

# ACADEMY NEWS

VOL. 2                      NO. 2

**NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY**  
National Science Development Board

**National Scientists**

Juan Salcedo, Jr., M.D.  
Alfredo C. Santos, Dr. Phil.  
Gregorio Y. Zara, Dr. Sc. (deceased)

**Academicians**

Teodoro A. Agoncillo, Ph.D., (*honoris  
causa*)  
Encarnacion Alzona, Ph.D.  
Paulo C. Campos, M.D.  
Jose Encarnacion, Jr., Ph.D.  
Pedro B. Escuro, Ph.D.  
Raymundo A. Favila, Ph.D.  
Francisco M. Fronda, Ph.D.  
Bienvenido O. Juliano, Ph.D.  
Alfredo V. Lagmay, Ph.D.  
Cecilio S. Lopez, Dr. phil. (deceased)  
Melecio S. Magno, Ph.D.  
Fe del Mundo, M.D.  
Tito A. Mijares, Ph.D.  
Geminiano T. de Ocampo, M.D.  
Eduardo A. Ouisumbing, Ph.D.  
Jose N. Rodriguez, M.D. (deceased)  
Camiro del Rosario, Ph.D.  
Juan S. Salcedo, Jr., M.D.  
Alfredo C. Santos, Dr. phil.  
Dioscoro L. Umali, Ph.D.  
Carmen C. Velasquez, Ph.D.  
Gregorio T. Velasquez, Ph.D.  
Gregorio Y. Zara, Ph.D.



## Seven New Members Chosen, Investiture to Take Place July 15

### PICC is Venue of 2nd Annual Presentation of Papers on July 15

The Second Annual Presentation of Papers of the National Academy of Science and Technology will be held at the Philippine International Convention Center on July 15.

A synchronous paper reading will take place in the morning and afternoon sessions under these areas—biological, chemical, mathematical, physical and social sciences as well as medicine.

A formal investiture followed by an oath-taking of the new Academicians will be held after the presentation of papers being held on July 15. It will be climaxed by an address of the Science Minister, Melecio S. Magno.

The new Academicians were named after the election held March 12th at the NIST building on Herran during the third meeting of the National Academy of Science and Technology. They are:

Luz Oliveros Belardo, a holder of Ph. D. in pharmaceutical Chemistry, University of Connecticut; Magdalena C. Cantoria, Ph. D. in Botany from the University of Chicago; Conrado S. Dayrit, a doctor of medicine from the University of the Philippines; Emerita V. de Guzman, a Ph. D. in Plant Physiology holder from Cornell University; Francisco O. Santos, Ph. D. in Chemistry from Yale University; Joventino D. Soriano, Ph. D. in Botany, University of Chicago and Clara Lim-Syllianco, Ph. D. in Biochemistry and Organic Chemistry, University of Iowa.

#### MORNING SESSION

- 8:00 ..... Registration
- 9:00 ..... Plenary Session (Meeting Room 4)  
National Anthem  
Welcome Remarks  
TITO A. MIJARES, Ph.D., Academician  
Secretary  
Presidential Address  
PAULO C. CAMPOS, M.D., Academician  
President

10:00 ..... RECESS

- 10:30 ..... Scientific Sessions  
Social Sciences and Mathematical &  
Physical Sciences (Meeting Room 5)  
Chemical Sciences (Meeting Room 4)

12:00 ..... LUNCHEON

#### AFTERNOON SESSION

- 2:00 ..... Scientific Sessions  
Biological Sciences (Meeting Room 5)  
Medical Sciences (Meeting Room 4)

(Pls. turn to page 4 for details)

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Search for 7 outstanding young scientists/technologists

The National Academy of Science and Technology (NAST) will set the guidelines as well as select the 7 outstanding young scientists/technologists. This is in connection with the forthcoming celebration of the National Science and Technology Week (NSTW) on July 14-20, 1980,

## MAGDALENA C. CANTORIA, Ph. D., Academician

Magdalena C. Cantoria, professor of pharmacy at the College of Pharmacy, University of the Philippines, has always been interested in plants. She found herself in the field of pharmacy by chance, but after receiving her B.S. Pharmacy degree, *cum laude*, from the U.P., she pursued graduate studies in botany. She obtained her M.S. in botany also at the U.P. Because of her pharmacy background, her interest in plants in general was now focused on plants of importance in pharmacy and medicine. Later, while on a United States Foreign Operations Administration training grant in medical botany at the Massachusetts College of Pharmacy at Boston, she earned the M.S. Pharmacy degree, this time in the field of pharmacognosy.

