines. He has been cited for his exhaustive studies on the epidemiology of cholera, typhoid fever, dysentery, measles and diphtheria which led to the control of these diseases in the country.

**Clara Y. Lim-Sylianco, Ph.D. Biochemistry and Organic Chemistry**

B.S. (Chemistry), Siliman University, 1949

M.S. (Chemistry), University of the Philippines, 1953

Ph.D. (Biochemistry and Organic Chemistry), University of Iowa, 1957



Dr. Sylianco has done a lot of work on mutagens, antimutagens, and bio-organic mechanisms where she has more than 50 scientific articles, 7 books and 5 monographs to her name. Her books are used as textbooks in college chemistry courses in many schools throughout

the country.

For her achievements, Dr. Sylianco received the Gregorio Y. Zara award, 1979; UP Endowment Professorial Chair in chemistry, 1974-1977; and was Fellow of the Royal Society, 1958.

**Cecilio F. Lopez, Dr. phil. Philippine Linguistics and Oriental Studies**

B.S. (Zoology), University of the Philippines, 1923

Dr. phil. (Linguistics major, ethnology and phonetics minor),  
University of Hamburg, 1928



Dr. Lopez was cited as the Father of Philippine Linguistics in recognition of his pioneering work in the development of a Filipino tradition in the scientific study of Philippine language. Many of his works are considered classics such as *A Manual to the Philippine National Language*, two sequels of *A Comparative Philippine World-List*, 1974 and 1976 and *A Handbook of Comparative Austronesian*, 1978 and in two parts: the mnemonic, consisting of 109 problems of proto-morphs solved in five Indone-

sian languages, two Melanesian languages and three Polynesian languages; the heuristic, including 24 Philippine languages and 192 proto-Austronesian morphs.

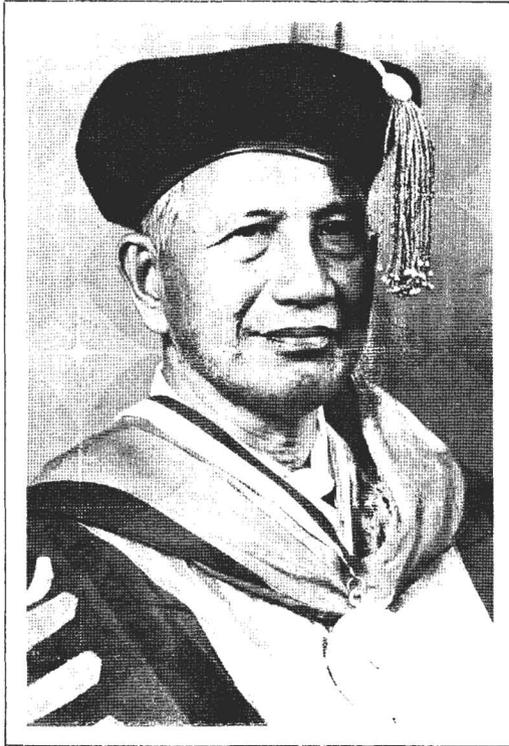
Dr. Lopez was recipient of several honors and awards. He was a John Simon Guggenheim Fellow in Linguistics at Yale University in Michigan. In 1970, he was awarded a plaque and gold medal as Outstanding Alumnus of the University of the Philippines.

**Melecio S. Magno, Ph.D. Physics**

B.S. (Mining Engineering), *cum laude*, University of the Philippines, 1940

M.A. (Physics), Johns Hopkins University, 1951

Ph.D. (Physics), Johns Hopkins University, 1958



Dr. Magno has done studies on the absorption and fluorescence spectroscopy of crystals, specifically rare-earth crystals; effects of typhoons on the distribution of atmospheric ozone; sky luminosity; atmospheric radiation; gravitation; and the philosophy of science. He is a co-author of *University Physics*, a textbook in physics at the University of the Philippines.

Dr. Magno was U.P. Endowment

Professorial Chair holder in physics from 1973-1976 and recipient of a UNDP-WMO Fellowship in environmental physics and ozone research in 1974. He became Vice-President for Academic Affairs at the U.P. in 1975. In 1976, Dr. Magno was appointed Chairman of the National Science Development Board (NSDB), and in 1978, when the NSDB became a ministry, he became the first Minister of Science.

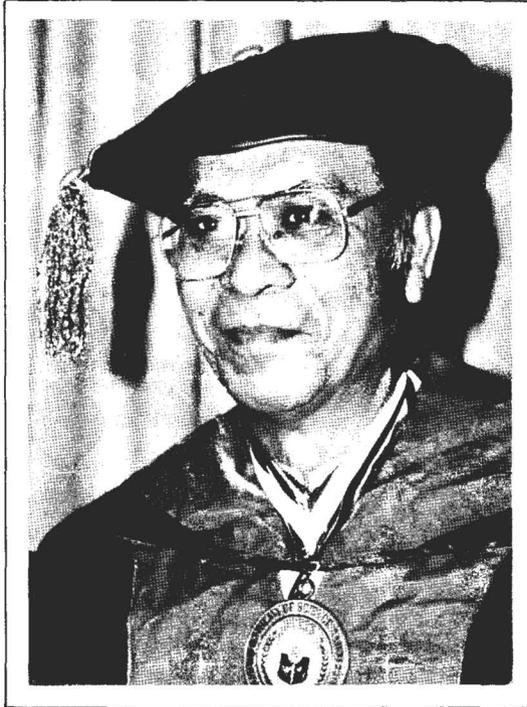
**Tito A. Mijares, Ph.D. Statistics**

A.B. (Meteorology), University of California, Los Angeles, 1948

B.S. (Electrical Engineering), National University, 1950

M.S. (Statistics), University of the Philippines, 1958

Ph.D. (Statistics), Harvard University, 1962



As researcher, Dr. Mijares conducted studies concerning multivariate theory and analysis which were published in *The Annals of Mathematical Statistics*, an international journal.

As Deputy Director-General of the National Economic Development Authority (NEDA) and Executive Director of the National Census and Statistics Office (NCSO) for a number of years, Dr. Mijares

had the responsibility of overseeing the overall development and direction of the statistical system in the country.

For his achievement in statistics, Dr. Mijares was elected to membership in international statistical groups such as the Statistical Institute for Asia and the Pacific, International Statistical Institute, and the Institute for Vital Registration and Statistics.

**Fe del Mundo, M.D. M.A. Pediatrics**

M.D., University of the Philippines, 1933.

M.A. (Bacteriology), Boston University and Massachusetts  
Institute of Technology, 1940



Dr. del Mundo dedicated her life to the cause of pediatrics in the country. She did not confine herself only to research in different aspects of pediatrics but she also trained physicians, paramedics and lay health workers in child care. She also went to the extent of doing extension services to remote rural areas in the Philippines and became the moving spirit behind the establishment of various pedia-

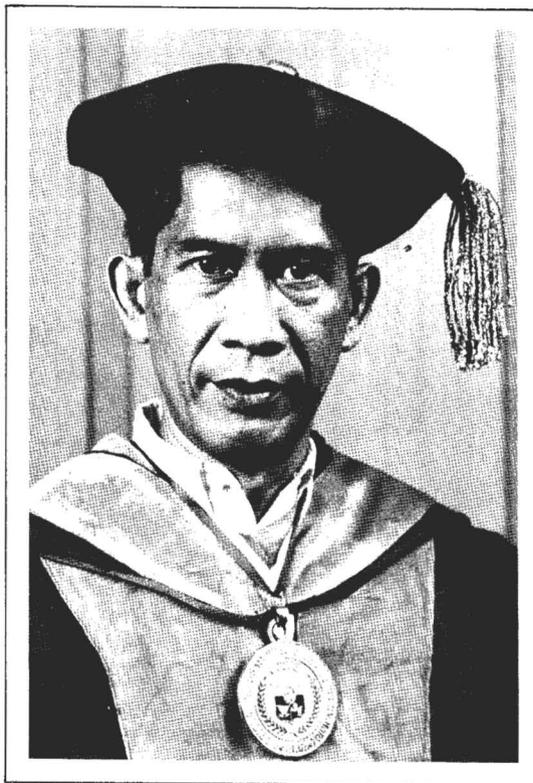
tric institutions in the country.

Her untiring devotion to child care earned her a number of honors: Elizabeth Blackwell award for outstanding service to mankind, 1966; Ramon Magsaysay award for public service by a private citizen, 1977; Rotary International Science award, 1960; and 15th International Congress of Pediatrics award as most outstanding pediatrician and humanitarian, 1977.

**Quirino O. Navarro, Ph.D. Nuclear Chemistry**

B.S. (Chemistry), University of the Philippines, 1956

Ph.D. (Nuclear Chemistry), University of California at Berkeley, 1962



A significant contribution of Dr. Navarro to science is the determination of nuclear property in the isotopes of californium, einsteinium and dysprosium using cryogenic techniques. His findings were cited in two books and three international tomes of nuclear science and later

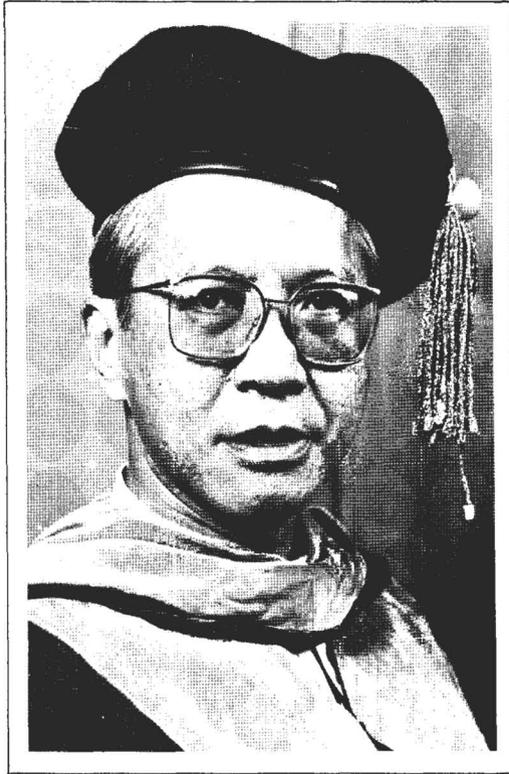
confirmed at the University of California at Berkeley with the use of advanced instrumentation. Dr. Navarro has also worked on neutron spectrometry and crystallography; and electronics and instrumentation process.

