



PHILIPPINE SCIENCE & TECHNOLOGY ABSTRACTS



**SCIENCE AND TECHNOLOGY INFORMATION INSTITUTE
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PHILIPPINE SCIENCE AND TECHNOLOGY ABSTRACTS

Bimonthly classified abstracts of the latest Philippine publications in the field of science and technology

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AGRICULTURE

- 0001 Accelerating doubled haploid line generation in rice through anther culture medium modification. Macabale, Sharon S., Villalba, Wilhelmina E., Chico, Martha V., Romano, Lenie P., Desamero, Nenita V., Julaton, Maria Corazon N., Sta. Maria, Laila B.. **Transactions of the National Academy of Science and Technology Philippines**, , :293-294

In this study, we evaluated two anther culture callus induction media, 2,4-D (MNK) and phenylacetic acid (PAA)-enriched (P10NB) medium, in ten rice genotypes distributed over three planting seasons. Results indicated that the relative advantage of using either one of the media depends on the genotype. At least 50% of the genotypes formed more calli in PAA-enriched medium. With PAA, plants can be generated from cultured anthers, directly, that is, without transferring to regeneration medium, referred to as one-step method. In contrast, the two-step method requires transfer of call used explant from callus induction to regeneration medium. Higher frequency of green plant regeneration was recorded in P10NB compared with MNK. Some genotypes performed better in P10NB one-step, while others in two-step method. More plantlets per anther and more fertile doubled haploid plants were obtained from PAA-enriched medium, with better response in two-step method. Initial assessment indicates that the doubled haploid plants regenerated from P10NB matured earlier than those regenerated from MNK. More so, the doubled haploid plants from P10NB-one step matured earlier than those from two-step method. This resulted in the shortening of the seed to seed cycle period from anther source establishment to R₁ seed harvest of regenerated doubled haploids plants. Although better responses were observed in the two-step, the one-step method has the advantage of economizing the culture medium requirement, its chemical components, and the time and labor spent for medium preparation. **(Author's abstract)**

Direct regeneration. Doubled haploid. Anther culture. Phenylacetic acid. 2,4-D. Agriculture.

- 0002 Adapting plants to marginal environments:. Javier, Emil Q.. **Scientia Filipinas**, , 2(1):18-26

For six years, 25 million peasants and tribe members on the Western African Coast waited for seasonal rains, the source of their livelihood. When the heavens denied them of this vital showers, they waited for the second season, the third; the fourth; the fifth. For six successive seasons, rainfall was, at best, exiguous. Forced to consume their seeds, these people were unable to plant again. So this flat tropical area that once produced the strongest of African warriors were left barren and desolate after a loss of life not less than a hundred thousand. This scenario merely indicates a proportion of the food crisis which the world is becoming conscious of: as pressure for food increase, man is forced to grow crops under less hospitable environments. In the Philippines, 47% of the total rice area alone is rainfed lowland, depending solely on monsoons to maintain flooded field conditions. The urgent need of the times and the greatest challenge to plant breeders, the author expounds, is to develop varieties that adapt themselves to less than ideal or marginal environments.

Agriculture. Plant breeding. Marginal environments.

- 0003 Agricultural biotechnology. Padolina, William G.. **Philippine Journal of Development**, , 28(1):1-12

Developing countries, still heavily dependent on agriculture, must now harness biotechnology to modernize agricultural production and diversify product outputs. The Philippines was one of the first Asian countries to establish a biotechnology research and development program. However, not much progress in harnessing the tools of biotechnology has been achieved, especially in the area of varietal improvement. Despite an early realization of the importance of biotechnology in national agricultural development, there was little political will to provide resources for this program to move forward.

Modern biotechnology must be regarded as one of the tools in modernizing Philippine agriculture. Its role in varietal improvement, biosecurity, product standards, and pest and disease prevention and management must be enhanced.

A critical mass of highly trained human resources in the natural and social sciences that will undertake the research and development activities in agricultural biotechnology must also be assured.

Private sector participation in the development of agricultural biotechnology must be encouraged. The sustainability of these research and development activities can only be assured if they serve commercial purposes. This may form the beginnings of an agricultural biotechnology industry and the much-needed commercial base for modern biotechnology to take off in the country.

Agriculture. Biotechnology.

- 0004 Alley cropping system in sloping lands. Paningbatan, Eduardo P., Maglinao, Amado R., Alamban, Raul B.. **Technology!**, , 18(2):1-28

Alley cropping as a soil conservation measure and a crop production enhancement strategy, improves soil physical properties, maintains soil organic matter, promotes nutrient cycling, suppresses weeds, and consequently improves and sustains crop production and farmer's productivity.