Pharmacognosy, she pointed out when asked, is the study of the biology, chemistry, and economics of drugs of biological origin. Although it is one of the oldest among the pharmaceutical sciences, it has undergone a lot of change within the last three decades. She explained that a great proportion of substances used in medicine and pharmacy are derived from bacteria, plants, and animals. Of these, about 85% are obtained from plants. Modern pharmacognostic studies deal with the physiology of the living organisms producing these substances and the biochemical pathways leading to their formation. She expressed the hope that the cultivation of drug plants on a commercial scale be developed, at least to meet the needs of the local pharmaceutical industry. Several Philippine plants are potential sources of medicinal substances and pharmaceutical ingredients like flavors, perfumes, and suspending agents. Other valuable plants may be introduced, if doing so is shown to be feasible.

From 1958 to 1961, Dr. Cantoria studied at the University of Chicago,

holding a fellowship from the International Federation of University Women, a study grant from the American Association of University Women, and the Charles L. and Frances K. Hutchinson Fellowships from the University of Chicago. After receiving her Ph. D. in 1961 in the Department of Botany, majoring in plant physiology with biochemistry as cognate, she undertook a summer course on Methods in Radiation Biology at the Argonne National Laboratory before returning to the Philippines. When a UNESCO Regional Training Course in Plant Physiology was held at the University of Delhi in 1965, she was chosen by the National Research Council of the Philippines as one of the two Philippine plant physiologists sent. The other was Dr. Emerita V. de Guzman, another newly-elected Academician.

Dr. Cantoria received the Edwin Leigh Newcomb Award for the best paper in pharmacognosy given by the American Foundation for Pharmaceutical Education in 1954 for her paper on the morphology and anatomy of *Rauvofia vomitoria* Afz. and again in 1962 with Dr. Edward S. Mika in the teacher-researcher group for their paper on the growth and development of *Datura stramonium* L. The University of the Philippines Alpha Chi Chapter of Phi Sigma Society, an international honor society for the promotion of research in the biological sciences, chose Dr. Cantoria as recipient of the Phi Sigma Award for marked distinction in biology in 1951. In 1977, the same honor society elected her "The Most Outstanding Phi Sigma for 1976-1977". With half of the financial award that went with the title, she initiated in the U.P. Pharmacy Alumni Scholarship and Research Foundation, Inc., an Award in Pharmacognosy at the graduate level. The first recipient of this award is Dr. Mildred B. Diiveros



for her work on *Zingiber zerumbet* (L.) Sm. and its proposed variety (Fam. Zingiberaceae)

Dr. Cantoria was elected to membership in the honor societies of Phi Kappa Phi, Phi Sigma, Rho Chi, and Sigma Xi and to regular membership in the National Research Council of the Philippines and the Society for the Advancement of Research. She is an active member of the American Society of Pharmacognosy, the Philippine Pharmaceutical Association, and other scientific and professional organizations.

She has participated in and attended various congresses, symposia, and seminars, both here and abroad. The latest international symposium in which she participated was the International Symposium on Recent Advances in Natural Products held in Seoul, Korea, 14 to 16 December 1979. The Philippines was invited by the Korean Society of Pharmacognosy and she was the one recommended by Dr. Jesusa A. Concha, dean of the U.P. College of Pharmacy. Dr. Cantoria's paper was entitled "Pharmacognostic Studies at the College of Pharmacy, University of the Philippines". Previously, she was selected by the Pharmacognosy Society of Thailand as one of the participants in the UNESCO-sponsored Regional Seminar on Medicinal Plants held in Bangkok, Thailand, 10 to 14 September 1979 where she talked on "Studies on the Growth and Development of *Mentha* and *Datura* in

(turn to page 4)

## CLARA Y. LIM-SYLIANCO, Ph.D.

A holder of a doctorate degree in biochemistry and organic chemistry, Dr. Clara Y. Lim-Sylianco's first love is medicine. Yet, her interest in medicine was not thrown in the shade completely—because the main thrust of her researches is related to it. An example is her study on the mutagenic potentiality of the country's medicinal plants as well as the antimutagenic effect of some vitamins.