**Bienvenido F. Nebres, Ph.D. Mathematics**

A.B., M.A. (Philosophy), Berchmans College (Cebu City), 1962, 1963

M.S. (Mathematics), Stanford University, 1967

Ph.D. (Mathematics), Stanford University, 1970

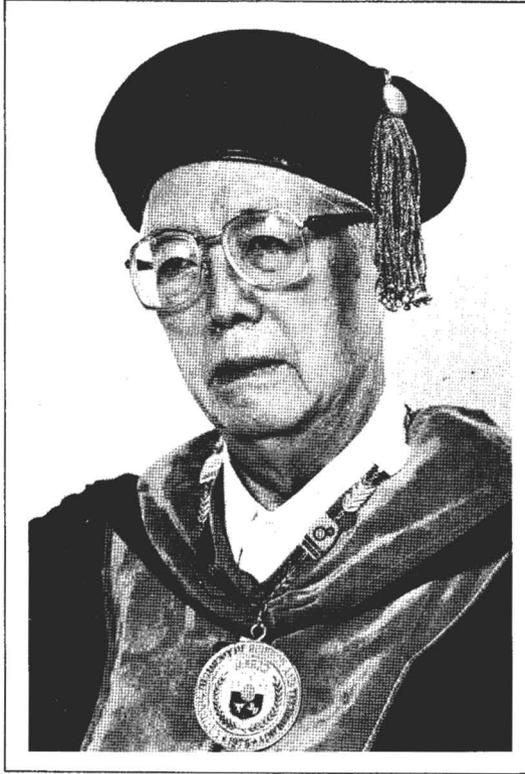


Fr. Nebres is one of the foremost living mathematicians today. He has published some 15 papers in pure mathematics and in mathematics education. As President of the Mathematical Society of the Philippines for a number of years, he contributed greatly to the devel-

opment of higher mathematics education in the country. Fr. Nebres was formerly President of the Southeast Asian Mathematical Society and is now member of the Executive Council representing the Philippines in this Society.

**Geminiano T. de Ocampo, M.D. Ophthalmology**

M.D., University of the Philippines, 1932



The leader and pioneer in Modern Philippine Ophthalmology, Dr. de Ocampo introduced corneal transplantation in the Philippines and designed corneal dissector which was manufactured by Storz and Co., U.S.A.

Dr. de Ocampo also conceived and helped establish the Philippine Eye Bank (1950); established the De Ocampo Eye Hospital, the first eye hospital in the country, 1952; and founder and first President, Philippine Ophthalmological

Society (1958).

A prolific writer, Dr. de Ocampo's publications from 1934 to 1974 in local and foreign journals include 8 books, 151 medical scientific articles, 9 memorial lectures and 56 articles on medical organizations, medical practice, medical education and medical philosophy.

A much honored man, Dr. de Ocampo was recipient of more than 53 awards and honors.

**Luz Oliveros-Belardo, Ph.D. Pharmaceutical Chemistry**

B.S. (Pharmacy), University of the Philippines, 1929

M.S. (Pharmaceutical Chemistry), University of the Philippines, 1933

Ph.D. (Pharmacy), University of Connecticut, 1957



Dr. Belardo spent five decades of her life studying the chemistry of natural products and essential oils from Philippine plants. She has extracted 33 new Philippine essential oils and studied their chemical and physical properties. Results of her work found application in the creation of new flavors and in herbal medication.

Her consistent work on phytochemical research brought her honors and 32 awards among which are: The Lunsford-Richardson Award in Pharmacy, USA, 1956; Philippine Pharmaceutical Associa-

tion Outstanding Pharmacist Award, 1963; Federacion Internacional de Abogadas Award, 1979; Waseda University Plaque of Recognition, Japan, 1981; Professional Regulation Commission Award in Pharmacy, 1983; National Research Council of the Philippines Award in Pytochemistry, 1984; Distinguished Leadership Award in Chemistry, USA, 1985; El Consejo Cultural Mundial Award, Mexico, 1988.

She counts with 7 in biographical listing. She is a member of many learned societies here and abroad".

**Faustino T. Orillo, Ph.D. Mycology**

B.S.A. (Plant Pathology), University of the Philippines, 1944

M.A. (Mycology), Harvard University, 1948

Ph.D. (Mycology), Harvard University, 1950



Dr. Orillo's researches in plant pathology helped pave the way to minimizing losses suffered by crop producers attributable to plant diseases. Noteworthy of his scientific publications are on coffee rust, blight affecting kenaf and leaf spot of maize caused by *Helminthosporium maydis*.

In recognition of his outstanding contributions to Philippine agricul-

ture, Dr. Orillo received the Distinguished Alumnus award given by the UP College of Agriculture in 1974. He is also member of several professional and learned societies namely: Botanical Society of America, Mycological Society of America, American Association for the Advancement of Science and the American Phytopathological Society.

**Eduardo A. Quisumbing, Ph.D. Plant Taxonomy, Systematics  
and Morphology**

B.S.A., M.S., University of the Philippines, Los Baños, 1918, 1921

Ph.D., University of Chicago, 1923



A foremost botanist, Dr. Quisumbing is pioneer in the study of Philippine medicinal plants where he made tremendous contribution. His book *Medicinal Plants in the Philippines* is the forerunner of all researches on medicinal plants in the country. He was author of more than 129 scientific articles published here and abroad. While Director of the National Museum, Dr. Quisumbing undertook restoration of

the Herbarium which was completely destroyed during the war.

Dr. Quisumbing was recipient of the Distinguished Service Star (1954) for outstanding contribution to the field of systematic botany; Diploma of Merit on Orchidology and Fellow Gold Medal, Malaysian Orchid Society (1966); Gold Medal, American Orchid Society; and 1975 PhilAAS Most Outstanding award.

**Dolores A. Ramirez, Ph.D. Biochemical Genetics**

B.S.A., University of the Philippines, 1956

M.Sc. (Cytogenetics), University of Minnesota, 1958

Ph.D. (Biochemical Genetics), Purdue University, 1963



Dr. Ramirez is recognized for her researches in biochemical genetics and cytogenetics. She has been working on the genetic systems controlling the makapuno endosperm of coconut; the genetics of chemical resistance factors against *Cercospora kex* leaf spot; and the cytogenetics of the hybrids of rice with related wild species.

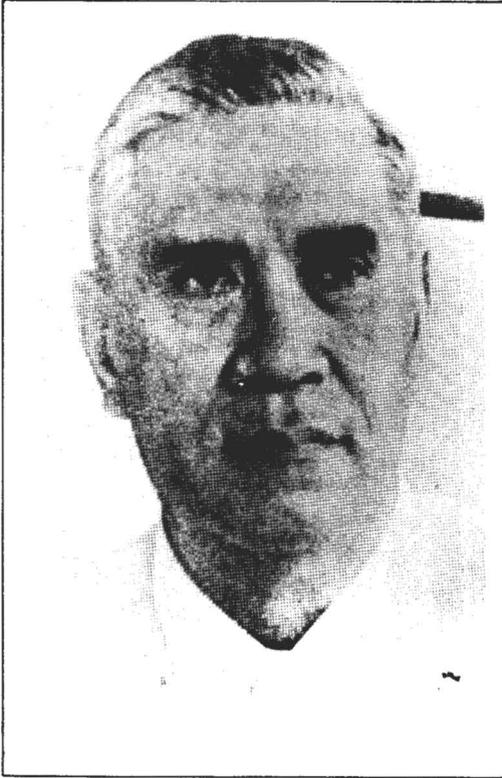
Dr. Ramirez was a holder of the SEARCA Professorial Chair for Genetics (1974-76), and recipient of the Gregorio Y. Zara award in basic research (1976), Rizal Pro Patria award for outstanding achievement in science (biochemical genetics) (1981), and UP Professorial achievement award in agriculture (1985).

**Jose N. Rodriguez, M.D. Leprology**

M.D., University of the Philippines, 1920

C.P.H., Johns Hopkins University, 1932

M.P.H., Johns Hopkins University, 1948



Renowned Filipino leprologist and researcher, Dr. Rodriguez devoted 53 years to the control of leprosy in the country. As one of the very few pioneers in the early fight against leprosy all over the world, he proposed a control program which was not only adopted in the Philippines but in other Asian countries as well.

Dr. Rodriguez had written many scientific articles on leprosy which

have been published in various journals all over the world and considered classics in leprosy research.

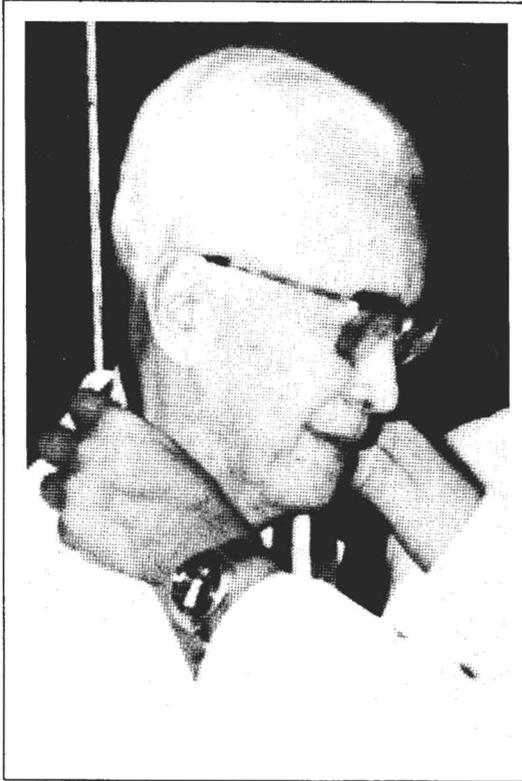
In recognition of his untiring struggle for the cause of leprosy in the Philippines for over a half century, Dr. Rodriguez was recipient to many honors and awards including the 1974 Damien Dutton award.

**Casimiro del Rosario, Ph.D. Physics**

B.S. (Chemical Engineering), University of the Philippines, 1918

M.S. (Physics), Yale University, 1924

Ph.D. (Physics), University of Pennsylvania, 1932



Dr. del Rosario's contributions to science are in physics, meteorology, and astronomy. His work on soft x-rays which required high vacuum photography earned him recognition. He co-founded the Bartol Research Foundation in Philadelphia which undertook pioneering researches in nuclear physics.

For 11 years Dr. del Rosario

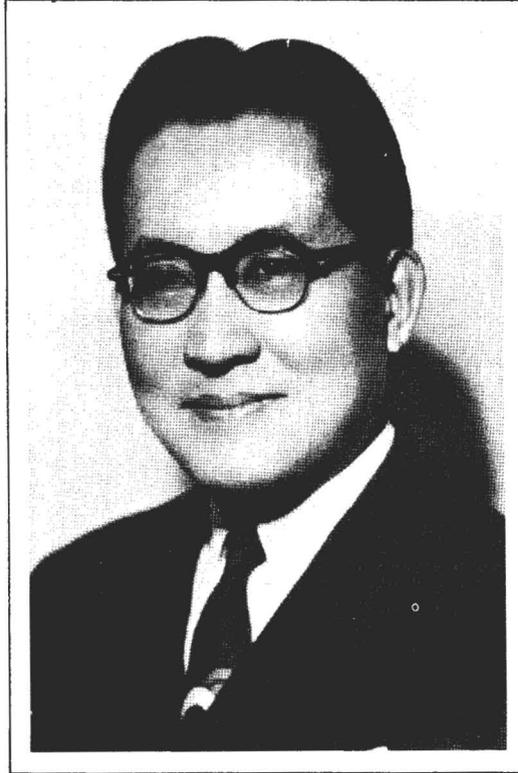
headed the Philippine Weather Bureau and was the first Vice-Chairman of the National Science Development Board.

In 1965, Dr. del Rosario received the Presidential Award for researches and achievements in physics, meteorology and astronomy; and the University of the Philippines Alumni award.