Agriculture. Crop production. Alley cropping system. Sloping lands.

- 0005 Anthurium for cutflower production. Valmayor, Helen L.. **Technology!**, , 10(3):1-16

The growing of anthurium for cutflowers has a great potential for the world's cutflower market. Anthurium growing has been gaining popularity and acceptance by cutflower growers in the Philippines for several reasons. The

flower has attractive colors such as red, pink, orange, coral, white and combinations of green with other colors. Being waxy and glossy, the flower has a very long vase life which may extend to three weeks or more at room temperature, thus making the flower ideal for the export market.

In the Philippines, many flower growers raise anthuriums because they are easy to culture, propagate and market.

Known for its comparatively high potential in terms of financial return per unit area, anthurium growing is suitable for compact backyard livelihood projects that would benefit many individuals. Furthermore, the cutflower industry, being labor intensive, could provide remedies to the country's rising unemployment problem.

Agriculture. Anthurium. Cutflower production.

- 0006 Approaches in developing ringspot virus resistant papaya. Villegas, Violeta N.. **Transactions of the National Academy of Science and Technology Philippines**, , :63-70

Papaya ringspot virus (PRSV-P) is a major disease of papaya in the Philippine. PRSV-P infected plants exhibit leaf mottling, reduced lamina, tapering of stem, oil streaks on petioles and ringspots on the fruits. Screening available germplasm revealed that resistance is not found within the cultivated *Carica papaya* species. Three approaches are being utilized to develop PRSV-P resistant papaya. Intraspecific hybridization produced a moderately tolerant variety and identified tolerant genetic stocks. Interspecific hybridization, done by crossing papaya with PRSV-P resistant wild relatives (e.g. *C. cauliflora*, *C. quercifolia*, *C. pubescens*), produced resistant hybrids. However, sterility and hybrid breakdown hamper the backcrossing procedure to transfer the resistance trait to papaya. Genetic engineering is another technique being pursued and this works on the principle of coat protein-mediated resistance. Coat protein gene from the local virus isolates has been cloned and inserted into Davao solo papaya via microprojectile bombardment. Putative transformants now regenerating.

International collaboration has played an important role in our efforts to develop PRSV-P resistant papaya. Details of the progress made using intraspecific and interspecific hybridization and genetic engineering are discussed. **(Author's abstract)**

Agriculture. Papaya. Ringspot virus. PRSV-P.

- 0007 Aspect of biology and conservation of the Philippine Cockatoo *Cacatua haematuropygia* on Rasa Island, Palawan, Philippines
. Widmann, Peter, Lacerna, Indira D., Diaz, Siegfried H. **Silliman Journal**, , 42(2):129-148

The Philippine cockatoo, (*Cacatua Haematuropygia*), is a highly endangered bird species. Since three years ago, the Philippine Cockatoo Conservation Program has been carrying out a project in Southern Palawan to save this species from extinction. The project area comprises the small coral

island of Rasa (8.3 km²) in the Sulu Sea, which belongs to the municipality of Narra in southern Palawan. The vegetation of the island consists of predominantly old growth mangrove and coastal forest, with a fair presence of suitable nesting and feeding trees.

One of the activities of this program is gathering information on the conservation status, population dynamics, feeding, and breeding biology of the species. As of 2000, the density of cockatoo breeding pairs was 1.6 breeding pairs per km². At the end of the breeding season in 2000 the minimum density was 6.7 individuals per km² which reflects the high proportion of non-breeding birds.

Following an ecosystematic, rather than a purely species conservation approach, with the cockatoo serving as flagship species, the project activities on Rasa consequently include all terrestrial and marine ecosystem of the island. Basic inventories of woody plants, fishes, reptiles, birds, and mammals have been conducted.

The project also follows a strongly community-based approach to management which involves all stakeholders in the design of the project from the beginning. Aside from the conservation work, other components of the project include information-education-communication campaigns, alternative livelihood and community organizing. **(Author's abstract)**

0008 Backyard fattening of cattle. **Technology!**, , 3(2):1-12

Small farmers can make extra income by raising a head or two of cattle in their backyards. For a 180-day fattening period, a farmer can earn a net return of P 843.00/head from quality feeder stock.