Dr. Lim-Sylianco finished pre-med with highest honors at Silliman University in 1947 and was all set to take up Medicine proper but took up B.S. Chem instead and graduated *magna cum laude* at the same university two years after. She pursued a graduate course in Chemistry at UP, Diliman in 1949-51 while working as research assistant at said university (1949-51) and later on as instructor at Silliman U (1951-53). She obtained a Ph. D. in Biochemistry and Organic Chemistry (1953-57) from the University of Iowa while working as research assistant at the university's Dept. of Pediatrics, (1953-55) and research fellow, Dept. of Biochemistry, (1955-57). After graduating with a Ph. D. she worked her way up, first, as an assistant professor, at the Dept. on Chemistry, UP (1957-63) then as associate professor (1965-70) and to full professor in 1970. She still teaches there up to the present in addition to being a professorial lecturer at the Dept. of Biochemistry also at the state university. She too served as consultant between 1970-73 at the National Institute of Science and Technology, (NSDB).

Dr. Lim-Sylianco, together with her co-researchers, has completed many projects to her credit. Among these were: antimutagenic effects on aflatoxins and nitrosamines; benzidine; some alkylating and intercalating agents; and antihypertensive drugs. Others are on mutagenicity and clastogenicity potential of safrole and

myristicin, interactions of some mutagens on enzymes and mechanisms of color reactions with amino acid.

As a teacher as well as a researcher, she nurtured the idea of writing chemistry books suited to the Philippine condition and those that can be usefully handy to Filipino students. Her diligence paid off because her *Principle of Organic Chemistry*, using the rational approach, is a textbook adopted nationally, 5th ed., 1975. Her other works include *Modern Biochemistry*, another nationally adopted textbook using the molecular approach, 1976; *Structure and Function of Biomolecules*, textbook for advanced biochemistry, 1975; *Monograph Series on Molecular Biochemistry: Nucleic Acids, Protein, Carbohydrates, Lipids*, 1974; *Laboratory Manual in Organic Chemistry*, 1965; and *Laboratory Manual in Biochemistry*, 1961.

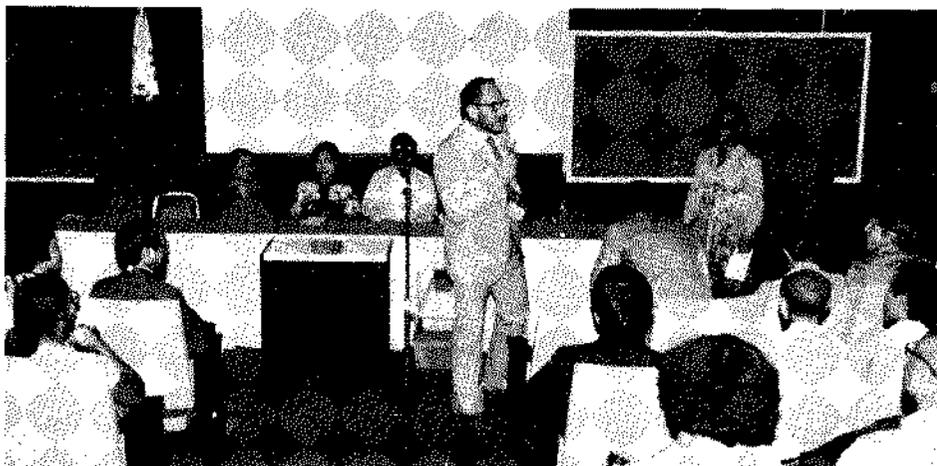
Her endeavor is not confined in the classroom walls nor in laboratory corners. She is an active officer and member of various professional organizations. Besides, she finds time to organize scientific societies. She is



founder-director of the Philippine Biochemical Society and Organic Chemistry Teachers Association. She is involved actively in scientific and technological conferences, seminars and workshops either as lecturer, speaker, participant or observer. She organized the ICASE Asia Symposium on Low-Cost Equipment for Integrated Science Education at all levels last Dec. 27-31, 1979 held at AIT; UP. She is working on a forthcoming international conference on the Detection and Regulation of Environmental mutagens carcinogens and teratogens.

She had gone to different parts of the globe to attend international conferences where in almost all occasions she presented papers about her major researches. To date, she has more than 86 papers presented in local and international seminars.

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The newly-named Academician, Dr. Lim-Sylianco is shown presiding over a session on ICASE-Asian Symposium on low-cost equipment for integrated science education at all levels, held at the Asian Institute of Tourism December 27-31, 1979.

## Search for 7 outstanding young scientists/technologists *(Continued from page 1)*

### THE PAPER READING SESSIONS

The session on social sciences will be held at Meeting Room 5 to be chaired by Teodoro A. Agoncillo (Ph.D.) *honoris causa*, Encarnacion Alzona (Ph.D.) will present a paper on "Dr. T.H. Pardo de Tavera and Philippine Historiography."