**Juan S. Salcedo, Jr., M.D., Nutrition and Public Health**

M.D., University of the Philippines, 1929

M.S. (Biochemistry), Columbia University, 1943



As scientist, Dr. Salcedo contributed immensely to the areas of biochemistry, nutrition, physiology. As science administrator, to science policy development, science promotion and scientific manpower development. He has published 265 works and researches in Philippine and foreign science journals.

Dr. Salcedo is recipient of many awards including the Ramon Mag-saysay award for outstanding public

health nutritionist in 1957; Republic Cultural Heritage award in science, 1966; and the Presidential Pro Patria award, 1969.

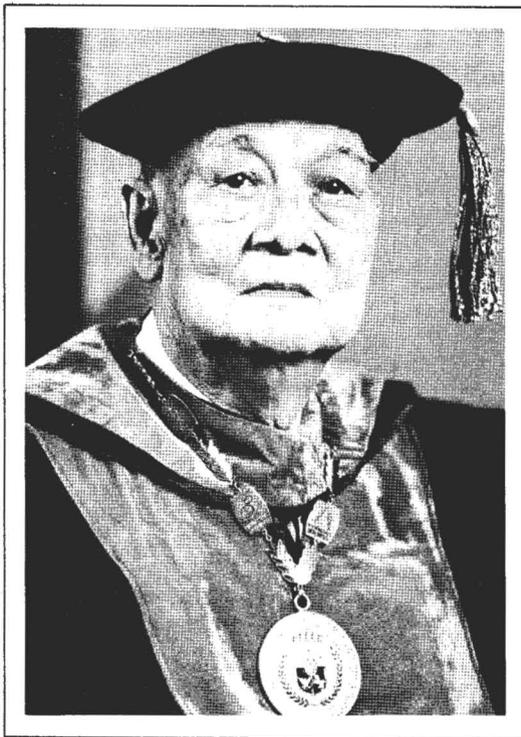
During the time of President Quirino, Dr. Salcedo served as Secretary of Health. He was also chairman of the National Science Development Board (NSDB) (1963-1970) and chairman of the National Research Council of the Philippines (1961-1976).

**Alfredo C. Santos, Dr. phil, Physical Chemistry**

B.S. (Pharmacy), University of the Philippines

Doctorate in Pharmacy, University of Santo Tomas

Dr. phil., Westfälische Wilhems Universität Münster, 1929



Dr. Santos is recognized for his researches in the chemistry of natural products. He has done a lot of work in the isolation and elucidation of phaeanthine and phaeantharine, and other alkaloids from Philippine medical plants.

For 45 years, Dr. Santos served in various capacities at the University of the Philippines until he retired in 1965 as Dean of the College of Pharmacy. After his UP stint, Dr. Santos continued to do research at the UST Research Center and the

National Institute of Science and Technology (NIST).

In recognition of his original experimental researches in numerous alkaloids isolated from Philippine medicinal plants, Dr. Santos received President Magsaysay's Distinguished Service Star in 1954. He is also recipient of the 1953 Outstanding Pharmacist Researcher award of the Philippine Pharmaceutical Association and the 1973 PhilAAS Outstanding Scientist award.

**Francisco O. Santos, Ph.D., Agricultural Chemistry**

A.B., M.S., University of the Philippines, 1914, 1919

Ph.D., Yale University, 1922



Many studies by Dr. Santos concern improvement of nutrition of the Filipinos. He made comprehensive investigations on the nutritive values and chemical composition of Filipino foods, amount of nutrients and vitamin contents of traditional Philippine food materials and Philippine nutrition pro-

blems.

Dr. Santos was recipient of a number of awards including the Distinguished Service Medal for outstanding contribution in the field of nutrition among Filipinos, 1955; Andres Soriano award in chemistry, 1956; and the University of the Philippines Alumni award, 1979.

**Joventino D. Soriano, Ph.D. Cytogenetics and Mutations Research**

B.S.A., University of the Philippines, 1944

M.S., University of the Philippines, 1952

Ph.D., University of Chicago, 1957



Dr. Soriano is recognized for his studies on plant cytogenetics and mutations research some of which found publication in international journals. By using radiation and chemical mutagens, Dr. Soriano contributed to the elucidation of the mutation process.

Among the honors and awards received by Dr. Soriano are: SEATO Research award, 1963; Internation-

al Atomic Energy Agency fellowship, 1962; Professorial Chair of Botany at the University of the Philippines, 1974-1976; and UNESCO fellowship, 1958-1961. Dr. Soriano is a member of various association in genetics such as the Genetics Society of America, American Genetics Association and the Indian Society of Genetics and Plant Breeding.

**Dioscoro L. Umali, Ph.D., Genetics and Plant Breeding**  
B.S. (Agronomy), University of the Philippines, Los Baños, 1939  
Ph.D., Cornell University, 1949



As plant breeder, Dr. Umali specialized in the breeding of rice, corn, abaca and mussaenda. His research output and writings paved the way for the launching of programs of rainfed and upland agriculture, social forestry, environmental conservation and rural poverty. Under his stewardship, the U.P. College of

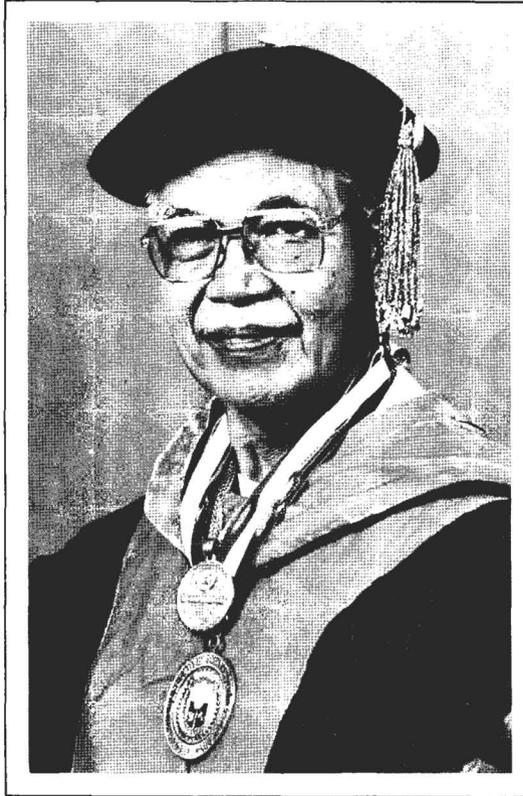
Agriculture became a premier institution of higher learning in Asia.

His contributions to the scientific world and to agriculture and rural development have given him due recognition. He is recipient of four honoris causa doctor's degrees and numerous other honors and awards from here and abroad.

**Jose R. Velasco, Ph.D. Plant Physiology**

B.S.A., University of the Philippines, 1940

Ph.D. (Plant Physiology), University of California, Berkeley, 1949



Dr. Velasco's pioneering and promising works in various areas of plant physiology such as mineral nutrition, photoperiodism, chemical weed control and plant growth in general, have provided the basis of some important crop production management practices as well as laid out research directions. He is known for his research on cadang-cadang disease of coconuts.

Among the honors and awards received by Dr. Velasco for his scientific achievements include: Guggenheim Foundation fellowship (1963), UP Alumni Association Distinguished Alumnus award (1971), Planters Products Achievement award for crop science teaching (1974) and PCCP Distinguished award in pest management (1974).

**Carmen C. Velasquez, Ph.D., Parasitology**

B.S. (Zoology), University of the Philippines, 1934

M.S. (Zoology), University of Michigan, Ann Arbor, 1937

Ph.D. (Parasitology), University of the Philippines, 1954



Dr. Velasquez's contributions to science include thirty-two new species and one new genus of digenetic trematodes from Philippine food fishes, two from birds and five from mammals; nine life cycles of trematodes of the family Transversotrematidae, Echinostomatidae, Notoctylidae (2), Plagiorchidae, Heterophyidae (2), Microphallidae and Philophthalmidae. In addition, two new species of nematodes from Philippine fishes and a new species of *Capillaria* from the intestine of

man. Also, a new species of parasitic copepod in *Glossogobius giurus* (Goby). Most of these works are published in international journals and cited in a number of journals abroad.

Dr. Velasquez is recipient to numerous academic honors and Presidential awards. She is listed in the American Men and Women of Science, International Scholars Directory, International Who's Who of Intellectuals and World Who's Who of Women.

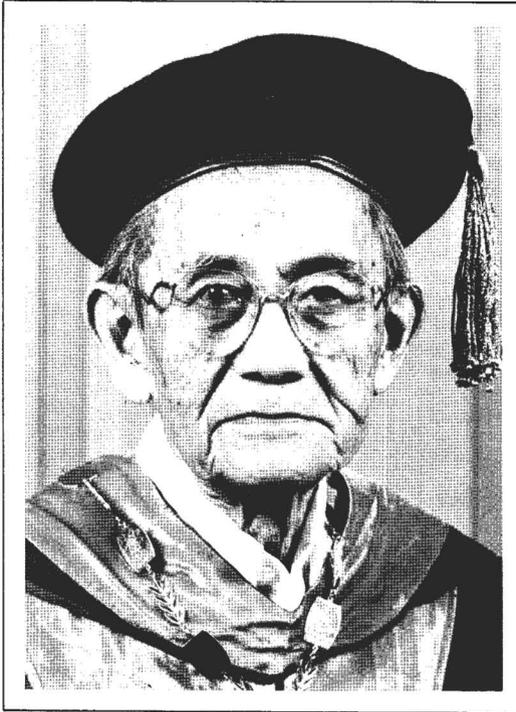
**Gregorio T. Velasquez, Ph.D., Phycology**

B.S., University of the Philippines, 1925

M.S., University of the Philippines, 1931

M.A., University of Michigan, 1937

Ph.D., University of Michigan, 1939



Dr. Velasquez pioneered in Philippine phycology. He made the first intensive study of the local Myxophyceae or the bluegreen algae and devoted at least 30 years of productive work in the study of Philippine algae from which he received local and international recognition.

From laboratory assistant in the Department of Botany, University of the Philippines, he rose from the ranks until he became Professor in Botany in 1958. He was appointed Emeritus Professor when he retired

in November 1967.

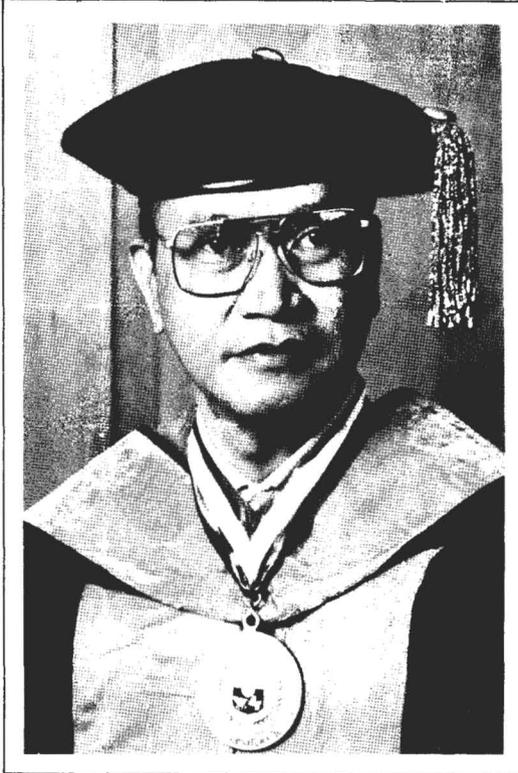
Among his numerous honors are Distinguished Science Medal and Diploma of Honor from the Republic of the Philippines (1956), the John Simon Guggenheim Memorial Foundation Fellowship (1956-57). He is listed in the Men of Science, Division of Biological Sciences, (1969), World's Who's Who in Sciences (1970) and the Republic of the Philippines Cultural Heritage award (1972).

**Benito S. Vergara, Ph.D., Plant Physiology**

B.S. University of the Philippines, 1955 (Botany)

M.S., University of Hawaii, 1959 (Botany)

Ph.D., University of Chicago, 1960 (Plant Physiology)



Dr. Vergara, plant physiologist, has done considerable work on the biological studies and improvement of deep water rice, flood tolerant rice and cold resistant rice; the development of rapid generation advance methods for rice; and the physiology of rice flowering. He elucidated the basic principles involved in the photoperiodism of the rice plant through numerous experiments. He authored a technical bulletin on the flowering response of the rice plant, a major reference

work and model for growth phases and other agricultural crops as well as the Illustrated Farmer's Primer on Growing Rice which has been translated into more than 36 languages.

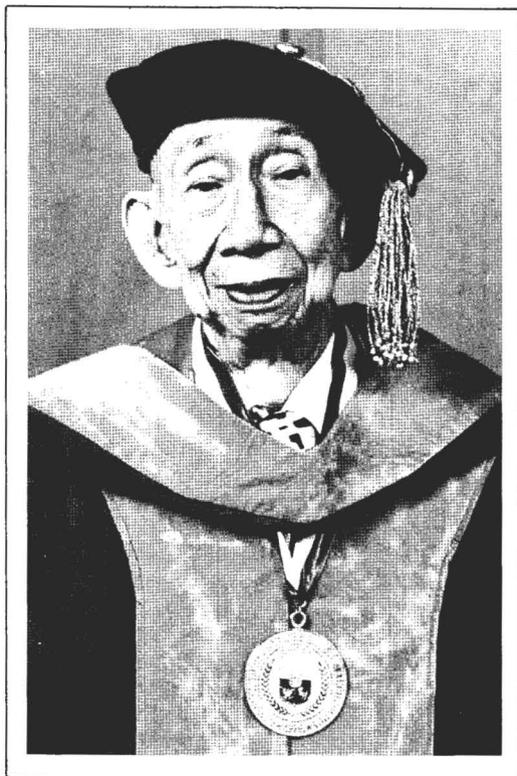
For his contributions to science, Dr. Vergara is recipient of the Outstanding Phi Sigma award (1977), BIOTA Achievement award (1980) and Pro Patria award (1980). American Society of Agronomy Fellow (1986).

**Gregorio F. Zaide, Ph.D. History**

Ph.B., University of the Philippines, 1921

M.A. (History), University of the Philippines, 1931

Ph.D. (History), University of Santo Tomas, 1943



Dr. Zaide, renowned historian, has made significant contributions to Philippine history. A hardworking scholar, he authored 67 books, some of which became textbooks in history for high schools and colleges in the country. He has also written more than 500 articles in history published in local and foreign periodicals.

For his accomplishments, Dr. Zaide received the Diploma of Out-

standing Writings on Filipino National Heroes; a Special Prize in History in the 1940 Commonwealth Literary Contest; 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. Jose Rizal, the Distinguished Public Service award, among others.

**Prescillano M. Zamora, Ph.D., Plant Anatomy-Morphology**

B.S. (Botany), University of the Philippines, 1952

M.S., Ph.D., Cornell University, 1958, 1965



Dr. Zamora is recognized for his contributions to plant anatomy-morphology, pteridophyte biology, and the conservation of environment and natural resources policy research. His work on the xylem elements of vascular plants is the basis for the formulation of the two-phase wall deposition concept

now accepted universally. His studies on the taxonomy of Philippine ferns led to the discovery for more species of the group.

Dr. Zamora was a Rockefeller Foundation fellow at Cornell University (1961-65), NSF Research grantee (1962-65) and U.P. Professorial Chair holder (1977-80).

**Gregorio Y. Zara, D.Sc. Physics**

B.S. (Mechanical Engineering), Massachusetts Institute of Technology, 1926

M.S. (Aeronautical Engineering), University of Michigan, 1927

D.Sc. (Physics), Sorbonne University of Paris, 1930



Dr. Zara's important achievements include: the invention of two-way television telephone, electrical kinetic resistance known as the Zara effect, airplane engine using alcohol as fuel which was first flown at the Manila International Airport on September 30, 1954, and solar energy.

For his more than 40 research works and 20 outstanding contributions to science, Dr. Zara was

well awarded. He was recipient of a Presidential Diploma of Merit and Distinguished Service Medal in 1959 for his pioneering works and achievements in solar energy, aeronautics and television; Presidential Gold Medal and Diploma of Honor for Science and Research in 1966; and Cultural Heritage award for Science Education and Aero Engineering, 1966.

# **The National Scientists**

**National Scientists  
(1978-1989)**

<i>Year</i>	<i>Recipient</i>	<i>Specialty</i>	<i>Remarks</i>
1978	Juan S. Salcedo, Jr., M.D.	Nutrition and Public Health	died October 25, 1988
1978	Alfredo C. Santos, Dr. phil.	Physical Chemistry	
1978	Gregorio Y. Zara, D.Sc.,	Engineering and Inventions	died October 15, 1978
1980	Fe del Mundo	Pediatrics	
1980	Eduardo A. Quisumbing, Ph.D.	Plant Taxonomy, Systematics and Morphology	died August 23, 1986
1982	Geminiano T. de Ocampo, M.D.	Ophthalmology	died September 2, 1987
1982	Casimiro del Rosario, Ph.D.	Physics, Astronomy and Meteorology	died September 15, 1982
1982	Gregorio T. Velasquez, Ph.D.	Phycology	died July 29, 1989
1983	Francisco M. Fronda, Ph.D.	Animal Husbandry	died February 17, 1986
1983	Francisco O. Santos, Ph.D.	Human Nutrition and Agricultural Chemistry	posthumous died February 19, 1983
1983	Carmen C. Velasquez, Ph.D.	Parasitology	
1985	Teodoro A. Agoncillo, Litt.D. (h.c.)	Philippine History	posthumous died January 14, 1985
1985	Encarnacion A. Alzona, Ph.D.	Philippine History	
1985	Hilario D.G. Lara, M.D., Dr. P.H.	Public Health	died December 18, 1987
1986	Julian A. Banzon, Ph.D.	Chemistry	died September 14, 1988
1986	Dioscoro L. Umali, Ph.D.	Agriculture and Rural Development	
1987	Luz Oliveros-Belardo, Ph.D.	Phytochemistry	
1987	José Encarnacion, Jr., Ph.D.	Economics	
1988	Alfredo V. Lagmay, Ph. D.	Experimental Psychology	
1989	Paulo C. Capros, M.D.	Nuclear Medicine	

## Rank and Title of National Scientist

Conferment of the rank and title of *National Scientist* by the President of the Republic is the highest honor given to a man of science in the Philippines.

Each year, the Academy may recommend not more than ten (10) scientists for distinguished individual or collaborative achievement in science and/or technology who shall be accorded National Scientist. Selection of recommendees for the National Scientist requires 60% vote of the full membership of the Academy.

A National Scientist has the following benefits and privileges which are implemented under the auspices of the Academy:

- A cash award of ₱10,000 upon conferment and decoration of National Scientist;
- A life pension which is payable monthly;
- Medical and hospitalization benefits;
- A place of honor in state functions, national commemoration ceremonies and all scientific gatherings; and
- A state funeral, the arrangements for and the expenses of which shall be borne by the government upon the death of the National Scientist.

Since 1978, 19 scientists have been accorded the rank and title of National Scientist. Eleven of these are living and except for one, the deceased ones were interred at the Libingan ng mga Bayani, after a state funeral arranged by the Academy.

The National Scientists from 1978-1987 and their citations are as follows:

### Teodoro A. Agoncillo, Litt. D. (honoris causa) (posthumous) – Philippine History

Professor Teodoro A. Agoncillo, eminent historian. For distinguished achievement in the social sciences and in the humanities by which the University of the Philippines has given him the title *University Professor*, the highest academic appointment in any university. Professor Agoncillo has been 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. The community of scholars, as well as private and public institutions, have already given him numerous awards and prizes for his contribution to literature and Philippine historical writing.

### Encarnacion Alzona, Ph.D. – Philippine History

Eminent historian and 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. Some of her works have already become classics, particularly her "A History of Education in the Philippines." While 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.

### Julian A. Banzon, Ph.D. – Chemistry

Academician, distinguished scholar, scientist, professor, and biophysical chemist.

Dr. Banzon has dedicated a good portion of his life to scientific endeavors, concern

trating his attention to that unique Philippine palm, the coconut. His studies have shown that this palm very well be the renewable source of chemicals and fuels. The production of ethyl esters, coming from two Philippine indigenous crops, sugar cane and coconut, is one of the first study on fuels. Dr. Banzon has devised some novel processes, noteworthy among these is the extraction of residual coconut oil by the chemical, rather than by a physical process.

For these and many more significant scientific works, Dr. Banzon has been accorded honors and citations notably: Distinguished Alumnus award, University of the Philippines, 1986; Distinguished Service award, Integrated Chemist of the Philippines, Inc., 1980; Chemist of the Year award, Professional Regulation Commission, 1978; PHILSUGIN Award for Research, Crop Science Society of the Philippines, 1976; and Outstanding Chemistry Graduate, U.P. Chemical Society, 1970.

**Luz Oliveros-Belardo, Ph.D. — Phytochemistry**

Distinguished scholar, chemist and researcher. She spent 5 decades of her life working on the chemistry of natural products specifically on Philippine medicinal plants.

Dr. Belardo's significant contribution to science is her work on essential oils from Philippine plants. Essential oils which have many uses as sources of flavors and fragrance materials; medicinals; new and rare organic compounds and energy, fascinated her so much that she spent the greater part of her research activity unravelling their nature. She has extracted 33 new Philippine essential oils and studied the chemical and physical properties.

In her twilight years, Dr. Belardo is still actively engaged in phytochemical research. Her accomplishments in science, however modestly they have been, contributed to the advancement of scientific knowledge and to national development. Flavors from her new essential oils are now being tried in the creation of appetite enhancers and tested as possible medicinals. Results of her phytochemical analysis offered some answers to the search for scientific basis in herbal medication.