Chairman of the mathematical and physical sciences will be Raymundo Favila, (Ph.D.). "Algebraically Closed Groups (An Application of Model Theory to Algebra)" will be presented by Fr. Bienvenido F. Nebres, (S.J.-Ph.D.).

Chaired by Alfredo C. Santos (Dr. phil.), the chemical sciences session will discuss three papers. They are "Phytochemical Research and Drug Development" by Dr. Santos and "An Odyssey into Cadang-Cadang Problem" by Jose R. Velasco, (Ph.D.) and Luz O. Belardo (Ph.D.) will talk on Essential Oils.

Emerita V. de Guzman (Ph.D.) will discuss "Embryo Cultures, Callus Growth and Organ Regeneration in Coconut Tissues," while Magdalena C. Cantoria (Ph.D.) will talk on "Physiology and Biochemistry of the Volatile Oils of *Mentha* Species (Family Labiatae) Grown in the Philippines." Gregorio T. Velasquez (Ph.D.) chairs the session.

Dr. Paulo C. Campos (M.D.) heads the meeting on medical sciences, with three Academicians as presenter of papers. Topics to be discussed are on "Anti-mutagenic Effects of Some Vitamins" by Clara Y. Lim-Sylianco, (Ph.D.); "Biological Pathways" by Geminiano T. de Ocampo (M.D.), and "Seroepidemiologic Surveys in the Philippines by Three Viral Vaccine Preventable Diseases" by Fe del Mundo, (M.D.).

which coincides with the 22nd anniversary of the National Science Development Board.

The NSDB has launched a search for the seven (7) Most Outstanding Young Scientists/Technologists of the Philippines under the following disciplines: Mathematics, physics, chemistry, engineering, medicine, biological sciences and social sciences.

To be an awardee, he must be a Filipino citizen, 40 years or less on 18 July 1980, a B.S. degree holder in one of the above cited disciplines, and a major researcher of a project or research activity.

Criteria for selecting the awardees

include relevance of research activities, quality of scientific works and publications, and productivity as well as importance of research works.

Each awardee will be entitled to receive a Presidential Trophy and a cash award of TEN THOUSAND PESOS (P10,000.00) from the NSDB.

Nomination must be submitted by heads of government and private research institutions as well as colleges and universities. Accomplished forms must be sent on or before the end of June to the NAST, Bicutan, Taguig, Metro Manila or mailed to NAST, NSDB, P.O. Box 3596, Manila.

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### DR. CANTORIA *(from page 2)*

the Philippines". She read this same paper at a symposium on medicinal plants sponsored by the National Research Council of the Philippines last January.

Dr. Cantoria has conducted basic research on the pharmacognosy of agar, rauwolfia, datura, mint, and *Piper* species. The applied aspects of the physiology and biochemistry of mint, datura, and catharanthus are also being investigated. All her projects have been funded by the National Research Council of the Philippines. For a limited time, some support was received from the University of the Philippines Natural Science Research

Council. She has a collection of over 300 species in a drug plant garden which she maintains at the University of the Philippines Quezon City campus for instructional purposes. She regards as her most important research her studies on the physiology of Philippine mints and her most outstanding work, her book "Pharmacognosy in Action" published by the National Research Council of the Philippines.

She acknowledges the influence and encouragement of her professors, Dr. Patrocinio Valenzuela, Dr. Gregorio T. Velasquez, Dr. Alfredo C. Santos, and Dr. Heber W. Youngken, Sr. This has paved for her continued interest in scientific research.

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### DR. LIM-SYLIANCO *(from page 3)*

She is a mentor who aims for academic excellence for her students. During her college years, she was an excellent student who garnered several awards and recognition. Among these were: Fulbright Travel Grant, (1953); Bose Award, University of Iowa, (1956); Iowa Sigma Pi Award, Iowa U (1956); and Fellow, the Royal Society of Chemistry, London.

Among her professional awards were: the Outstanding Silliman Award (1966); and Gregorio Y. Zara Award,

Philaas (1979). She was privileged to hold the seat of A.S. Clemente Professorial Chair in Chemistry (1977), and UP Endowment Professorial Chair in Chemistry (1974).

Born on August 18, 1925 at Guihulngan, Negros Oriental, Dr. Lim-Sylianco is married to Teodoro T. Sylianco. They are blessed with two children: Lorraine and Eunice. They are living right inside UP campus, at Area I, Juan Luna St.