**José Encarnación, Jr., Ph.D. — Economics**

Economist, past president of the Philippine Economic Society, recipient of a Distinguished Scholar award from the University of the Philippines, Academician, is a theorist with interests also in the policy area. The first Filipino to publish in an economics journal of international standing, his contributions to economic theory have appeared in major journals in England and the United States. He served on the United Nations Committee for Development Planning and, as chairman on the Council for Asian Manpower Studies, which have strong policy orientations. While on leave from the University of the Philippines he taught at Princeton, the University of Wisconsin-Madison and Gadjaja Mada in Indonesia. His work as a professor and as dean of the U.P. School of Economics has been significant in making this institution a regional as well as a national resource, bringing recognition from abroad as shown by biographical listings in "Men of Achievement" (12th ed.), "Who's Who in the World" (8th ed.), and "International Director of Distinguished Leadership" (1st ed.).

**Francisco M. Fronda, Ph.D. — Animal Husbandry**

A distinguished educator, eminent scientist, researcher and prolific writer in agricultural science.

Having devoted over six decades of his life to teaching, research and extension activi-

ties, Dr. Fronda contributed immensely to what is today the country's multimillion peso poultry industry. Over all these years, he has published here and abroad no less than 500 scientific articles of great value in the development of poultry and livestock industry, authored a textbook in Poultry Science Production now in its third edition for students in agriculture and co-authored a series of book entitled "Let Us Raise Series" for secondary and elementary pupils.

For all these, Dr. Fronda is virtually synonymous to Poultry Science in the Philippines and elsewhere in the Asian Region. This earned for him and his country lasting honor and distinction foremost of which are: "The Distinguished Service Medal and Diploma of Honor" from the President of the Republic of the Philippines, in recognition of his valuable services to science and people, 1955; "The Father of Poultry Industry in the Philippines" citation made by the Philippine Association of Animal Science, 1980; degree of "Doctor of Science," *honoris causa* and the "Father of Thai Poultry Industry" honor conferred by the Kasetsart University, Bangkok, Thailand which were presented by Her Royal Highness, the Crown Princess of Thailand, 1982.

**Hilario D.G. Lara, M.D. — Public Health**

Recognized for his pioneering and significant contributions to public health and public health education in the Philippines. Eminent scientist and researcher, he devoted over five decades of his life to the pursuit, dissemination, and application of knowledge pertaining to the epidemiology and prevention as well as control of disease, promotion and conservation of health and sanitation of environment which led to the control of cholera, typhoid fever, dysentery, measles and diphtheria in the country. For these works he has attained international recognition with the inclusion of his name in the "Book of World Biography" and the "Book of the American Men of Science."

Distinguished medical man and public servant, recognized for organizing and developing the Institute of Public Health, University of the Philippines, for establishing the first medical library in the country and for his pioneering work on the establishments of community Health Demonstration Centers.

**Fe del Mundo, M.D. — Pediatrics**

A leading pediatrician and distinguished scholar, humanitarian and exemplary citizen has been the moving spirit behind the establishment of various pediatric institutions in the Philippines.

A medical researcher and writer, Dr. del Mundo has produced numerous articles and treatises on various scientific subjects, especially on pediatrics. These works have either been published or read before many scientific fora here and abroad.

Her achievements in the fields of pediatrics, public service and other community endeavors have earned for her well-deserved awards, honors and decorations affirming her qualities and accomplishments. Among the awards and distinctions she has received are: the Ramon Magsaysay award for Public Service by a Private Citizen, 1977; XV International Congress of Pediatrics award for Outstanding Pediatrician and Humanitarian, 1977; award as Fellow of the World Academy of Art and Science, 1967; and the Elizabeth Blackwell award for Outstanding Service to Mankind, 1966.

**Geminiano T. de Ocampo, M.D. — Ophthalmology**

An outstanding ophthalmologist and a scholar of international renown.

Dr. de Ocampo set up the first eye hospital in the Philippines and helped established

the Philippine Eye Research Institute and the Philippine Ophthalmological Society.

He was the first Filipino to design in 1956 an ophthalmological instrument known as the de Ocampo corneal dissector, manufactured later by a U.S. firm. As a surgeon, he introduced corneal transplantation in the Philippines.

For these and many more significant scientific works, he received various honors and citations notably: the Asia-Pacific Academy of Ophthalmology Jose Rizal Award for Excellence in Ophthalmology, 1968, the President Award for Filipino Life Scientist, 1965; the Republic Heritage and Cultural Award for Science, 1961; and a certificate of distinction for exemplary leadership on ophthalmological research and surgery.

As a civic leader, he worked for the passage and amendment of Republic Act. No. 343 concerning donation of eyeballs for corneal transplantation.

**Eduardo A. Quisumbing, Ph.D. — Plant Taxonomy, Systematics, and Morphology**

An outstanding scientist, scholar, educator and writer, a distinguished botanist and authority on plant taxonomy, systematics and morphology.

Dr. Quisumbing is widely recognized for his pioneering work on Philippine medicinal plants and orchids.

He has written 129 scientific articles. The book "Medicinal Plants of the Philippines" is considered the forerunner of researches and publications on medicinal plants in the country today.

He has served the Philippine Government in various capacities. As Director of the National Museum, he restored the National Herbarium, which was destroyed during the war.

For his lifelong and dedicated career in Botany, Dr. Quisumbing received many awards and distinctions, which he richly deserves.

**Casimiro del Rosario, Ph.D. — Physics, Astronomy and Meteorology**

Foremost Filipino physicist whose researches on ultraviolet light of different wavelengths, on the effect of radioactive radiations on euglena, on the high voltage electrical discharges in high vacuum, and many others, which were all published in reputable international scientific journals earned for himself and his country lasting honor and distinction.

For his distinguished achievements, Dr. del Rosario was accorded the Presidential Award in 1965. He was cited for his important researches and accomplishments in physics, astronomy and meteorology.

A consistent scholar, he was recipient of the Junior Sterling Research and Bartol Foundation Research Fellowships. He was a professor of physics at the University of the Philippines, eventually becoming chairman of the U.P. Physics department. After serving as Director of the Philippine Weather Bureau for 12 years, Dr. del Rosario was appointed Vice-Chairman of the National Science Development Board.

**Juan S. Salcedo, Jr., M.D. — Nutrition and Public Health**

An authority in nutrition and public health and medical statesman, conducted medical research for the improvement of the health and nutrition of the people. He spent much of his lifetime studying health factors, ranging from fatty acids to vitamins.

He has published more than 200 articles on medicine, science, and technology, all of which stressed the need for proper utilization of science, hand in hand with technology, in the process of shaping the nation not only from the economic plane but also from a social perspective.

## NATIONAL SCIENTISTS

His work is recognized by his contemporaries. Many organizations, public and private, have showered him with signal honors.

At the twilight of his life, Dr. Salcedo continued to support national goals and objectives through his programs for science promotion.

### Alfredo C. Santos, Dr. phil. — Physical Chemistry

Dr. Alfredo C. Santos devoted his career in the study of chemistry of natural products, and the search for medicinal properties of local plant species.

A professor of industrial pharmacy by vocation, he conducted significant researches on the isolation and structure elucidation of phaeanthine and phaeantharine which are alkaloids from indigenous medicinal plants.

Dr. Alfredo C. Santos hoped to find ways to lower the high prices of drugs by reducing the use of costly imported raw materials.

His empathy for the poor amongst us, especially the rural folks, who are unable to procure medicines and the relief that medicines bring, spurred him to these studies.

Dr. Alfredo C. Santos is thus both a humanitarian and a scientist.

### Francisco O. Santos, Ph.D. (Posthumous) — Human Nutrition and Agricultural Chemistry

Outstanding educator and eminent scientist in the fields of human nutrition and agricultural chemistry is well remembered for his deep concern and interest in the improvement of nutrition of the Filipinos, especially the laboring and deprived class.

As a researcher he made comprehensive investigations and published notable articles here and abroad on nutritive values and chemical composition of Filipino foods, amount of nutrient and vitamin contents of traditional Philippine food materials, Philippine nutrition problems, studies on the nutrition plan of families of various laborer communities in the country, and probable effects of a one-sided diet. He established the anti beri-beri vitamin content of sweet potato and demonstrated the food value of this crop. He was among the very first to advocate home gardening, its fruits and vegetables as good source of supplementary vitamins.

For his valuable contribution to human nutrition and agricultural chemistry, he was recipient of "Distinguished Service Medal" from the President of the Republic of the Philippines for outstanding contributions in the field of nutrition among Filipinos, 1955; "Col. Andres Soriano Award in Chemistry," 1956; elected member of the New York Academy of Sciences and Honorary Member, Sociedad Española de Bromatología.

He initiated and led the organization which became the forerunner of the present Food and Nutrition Research Institute.

### Dioscoro L. Umali, Ph.D. — Agriculture and Rural Development

Academician, scientist, educator, research organizer, development administrator and science statesman.

As scientist, Dr. Umali is known for his plant breeding work that resulted in the breeding of improved varieties of food grains, legumes, fruits and ornamental plants. His research output and writings paved the way for launching programs of rainfed and upland agriculture, social forestry, environmental conservation and rural poverty alleviation.

Under his stewardship, the U.P. College of Agriculture became a premier institution of higher learning in Asia. His awareness of the plight of the small farmer and fisherman

(the base of the social pyramid) led him to restructure the research system of the College and of other institution he headed to solve the poverty and unemployment. As FAO Regional Director for Asia and Pacific, he influenced the orientation of agricultural research and development policies of the Third World countries in Asia for this advantaged sector.

He is a strong advocate of people's participation in planning and decision making and of the adoption of technology and development models consistent with a country's geography, traditions and social history.

As science statesman and international civil servant, he played a catalytic role in providing deep insights and inspiring fellow scientists to set goals and share experiences about the process of social changes and transformation in a society concerned with developing the full potential of man.

His contributions to the scientific world and to agriculture and rural development have given due recognition. He is the recipient of four honoris causa doctor's degrees and numerous other honors and awards from here and abroad.

**Carmen C. Velasquez, Ph.D. – Parasitology**

Emeritus Professor of Zoology, University of the Philippines, scientist, educator, scholar, holds the distinction of being the first Ph.D. (Parasitology), University of the Philippines.

Her pioneering and untiring research efforts have resulted in the publications of 47 basic and about 45 scientific papers of value particularly in public health and conservation. Considered new to science are 32 species and one genus of digenetic trematodes in 13 families from Philippine food fishes, 2 from birds and 3 from mammals; 3 species and a genus of Monogenea from marine fishes; 8 life cycles of Digenea in 7 families and 3 of nematodes from freshwater and marine fishes. *Capillaria philippinensis* from the intestine of man in the Philippines was first to be reported in the world. Her book on "Digenetic Trematodes of Philippine Fishes", the first in Southeast Asia provide a regional reference to fish parasitology and aquaculture management.

Dr. Velasquez has been conferred national and international awards including: the Distinguished Service Medal and Diploma of Honor, Republic of the Philippines (1965)" in recognition of valuable service in science and people;" the John Simon Guggenheim Memorial Foundation Fellowship for "notable achievement in the field of specialization 1957-1958; 1963; U.P. Alumni Association Professional award, 1973; NSDB Outstanding published works (1972-1973); Outstanding Women in Science in the Philippines, 9th UNESCO Biennial Conference, Kababaihan ng Lahi (1975); Listed in American Men and Women of Science; Biographee, the International Who's Who Intellectuals and Who's Who of Women (1977), International Biographical Centre, Cambridge, England.