# The Round Table Conference on

## The Nuclear Issue

*(Continued from last issue, 5 December 1979)*

important decision must be made in the matter of energy production. No one can over-state the fact that energy is a necessary ingredient to development. We need power for our society, for our homes, our towns and our cities. We need power for our economic development, our agricultural and industrial projects, their supporting facilities such as highways and feeder roads and bridges, ports and harbors, etc. We need power for our transportation and communication facilities, our civil and military defense installations and others.

Heretofore, the Philippines has been taking advantage of its natural sources of energy, mostly its hydro-potentials, coal, and recently its geothermal power sources. Until this year the country was entirely dependent on imported oil for its oil-fired power plants. The spiralling high cost of imported oil, however, prompted the Philippines to search for this important material within its geographical boundaries until recent oil drillings were able to reduce her oil imports from the OPEC countries.

It must be recognized that fossil fuels are not necessarily unlimited. It has taken Mother Nature millions of years to make them. Considering the rapid rate at which all the countries of the world are consuming them today, one can say without fear of contradiction that these sources of power may last for only a few more decades. Even uranium itself that fuels a nuclear power reactor may be viewed as one which is not unlimited. The only energy source that seems to be unlimited, both in point of time and quantity, is the sun. It will, however, take a long time for man to economically harness solar energy for bulk electric power production.

Nuclear fission technology as it is now being utilized in nuclear reactors has already come of age. Since the mid-1960's the Philippines has been eyeing on nuclear power to fill the gap

in her power requirements for developmental projects, gaps left by hydroelectric power stations, oil-fired power plants, geothermal power and others. At this point in the country's effort to change itself from a developing to a developed country, the Philippine Nuclear Power Plant (PNPP — 1) project in Napot Point, Morong, Bataan may be considered as a potential contributor to the country's scientific, technological and economic progress. Its impact on society, however, precisely with respect to its design features and its actual operation as a power facility, has been such as to question its establishment in what is claimed to be one with geologic fault and lies in an earthquake belt. Our politicians, like those in the United States and elsewhere, started asking question. In the light of the Three Mile Island (TMI) incident in Harrisburg, Pennsylvania, are the safety features in the design and construction of PNPP — 1 sufficient guarantee that its operation in an earthquake belt with geologic fault will not endanger the health and safety of the Philippine public? Why then has the United States Nuclear Regulatory Commission (USNRC) stopped the exportation to the Philippines of nuclear equipment when it has allowed exportation of similar equipment to other countries?

Shall we continue the construction of the PNPP-? Shall we stop it temporarily until every Juan de la Cruz is convinced that the nuclear facility poses no danger to the Philippine public? Shall we ditch the entire project for good? These are questions that can be answered only by digging deeper into the relationships between power production and our developmental targets and programs, considering their relative time horizons and economics.

It is perhaps timely to recall that the recommendation to go nuclear in the late 1960's was not implemented simply because of the country's

financial incapability, although the cost of the hardware at that time was very much cheaper than it is today. The cost of building a facility in the future, any facility for that matter, much more a nuclear power plant, can be sky-rocketing.

The Philippine Nuclear Power Plant (PNPP — 1) is similar in design concept to several other Westinghouse designed and built nuclear power plants. About 200 nuclear power plants are now in operation throughout the world and the TMI incident is an unfortunate one. Other Westinghouse built nuclear power plants were inspected after the TMI incident and were found to be in satisfactory conditions for safe operation.

The Nuclear Power Plant in the TMI, Harrisburg, Pennsylvania, which triggered world concern over the possibility of similar nuclear incidents involving other nuclear power reactors, has design features different from those of the PNPP — 1. The design features that caused the TMI incident have been identified by the USNRC. Westinghouse has committed itself to incorporate additional safety features to the PNPP — 1 considering the findings of the USNRC in the TMI incident. This is in compliance with its contract with NPC to deliver to the latter a safe and reliable plant on a turnkey basis.

Shall we then look again at our development plans including agricultural, industrial, transportation and communication, military and other projects and their time horizons? Shall we then review our studies on the availability of local power sources and our ability to harness them on time to meet the above demands within their time horizons? If these power sources are found to be insufficient, shall we look into our financial capability to meet the spiralling cost of imported oil and other imported power sources? If all these fail to meet our needs, shall

*(to next page)*

# The Round Table Conference on

## Summary of Proposals Ph.D. Programs in Mathematics, Physics & Chemistry

In early 1974, on the occasion of Science Week, President Marcos gave preliminary approval for an Institute to train scientists and mathematicians both for research and the needs of the country. In addition to training people, such an Institute would also be very attractive for Filipinos with advanced degrees who have not returned to the Philippines after their studies abroad due to the scarcity of a proper atmosphere for doing research and doing high-level academic work in the Philippines.