**Gregorio T. Velasquez, Ph.D. – Phycology**

Emeritus Professor of botany in the University of the Philippines, scientist, scholar, educator, has taught and developed generations of Filipino biologists, some of whom became members of the National Academy of Science and Technology.

Dr. Velasquez contributed immensely to the intensive study of algae, devoting 30 years of his life to it. He pioneered in Philippine Phycology and produced 47 basic and 77 scientific papers of great value, particularly on Philippine Myxophyceae.

For his valuable works, Dr. Velasquez has been conferred many national and international awards, including: the Distinguished Science Medal and Diploma of Honor

## NATIONAL SCIENTISTS

from the Republic of the Philippines, 1956; the John Simon Guggenheim Memorial Foundation Fellowship for "notable achievement in his field of specialization, 1956-1957, the Republic of the Philippines Cultural Heritage award, 1972; the citations by the Carnegie Institute of Technology, U.S.A. and the Max Planck Institut of Zellbiologie in Germany; and Emeritus Membership in the New York Academy of Sciences.

Despite his advanced age, Dr. Velasquez continued with his research activities with unflagging enthusiasm, to the great benefit of our country and people.

### Gregorio Y. Zara, D.Sc. — *Engineering and Inventions*

In the minds of his peers, Dr. Zara made major contributions to the advancement of engineering and inventions in the Philippines. His innovations in his field of specialization have contributed in popular understanding and utilization of science in the country.

As an administrator, mentor, inventor, and engineer, he has always set the pace. Foremost among his contributions include the TV-telephone system, the wooden microscope, the semi-automatic propeller-making machine, and an aircraft propeller that is entirely made of wood. He designed the solarsorber and an airplane fueled by alcohol.

Dr. Zara has been ahead of his time. This quality was underscored by his pioneering research on solar energy as alternate energy source at a time when there was no energy crisis.

# **The Outstanding Young Scientists**

### **Outstanding Young Scientist Award**

The Outstanding Young Scientist Award was instituted in 1980 by the National Science Development Board (NSDB) to recognize scientists who are below 40 years old of age, for outstanding contribution in their field of specialization. Since it was first implemented, the Academy has been the screening and selection body for this award. In 1982, the OYS award became part of the recognition awards given by the Academy.

The OYS award carries with it a cash prize of ₱10,000 and a trophy which are presented by the President of the Republic to the recipients, usually during the National Science and Technology Week on the 2nd week of July of each year. From the time it was launched, there are 60 recipients of the award in the various field of science.

OUTSTANDING YOUNG SCIENTISTS

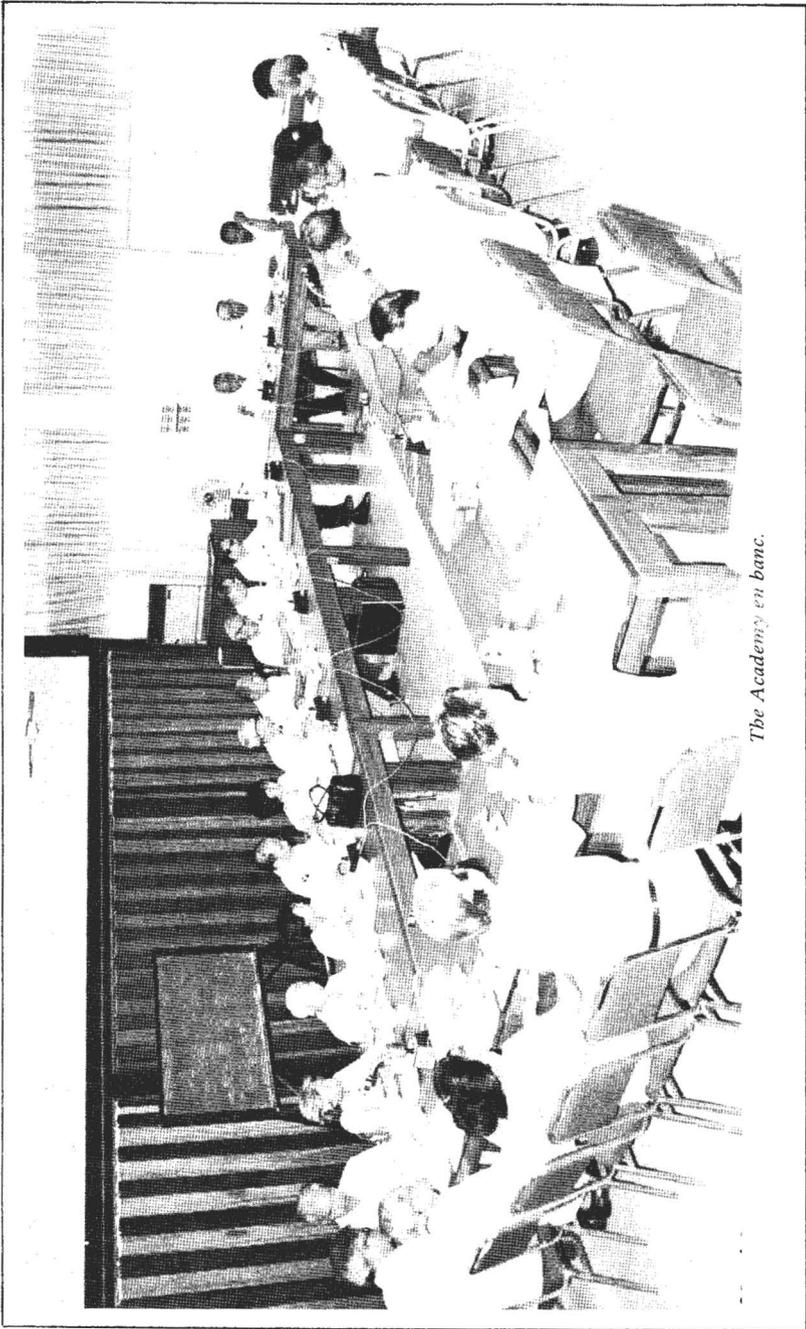
**Outstanding Young Scientist Award  
1980-89**

<i>Year</i>	<i>Recipient</i>	<i>Specialty</i>
1980	Salcedo L. Eduardo, Ph.D.	Parasitology
1980	Rafael D. Guerrero III, Ph.D.	Fisheries Management
1980	Rufino H. Ibarra, Ph.D.	Physics
1980	Florian M. Orejana, Ph.D.	Fish Processing and Quality Control
1980	Ernesto M. Pernia, Ph.D.	Economic Demography
1980	Thelma E. Tupasi, M.D.	Medicine
1980	Alberto Romualdez, Jr. M.D.	Medicine
1980	Ernesto J. del Rosario, Ph.D.	Chemistry
1980	Victoria A. Vicente, Ph.D.	Chemistry
1980	Ely Anthony R. Ouano, Ph.D.	Environmental Engineering
1981	Paciente A. Cordero, Jr. Ph.D.	Marine Biology
1981	Romeo M. Bautista, Ph.D.	Economics
1981	Lourdes J. Cruz, Ph.D.	Biochemistry
1981	Esperanza A. Icasas-Cabral, M.D.	Medicine
1981	Manolito G. Natera, Ph.D.	Physics
1981	Severino V. Gervacio, Ph.D.	Mathematics
1981	Ernesto P. Lozada, Ph.D.	Engineering
1982	Carmelo A. Alfiler, M.D.	Pediatric Medicine
1982	Rodolfo P. Cabangbang, Ph.D.	Plant Breeding
1982	Virgilio G. Enriquez, Ph.D.	Psychology
1982	Alejandro N. Herrin, Ph.D.	Demographic Economics
1982	Jose G. Marasigan, Ph.D.	Mathematics
1982	William G. Padolina, Ph.D.	Phytochemistry
1982	Percy A. Sajise, Ph.D.	Ecology
1982	Benito L. Tanhehco, M.D.	Biomedical Engineering
1983	Ponciano S.M. Halos, Ph.D.	Plant Pathology
1983	Remigio M. Olveda, M.D.	Parasitic Diseases
1983	Luzvisminda U. Rivero, Ph.D.	Chemistry
1983	Vicente B. Paqueo, Ph.D.	Human Resource Economics
1984	William T. Chua, M.D.	Cardiovascular Medicine
1984	Reynaldo A. de la Cruz, Ph.D.	Forestry
1984	Roger R. Posadas, Ph.D.	Physics
1984	Eufemio T. Rasco, Ph.D.	Plant Breeding
1984	Evelyn Mae Tecson-Mendoza, Ph.D.	Biochemistry
1984	Filemon A. Uriarte, Jr. Ph.D.	Engineering
1985	William D. Dar, Ph.D.	Agriculture
1985	Alumanda M. de la Rosa, Ph.D.	Radiation Chemistry
1985	Ann Inez N. Gironella, Ph.D.	Statistics
1985	Jose A. Magpantay, Ph.D.	Physics
1985	Corazon M. Raymundo, D.Sc.	Population Science
1985	Mediadora C. Saniel, M.D.	Medicine

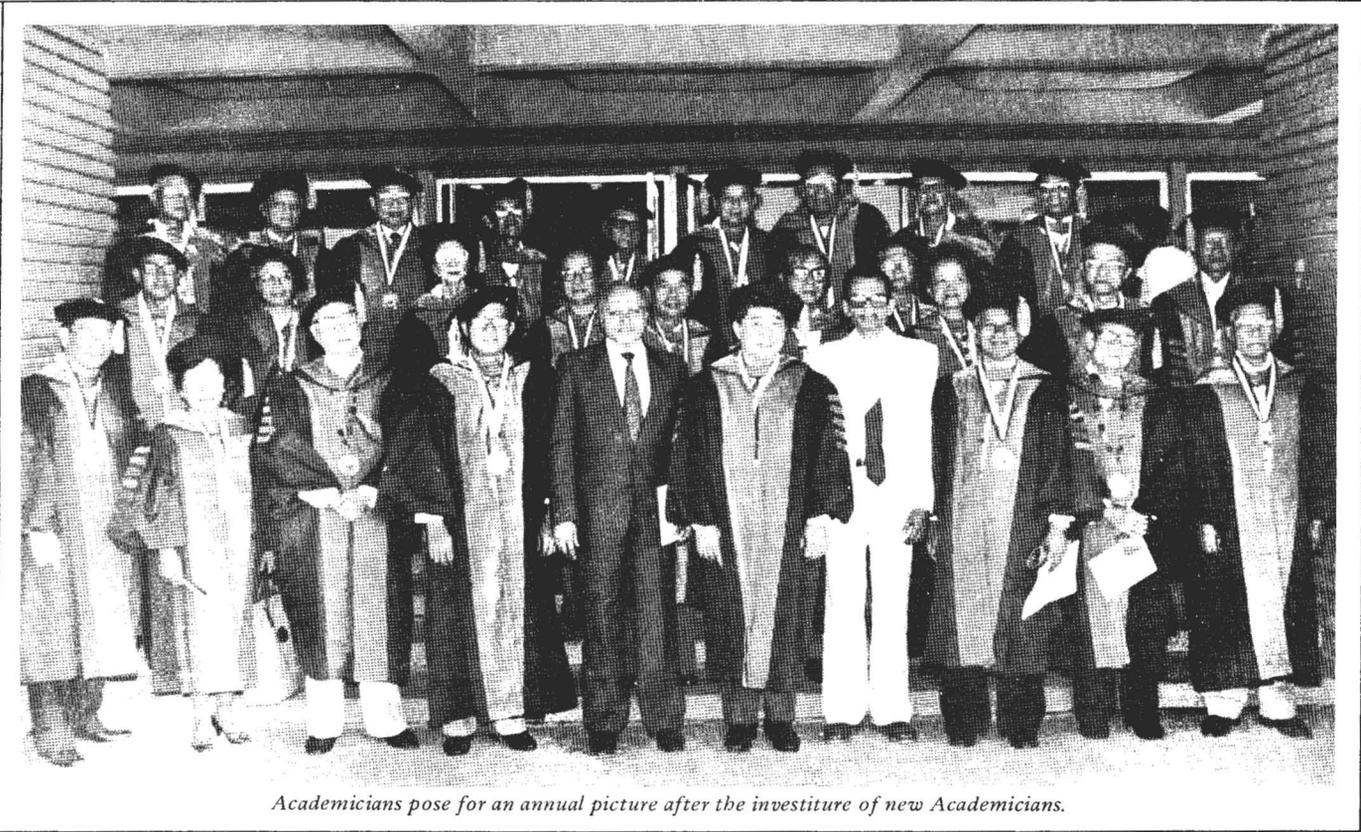
OUTSTANDING YOUNG SCIENTISTS

1985	Amaryllis T. Torres, Ph.D.	Psychology
1985	Regalado G. Zamora, Ph.D.	Animal Science
1986	Edwin A. Benigno, Ph.D.	Entomology
1986	Ida F. Dalmacio, Ph.D.	Food Microbiology
1986	Ma. Concepcion C. Lizada, Ph.D.	Biochemistry
1986	Ernesto S. Luis, Ph.D.	Food Chemistry
1986	Manolo G. Mena, Ph.D.	Engineering
1986	Glorina N. Pocsidio, Ph.D.	Zoology
1986	Danilo M. Yanga, Ph.D.	Physics
1987	Ruperto P. Alonzo, M.A.	Economics
1987	Dante B. Canlas, Ph.D.	Economics
1987	Rene P. Felix, Ph.D.	Economics
1987	Miguel D. Fortes, Ph.D.	Marine Plant Ecology
1987	Ruben M. Gapasin, Ph.D.	Plant Pathology
1987	Wilfredo I. Jose, Ph.D.	Engineering
1987	Felino P. Lansigan, Ph.D.	Statistics
1987	Reynaldo C. Mabesa, Ph.D.	Food Science
1987	Manuel F. Montes, Ph.D.	Economics
1987	Linda S. Posadas, Ph.D.	Physics
1988	Polly W. Sy, Ph.D.	Mathematics
1988	Rolando E. Ramos, Ph.D.	Mathematics
1988	Benito C. Tan, Ph.D.	Botany
1988	Ma. Cynthia Rose B. Bautista	Sociology
1988	Manuel M. Lantin, Ph.D.	Plant Breeding
1988	Francisco M. Basuel, Ph.D.	Community Development and Agricultural Education
1989	Efren C. Abaya, Ph.D.	Engineering
1989	Christopher C. Bernido, Ph.D.	Physics
1989	Candida B. Adalla, Ph.D.	Entomology
1989	Alfinetta Bustrillos Zamora, Ph.D.	Agronomy
1989	Mary Ann Lansang, M.D.	Medicine
1989	Virginia C. Cuevas, Ph.D.	Botany

**Pictorial**



*The Academy en banc.*



*Academics pose for an annual picture after the investiture of new Academicians.*

**NAST Executive Council  
1985-1988**



*Paulo C. Campos  
President*



*Melecio S. Magno  
Vice-President and Secretary*



*Alfredo V. Lagmay*



*Dioscoro L. Umali*

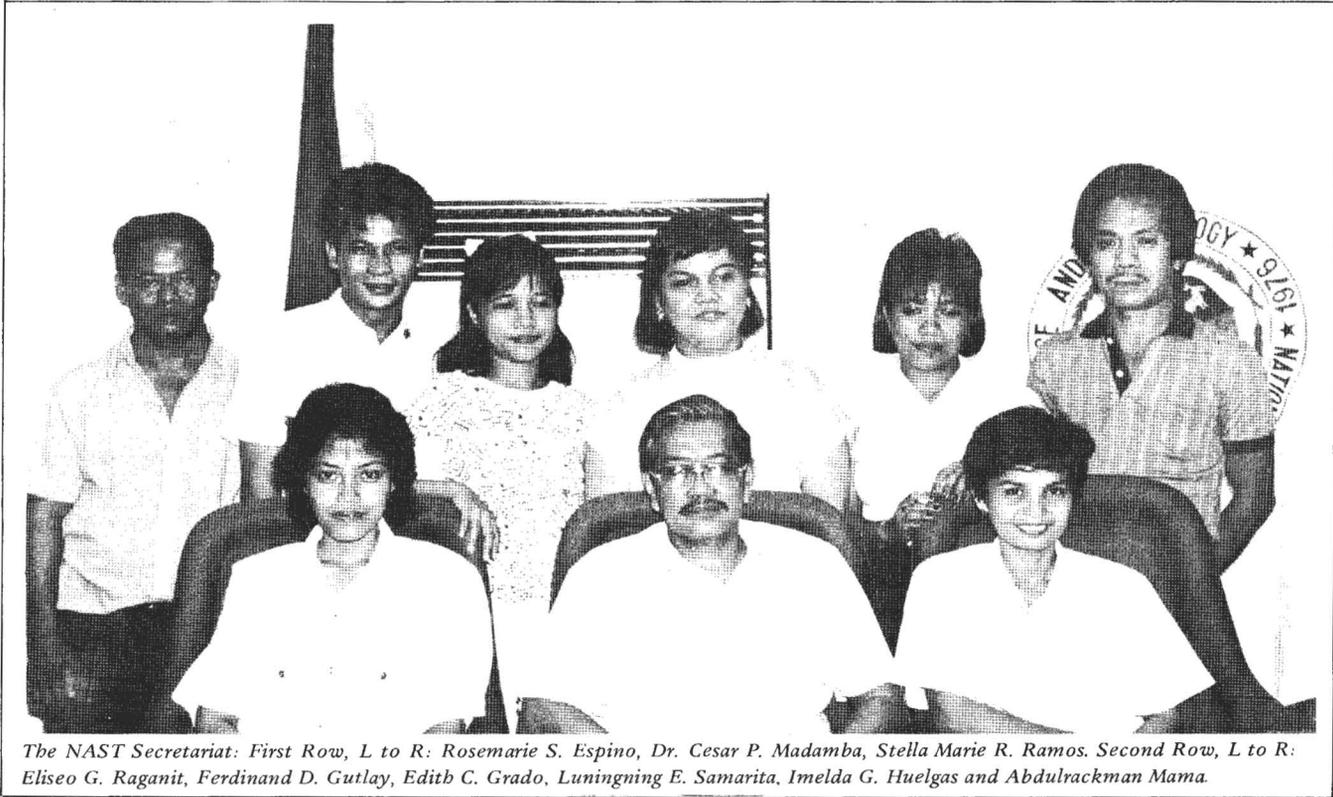


*José Encarnación, Jr.*

*Carmen C. Velasquez*



*Julian A. Banzon*



PRESIDENTIAL DECREE NO. 1003

CREATING THE NATIONAL ACADEMY OF SCIENCES

WHEREAS, the development of science and technology, among others, has been instrumental in bringing about the material progress of our country;

WHEREAS, in recognition of this contribution, the Constitution provides that "(T)he State shall promote scientific research and invention," and enjoins that "(T)he advancement of science shall have priority in the national development;"

WHEREAS, as a consequence, there has arisen the need to provide meaningful incentives to those engaged in scientific and technological research and to give due recognition to outstanding individual achievements in the sciences;

WHEREAS, it has further become necessary to professionalize the government's scientific and technological research services to further enhance its capability to contribute to the realization of national objectives;

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines, by virtue of the powers vested in me by the Constitution, do hereby decree and order:

SECTION 1. There is hereby created the National Academy of Sciences hereinafter referred to as the Academy, composed of outstanding scientists to serve as reservoir of competent scientific and technological manpower for the country, which shall be attached to the Office of the President for general coordination.

SEC. 2. For the purpose of this Decree, a scientist shall be defined as an individual who has earned a graduate doctoral degree in any field of the sciences in an accredited University and has demonstrated and earned distinction in independent research or investigative study in the basic and applied natural sciences, including agricultural, engineering, and medical sciences, in mathematics and in the experimental social sciences as manifested by his published works in recognized scientific and technical journals; Provided, however, that in highly meritorious and extremely exceptional cases the foregoing doctoral degree requirement may be waived.

SEC. 3. The general administration and direction of the affairs of the Academy shall be in the hands of an Executive Council of seven members who shall be appointed by the President of the Philippines from among at least ten members nominated by the Academy.

SEC. 4. The members of the Executive Council shall serve for a term of three years; Provided that in case of any vacancy, the appointee shall serve only the unexpired term.

SEC. 5. Any scientist who is a Filipino citizen of good moral character and in sympathy with the purposes of the Academy, may become a member of the Academy upon sponsorship of at least two members, subject to the approval of a majority of the full membership.

Except when terminated for cause or by voluntary resignation, membership in the Academy shall be for life.

SEC. 6. The Academy shall be initially composed of scientists who shall be nominated by the different national scientific societies and recognized research and academic institutions of higher learning and screened by an *Ad Hoc* Committee composed of the Chairman of the National Science Development Board, as Chairman and the President of the University of the Philippines, the Chairman of the National Research Council of the Philippines, the Commissioner of the Philippine Atomic Energy Commission, and Commissioner of the National Institute of Science and Technology as members.

## ENABLING ACTS

The *Ad Hoc* Committee shall screen and evaluate the nominations on the basis of academic training and qualification as provided for in Section 2 and may confer membership by a favorable vote of at least four members.

The *Ad Hoc* Committee shall exist for a period of not more than one year after promulgation of this Decree.

SEC. 7. The Academy may provide its members the following benefits and privileges:

- a. Free publication of scientific and technological works;
- b. Travel support for attendance and participation in international conferences;
- c. Eligibility in the Career Executive Service subject to confirmation by the Career Executive Service Board; and
- d. Such other incentives, financial or otherwise, designed to promote scientific effort and achievement.

SEC. 8. The Academy is hereby authorized to establish not more than ten yearly awards to scientists for distinguished achievement in science who shall be accorded by the President the rank and title of "National Scientist." Said "National Scientists" shall each be given a gratuity of Twenty Four Thousand Pesos and shall be entitled to other privileges as are enjoyed by the "National Artists."

SEC. 9. A member of the Executive Council shall receive at least One Hundred Pesos per session of the Council in addition to the reimbursement of actual reasonable travelling expenses.