Though such an Institute has not yet been formed, there have been efforts in the direction of training high level scientists

and mathematicians in the Philippines. In 1974, the University of the Philippines, Ateneo de Manila University and De La Salle University signed a consortium agreement for mathematics and the physical sciences to encourage greater cooperation between these institutions and to make better use of available resources and manpower. In 1977, these three Universities started a Ph.D. program in mathematics on a consortium basis with the support of NEDA and NSDB. This mathematics consortium also had the cooperation and support of the UP Statistical Center.

Doctorate programs in chemistry and physics have often been discussed in the universities. A deterrent factor in pushing through a Ph.D. programs has always been the availability of suitable faculty and research advisers and the funding for the dissertation. The problem however has become more urgent as the scientific and developmental needs not only of the schools but also of the country have been held back by the lack of such qualified personnel; many of our countrymen who have trained abroad have not returned to the Philippines — or have returned and decided to migrate to greener pastures

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### NUCLEAR ISSUE . . . (Continued from page 5)

we then say, "Let's continue to go nuclear"?

Considering the above information and the supposition that we may not be able to meet our urgent developmental need for bulk power from local power sources, I would suggest the resumption of work on the PNPP — 1 project with the understanding that the additional safety features promised by Westinghouse during the hearings at the PICC will be all incorporated in the PNPP — 1 at no additional financial burden to the Philippines. I would suggest in addition that local Filipino scientists and engineers be allowed to actively participate in all phases of the project including design, subcontracting, construction, tests, start-up, and operation of the entire facility. This may contribute to hastening technology transfer to the Philippines in the field of reactor technology.

In the event that the Philippines decides to permanently ditch the PNPP — 1 project in Morong, Bataan, I would suggest that steps be taken to study (a) the implications (moral, legal, economic) of cancelling the NPC contract with Westinghouse; (b) how the structures already constructed on the site may be utilized for other industrial purposes and how the equipment already delivered and accepted can be used in other projects.

The Philippines, however, may decide to retrofit its nuclear power plant program and have a nuclear power plant of another design and constructed on another site. In that even, we may choose the best of the existing reactor types. I would leave the economics to the economists and the legal aspects of the contract to the lawyers.

The design can be checked by experts that the Philippines may hire directly or requested through the IAEA, experts preferably from the USNRC and principal nuclear power reactor suppliers in the USA, Canada, and Europe. The design must be discussed in public hearings with the experts of the Ministry of Energy, the National Power Corporation and the Philippine Atomic Energy Commission, and other interested government institutions. The oppositors to the establishment of PNPP — 1 in Bataan should be invited to participate in the discussions.

The site can be selected to the satisfaction of all concerned. To this end, IAEA siting and safety mission may be requested. Selected sites and their inherent advantages (and/or disadvantages) should be discussed in public hearings with the participation of those institutions and groups mentioned above.

Even the terms of the contract should be discussed by a personnel of

experts to the satisfaction of the Government. The President of the Philippines will then be in the best position to be fully briefed before he approves the project. The Philippines will not be deprived of what the atom can offer.

The atomic explosions in Japan in 1945 ended the Second World War and gave us peace. It may be an uneasy peace that we enjoy today. The Bataan nuclear project is about to give us atoms for peace, but even now when it is only about 20% completed it has been giving us an uneasy peace of mind. Shall we remain to be afraid of the atom? Can't we be the master and the tamed atom of today, the slave? Can't we make this slave work and produce power for our daily needs? Shall we decide NOW to retrofit our nuclear power program so that we can be sure that our nuclear power plant is safe, reliable and located on a site that has been selected to the satisfaction of all concerned. To this end, IAEA siting and safety missions may be requested. Selected sites and their inherent advantages (and/or disadvantages) should be discussed in public hearings with the participation of those institutions and groups mentioned above.

Even the terms of the contract should be discussed by a panel of

*(to be continued)*

elsewhere.

The experience of the Ph. D. in mathematics has also been an encouragement to the initiation of a similar program in the physical sciences. The three universities (UP, ADMU and DLS) have shown that cooperative efforts can achieve more; the government, through the appropriate agencies, has shown the needed support; possible outside assistance through exchange of personnel may become more available with the recently-negotiated agreement between the NSDB and the Japan Society for The Promotion of Science.

Thus, there have been a number of meetings not only among the doctorate holders of the three universities but also of other concerned scientists in the country, as represented by officials of the Mathematics Society of the Philippines, the Physics Society of the Philippines and the Chemical Society of the Philippines. In these gatherings, both formal and informal meetings, the urgent need of training scientists in the Philippines and providing better opportunities for such scientists in the country were often highlighted.

The proposal now is to set up a consortium program for training Ph.D.'s in chemistry and physics and to continue the program in mathematics.

#### Institutional Linkages

##### A. Scientific Societies (National)

1. Mathematical Society of the Philippines
2. Philippine Physical Society
3. Chemical Society of the Philippines (Kapisanan ng mga Kimiko sa Pilipinas)

##### B. Scientific Societies (International)

1. Southeast Asian Mathematical Society
2. International Mathematical Union, especially its Commission on Development and Exchange

##### C. Scientific Organizations/Institutions (National)

1. Philippine Atomic Energy Commission
2. U.P. Statistical Center
3. Philippine Institute of Pure and Applied Chemistry
4. Manila Observatory
5. Pagasa

##### D. Scientific Organizations/Institutions (International)

1. Center for Theoretical Physics (Trieste, Italy)
2. International Center for Pure and Applied Mathematics (Nice, France)

3. Southeast Asian Regional Center for Mathematics (Singapore)

4. International Center for Mechanical Sciences (Udine, Italy)

##### E. Others

1. NSDB-Japan Society for the Promotion of Science Agreement
2. British Royal Society
3. Fulbright-Hays Program
4. British Council
5. German DAAD

#### Schedule

The plan is for groups of five or six to be trained in three year cycles. A new cycle begins every two years, so there is a one-year overlap between groups.

#### Financial Requirements

##### A. Mathematics

###### First Year

School Fees . . . . .	11,850	
Salary Substitutes for	60,000 – 90,000	
Book Allowance . . . . .	5,000	
		<u>₱76,850 – ₱106,850</u>

###### Second Year

School Fees . . . . .	8,650	
Salary Substitutes for	60,000 – 90,000	
Research Seminar . . . . .	7,200	
Book Allowance . . . . .	5,600	
Visiting Professor . . . . .	50,000	
		<u>₱127,250 – ₱160,850</u>

###### Third Year

School Fees . . . . .	19,160	
Salary Substitutes for	120,000 – 180,000	
Research Seminar . . . . .	7,200	
Book Allowance . . . . .	10,000	
Visiting Professor . . . . .	50,000	
		<u>₱232,760 – ₱266,360</u>

###### Fourth Year

School Fees . . . . .	11,850	
Salary Substitutes for	60,000 – 90,000	
Research Seminar . . . . .	7,200	
Book Allowance . . . . .	5,000	
Visiting Professor . . . . .	50,000	
		<u>₱130,460 – ₱164,050</u>

###### Fifth Year

School Fees . . . . .	7,310	
Salary Substitutes for	60,000 – 90,000	
Research Seminar . . . . .	7,200	
Book Allowance . . . . .	5,000	
Visiting Professor . . . . .	50,000	
		<u>₱125,910 – ₱159,510</u>

Total: ₱693,220 – ₱857,620

##### B. Chemistry

###### First Year

School Fees	₱18,046.80	
Salaries fellows/ substitutes for	79,200.80	– ₱115,200
Book Allowance	6,000.00	
Research supplies	— — —	
Research seminars	3,600.00	
Foreign lecturers	20,000.00	
		<u>₱126,846.80 – ₱162,846.80</u>

###### Second Year

School Fees	₱17,072.70	
Salaries fellows/ substitutes for	79,200.00	– ₱115,200
Book Allowance	6,000.00	
Research supplies	90,000.00	
Research seminars	3,600.00	
Foreign lecturers	20,000.00	
		<u>₱215,872.70 – ₱251,872.70</u>

###### Third Year

School fees	₱39,281.40	
Salaries fellows/ substitutes for	158,400.00	– ₱230,400
Book allowance	12,000.00	
Research supplies	90,000.00	
Research seminars	3,600.00	
Foreign lecturers	20,000.00	
Fellows at foreign universities	72,000.00	
		<u>₱395,281.41 – ₱467,281.40</u>

###### Fourth Year

School Fees	₱19,897.80	
Salaries fellows/ substitutes for	79,200.00	– ₱115,200
Book allowance	6,000.00	
Research supplies	90,000.00	
Research seminars	3,000.00	
Foreign lecturers	20,000.00	
		<u>₱218,697.80 – ₱254,697.80</u>