Each member of the Academy shall receive a gratuity of Six Thousand Pesos per annum: Provided that he publishes during the year at least one scientific paper or delivers one original public scientific lecture approved by the Executive Council.

SEC. 10. The total membership of the Academy shall not exceed Fifty at any one time. This number may be increased by a two-thirds vote of all the members and approved by the President.

SEC. 11. The Academy shall promulgate rules and regulations to carry out the provisions and objectives of this Decree.

SEC. 12. To carry out the above purposes, the amount of Two Million Pesos is hereby appropriated and shall be made available from the funds of the National Treasury.

SEC. 13. All laws, executive orders, decrees, rules and regulations contrary to or inconsistent with the provisions of this Decree are hereby repealed, amended or modified accordingly.

DONE in the City of Manila, this 22nd day of September, in the year of Our Lord, nineteen hundred and seventy-six.

FERDINAND E. MARCOS  
President of the Philippines

By the President:

JACOBO G. CLAVE  
Presidential Executive Assistant

## PRESIDENTIAL DECREE NO. 1003-A\*

**CREATING THE NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY**

WHEREAS, Section 9(1), Article IV of the Constitution provides that "(T)he State shall promote scientific research and invention," and enjoins that "(T)he advancement of science shall have priority in the national development."

WHEREAS, in the implementation of the foregoing constitutional mandate, there is need to provide meaningful incentives to those engaged in scientific and technological research, as well as to give the recognition to outstanding achievements in technology and the sciences;

WHEREAS, the development of science and technology has largely brought about the material progress of the country;

WHEREAS, the professionalization of the government scientific and technological research services will contribute to a large extent in effecting the constitutional objectives of promoting scientific research and invention and the advancement of science and technology for national development.

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines, by virtue of the powers vested in me by the Constitution, do hereby decree and order;

SECTION 1. There is hereby created the National Academy of Science and Technology, hereinafter referred to as the Academy, which shall be composed of outstanding scientists to serve as a reservoir of competent scientific and technological manpower for the country. The Academy shall be attached to the National Science Development Board (NSDB) for general coordination. The Secretariat of the Academy shall be provided by the NSDB.

SEC. 2. For the purpose of this Decree, a scientist shall be defined as an individual who has earned a doctoral degree in any field of the sciences in an accredited University and has demonstrated and earned distinction in independent research or significant innovative achievement in the basic and applied sciences, including agricultural, engineering, and medical sciences, in mathematics and in the social sciences as manifested by his published works in recognized scientific and technical journals. Provided, that, in highly meritorious and extremely exceptional cases the foregoing doctoral degree requirement may be waived.

SEC. 3. The general administration and direction of the affairs of the Academy shall be vested in an Executive Council of seven (7) members who shall be appointed by the President of the Philippines from among at least ten members nominated by the Academy.

SEC. 4. The members of the Executive Council shall serve for a term of three (3) years; Provided, That, in case of any vacancy, the appointee thereto shall serve only the unexpired term.

SEC. 5. A scientist who is a Filipino citizen and who is in sympathy with the purpose of the Academy may become a member therein when his nomination for membership, which shall be made by at least three (3) members of the Academy who shall certify that the nominee is qualified under the provisions of Section 2 of this Decree, is formally approved by a majority of the full membership of the Academy.

Membership in the Academy shall carry with it the title of 'Academician,' and shall be for life except when terminated for cause or by voluntary resignation.

SEC. 6. The Academy shall be initially composed of scientists who shall be nominated by different national scientific societies and recognized research and academic institu-

## ENABLING ACTS

tions of higher learning screened by a temporary Committee of ten (10) members to be appointed by the President of the Philippines upon recommendation of the Board of Governors of the National Science Development Board. This Committee shall be representative of five (5) major fields of sciences, including basic and applied biological, physical, mathematical; engineering and social sciences.

The temporary Committee shall screen and evaluate the nominee pursuant to the provisions of Section 2, and may confer membership by a favorable vote of at least (8) members.

The temporary screening Committee shall exist for a period of not more than twenty four (24) months after promulgation of this Decree.

SEC. 7. The Academy may provide its members the following benefits and privileges:

- a. Free publication of scientific and technological works;
- b. Travel support for attendance and participation in international conferences; and
- c. Such other incentives, financial or otherwise, designed to promote scientific and technological effort and achievement.

SEC. 8. The Academy may recommend annually for Presidential awards not more than ten (10) scientists for distinguished individual or collaborative achievement in science and/or technology who shall be accorded by the President the rank and title of "National Scientist." Said "National Scientists" shall each be given a gratuity in such amount to be fixed by the Academy and shall be entitled to other privileges as are enjoyed by the "National Artists."

SEC. 9. Members of the Executive Council and of the temporary Screening Committee shall be entitled to reasonable allowances for attendance at Council and Committee sessions, at the same rate as members of the Board of Governors of the NSDB, in addition to the reimbursement of actual reasonable travelling expenses.

Initially, each member of the Academy shall receive a gratuity of Six Thousand Pesos (₱6,000.00) per annum subject to adjustment by resolution of the membership, provided that such adjustment shall be approved by NSDB Board of Governors.

SEC. 10. The total membership of the Academy shall not exceed Fifty (50) at any one time. This number may be increased by a two-thirds vote of all the members and approval thereof by the President.

SEC. 11. The Academy shall promulgate rules and regulations to carry out the provisions and objectives of this Decree.

SEC. 12. To implement this Decree, the amount of Two Million Pesos (₱2,000,000.00) is hereby authorized to be appropriated out of any funds in the National Treasury not otherwise appropriated.

SEC. 13. All laws, executive orders, decrees, instructions, rules and regulations contrary to or inconsistent with the provisions of this Decree are hereby repealed, amended or modified accordingly;

Done in the City of Manila this 17th day of December in the year of Our Lord, nineteen hundred and seventy six.

FERDINAND E. MARCOS  
President of the Philippines

\*As amended by P.D. 1557

PRESIDENTIAL DECREE NO. 1557

**AMENDING SECTIONS 5 AND 6 OF PRESIDENTIAL DECREE  
NO. 1003-A CREATING THE NATIONAL ACADEMY OF  
SCIENCE AND TECHNOLOGY**

WHEREAS, Presidential Decree No. 1003-A established the National Academy of Science and Technology to be composed of outstanding scientists in the country; and

WHEREAS, certain amendments are necessary in order to carry out more effectively the objectives of the Decree;

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines, by virtue of the powers vested in me by the Constitution, do hereby order and decree:

SECTION 1. Section 5 of Presidential Decree No. 1003-A is hereby amended to read as follows:

“SEC. 5. A scientist who is a Filipino citizen and who is in sympathy with the purposes of the Academy may become a member therein when his nomination for membership, which shall be made by at least three (3) members of the Academy who shall certify that the nominee is qualified under the provisions of Section 2 of this Decree, is formally approved by a majority of the full membership of the Academy.

“Membership in the Academy shall carry with it the title of ‘Academician’ and shall be for life except when terminated for cause or by voluntary resignation.”

SEC. 2. Section 6 of the same Decree is hereby amended to read as follows:

“SEC. 6. The Academy shall be initially composed of scientists who shall be nominated by different national scientific societies and recognized research and academic institutions of higher learning and screened by a temporary Committee of ten (10) members to be appointed by the President of the Philippines upon recommendation of the Board of Governors of the National Science Development Board. This Committee shall be representative of five (5) major fields of sciences, including basic and applied biological, physical, mathematical, engineering and social sciences.

“The temporary screening Committee shall screen and evaluate the nominee pursuant to the provisions of Section 2, and may confer membership by a favorable vote of at least (8) members.

“The temporary screening Committee shall exist for a period of not more than twenty-four (24) months after promulgation of this Decree.”

SEC. 3. This Decree shall take effect immediately.

Done in the City of Manila, this 11th day of June, in the year of Our Lord, nineteen hundred and seventy-eight.

FERDINAND E. MARCOS  
President of the Philippines

By the President:

JACOBO C. CLAVE  
Presidential Executive Assistant

BY THE PRESIDENT OF THE PHILIPPINES  
EXECUTIVE ORDER NO. 818

**AMENDING PRESIDENTIAL DECREE NO. 1003-A, CREATING THE  
NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY AND FOR  
RELATED PURPOSES**

WHEREAS, it is desirable to make more efficient the administrative functions and operations of the National Academy of Science and Technology;

WHEREAS, it is necessary for the Academy to embark on programs traditionally and internationally expected of a national academy of science;

WHEREAS, the constitutional mandate that the "State shall promote scientific research and inventions" and that "the advancement of science shall have priority in the national development," requires that the Academy be made explicitly closer as advisers on science and technology to the President and his ministers;

WHEREAS, under Presidential Decree No. 1416, as amended, the President is empowered to undertake such organizational and related improvements as may be appropriate in the light of changing circumstances and new developments;

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines, by virtue of the powers vested in me by the Constitution and the authority vested in me by Presidential Decree No. 1416 as amended, do hereby order and direct:

SECTION 1. Section 1 of Presidential Decree 1003-A is hereby amended to read as follows:

"SECTION 1. There is hereby created the National Academy of Science and Technology, hereinafter referred to as the Academy, which shall be composed of outstanding scientists to serve as a reservoir of competent scientific and technological manpower for the country. The Academy shall be attached to the National Science and Technology Authority (NSTA) for general coordination. THE ACADEMY SHALL HAVE ITS OWN SECRETARIAT/ADMINISTRATIVE STAFF."

SEC. 2. The second paragraph of Section 9 of the same Decree is hereby amended to read as follows:

"Initially, each member of the Academy shall receive a gratuity of Six Thousand Pesos (₱6,000.00) per annum. THE ACADEMY MAY DETERMINE STIPENDS, INCENTIVES AND/OR RECOMMEND ADJUSTMENT OF GRATUITY TO/OR OF ITS MEMBER SUBJECT TO THE APPROVAL OF THE NATIONAL SCIENCE AND TECHNOLOGY AUTHORITY.

SEC. 3. The Academy may engage in projects or programs designed to recognize outstanding achievements in science and to promote scientific productivity.

SEC. 4. To carry out the purposes of this Executive Order, the Office of Budget and Management is hereby authorized to provide such amounts as may be necessary from available or applicable funds of the government.

SEC. 5. All other provisions of Presidential Decree No. 1003-A not otherwise affected by this Executive Order shall remain in force and all laws, decrees, orders, proclamation, rules, regulations, or parts thereof, which are inconsistent with any of the provisions of this Executive Order are hereby repealed or amended accordingly.

SEC. 6. Any portion or provision of this Executive Order that may be declared unconstitutional shall not have the effect of nullifying the other provisions thereof,

provided that such remaining portions can still stand be given effect in their entirety to accomplish the objectives of this Executive Order.

SEC. 7. This Executive Order shall take effect immediately.

DONE in the City of Manila, this 16th day of July in the year of our Lord, nineteen hundred and eight-two.

FERDINAND E. MARCOS  
President of the Philippines

By the President:

JUAN C. TUVERA  
Presidential Executive Assistant