###### Fifth Year

School fees	₱19,960.20	
Salaries fellows/ substitutes for	79,200.00	– ₱115,200
Book allowance	6,000.00	
Research supplies	90,000.00	
Research seminars	3,600.00	
Foreign lecturers	20,000.00	
Fellows at foreign universities	72,000.00	
		<u>₱290,760.20 – ₱326,760.20</u>
Contingency	₱ 50,000.00	
TOTAL COST	₱1,297,458.90	₱1,513,458.90

#### Mathematics & Chemistry

##### Sources of Support

A. Support for Ph. D. Students: stipend, school fees, book allowance

(to next page)

# Dr. Hughes is Guest of NAST in May 29 Meeting, Opens Door to US National Academy of Science and AAAS

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## NAST Head Returns from a Fruitful London Visit

Dr. William L. Hughes, professor of engineering and director of the Engineering Energy Laboratory of Oklahoma State U was guest of the National Academy of Science and Technology in one of its regular meetings, held May 29 at the NIST Herran in Manila.

Earlier during the same day, Dr. Hughes called on President Marcos at Malacañang. He was accompanied by Minister Melecio S. Magno and the Deputy Minister Segundo V. Roxas of NSDB. The visiting professor was invited by the NSDB to make a one week survey of the country's energy substitute, and which he lauded.

In welcoming the Oklahoma State U official, Dr. Paulo C. Campos, NAST President said "Very few people of your wavelength have come to visit us and we would like to be in the main stream all this relation." He intimated the desire of the Academy to establish correspondences and connections with major Academy of Sciences of the world and open formal relations. He reiterated the possibility of undertaking cooperative programs that can spring out of this association.

Dr. Hughes assured the members of conveying the desire and interest of the Academy in establishing linkages with the US National Academy of Science and the American Association for the Advancement of Science.

Dr. Hughes has this to say —

*On our other energy sources.* He visited many places such as Maya Farms where he saw animal manure and plants tapped for biogas and used in processing food, generate electricity and refrigeration. He likewise saw the production of alcohol for motor fuel blends or substitute at the Philippine Navy quarters in Cavite City.

On invitation of the British Royal Society, Dr. Paulo C. Campos, president of the NAST returned from London after a week visit of the various research institutions and facilities. While there he met and associated with both officers and members of the Society.

As a result of this summer visit, an agreement of Exchange Visits between the NAST and the Royal Society of London is underway. On October, Dr. Harrie Massey will come to further dis-

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"I think you people are much, much better than what you think you are."

### *On Agriculture.*

"I have seen some things that surpassed anything what I have seen in the United States. I think your foreign activity would be a world model of an integrated agriculture, one that is compact, well-organized and self-sufficient."

### *On Ecological Balance.*

"We are rapidly approaching the time when we must put everything back in the soil that we take up."

cuss the agreement. No less than the President of the British Royal Society, Dr. Alexander Robertus Todd will be here before the year ends to formalize the contract.

The accord proposes to cover a yearly visit for scientists in natural sciences, technology, agriculture and medicine. Those coming in as lecturers may stay up to three weeks, while research scientists may come for longer visits, although preference will be given to those associated with joint projects. The signing parties may name as Joint Projects, the proposals for cooperative research between laboratories or other institutions from their countries.

It is proposed too that the sending organization pays the international fares of its visitors and likewise make any other requests in a form of a proposal. On the other hand, the host group provides the costs of the visit such as board, lodging and transportation connected with the object of the visit.

Guidelines covering nominations in this case are still being finalized.

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## SUMMARY OF PROPOSALS . . . (Continued from page 7)

— These will have to be funded locally from NSDB and/or other government agencies

### B. Visiting Professors from abroad

— At least part of their support can come from outside

- from U.S. through Fulbright
- from Britain through British Council
- from Germany through

DAAD/Goethe Institute

- from France through French Embassy
- from Japan through JSPS- NSDB

### C. Ph.D. students to do research abroad

Again part of the support can come from abroad, through the same sources as in

(B) plus:

— UNESCO funds for the Math Centers at Singapore and Nice

— Center for Theoretical Physics at Trieste

### D. Books, Equipment, Research Support

— We should explore possibility of funds from Rockefeller Foundation

### E. Retention/Attraction of Faculty in Mathematics and Physical Sciences

— Faculty Chairs through funding proposal of NAST

— Establishment of an Institute with sufficient funding

# ACADEMY NEWS

*— a quarterly newsletter published by the  
National Academy of Science and Technology  
NSDB Building, Bicutan, Taguig, Metro Manila*

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