Batangas farmers are famous for their cattle fattening practice which results in production of high quality beef known in trade as "Batangas beef" or "Philippine prime beef." This beef commands premium price in the market because it is good quality beef in terms of marbling quality and yellow fat.

Aside from giving supplementary income to farmers, backyard feedlot fattening provides these opportunities:

1. The project gives employment to the farmer and the members of his family year-round.
2. Farm crop residues, weeds and other forage crop which otherwise go to waste are utilized effectively to feed the animals.
3. The feedlot fattening technology is simple. Space requirement to house the animal is minimal and inexpensive. Animals are less predisposed to disease and care and management requirements are relatively simple and easy to adopt.

The technology if widely practiced can boost the beef cattle industry and help meet the urgent demand for high protein food in the Filipino diet in accordance with the food and nutrition program of the government.

Agriculture. Beef cattle fattening.

- 0009 Banana propagation by shoot culture. Magnaye, Lydia V., Zamora, Alfinetta B., Escobido, Encarnacion O.. **Technology!**, , 17(1):1-22

Efforts to increase and sustain the country's production and export competitiveness are constrained by unavailability of clean planting materials. The widespread occurrence of diseases, such as the banana bunchy-top and Fusarium wilt makes it increasingly difficult to obtain disease-free suckers.

This concern stresses the need for a practical application of shoot culture as a method for rapid clonal propagation of clean plants. In vitro shoot culture can provide sufficient quantities of planting materials within a shorter period and at minimum cost. The assurance of a regular supply of quality materials will encourage planting and replanting of banana in small- and large-scale farms.

The technology is intended for farmer- and nursery owner-cooperatives as well as private entrepreneurs in areas where the demand for micropropagated banana plants is consistently high. Adoptors are also assured of supply of quality planting materials on a regular basis.

A tissue culture facility with 15,000 plantlets/month capacity will give 84% internal rate of return (IRR). It has three years payback period, 15% net present worth (NPW), with P1,057,327 opportunity cost of capital. The establishment of tissue culture facility provides a better investment option.

Agriculture. Banana propagation. Shoot culture.

- 0010 The batch-continuous process of converting crude coconut oil to edible oil. Bandojo, R.B. **The Technician**, , 1(1):31-43

A study of refined oil copra and "gata" using the batch-continuous process of Edible Oil Refining Process showed that the process yields acceptable edible oil having free-fatty acids of 0.07%; moisture content .09%; color .1/1 or one red per ten yellow. The process is more adaptable to the processing of "gata."

Agriculture. Batch-continuous conversion. Edible oil. Crude coconut oil.

- 0011 Beef production and carrying capacity of intensively managed grass and grass-legume pastures. Sanieel, Jr., M.F., Pepito, E.A.. **CMU Journal of Science and Technology**, , 3(1):203-241

This study was designed to determine the beef production potential of guinea (*Panicum maximum*) and para grass (*Brachiaria mutica*) pastures as influenced by the planting of centro (*Centrosema pubescens*) and the application of inorganic fertilizer. The entire study consisted of four grazing periods of 90 days each.

Average air-dry forage yield ranged from 3.1 to 4.0 tons per hectare per cut during the first two 90-day grazing periods and 2.2 to 4.2 tons per hectare

per cut for the other two periods on pure para pastures and on pure guinea grass without fertilization, respectively. Marked differences in forage yields were found as a result of fluctuations in rainfall.

Average weight gains were significantly higher on para pastures during the first 180-day period of grazing. However, weight gains were observed to be significantly higher on guinea pastures during the second 180-day periods. A decline in rainfall correspondingly resulted in the decrease in liveweight gains. The presence of the legume or the application of commercial fertilizers did not significantly affect weight gains.

Beef produced per hectare, animal days per hectare and carrying capacity followed the same pattern as weight gains. It appears that soil moisture influences to a great extent the quantity as well as quality of forage produced for the two species of grasses under study. Para grass was more tolerant to drier conditions while guinea grass was favored by high rainfall intensity.

Results from this study show that the main function of a legume in a grass pasture sward was to promote greater beef production by increasing the carrying capacity per unit of land rather than in improving daily weight gains. Fertilization also seemed to extend the grazing season during the dry period.

Grass and grass-legume pastures management. Beef production. Agriculture.

- 0012 Binary formulation of local whiteware bodies by slip casting. Rivera Virtudazo, Raymond V., Burgos, Celia, Cacao, Mayflor, Dejeito, Rodrigo V.. **Transactions of the National Academy of Science and Technology Philippines**, , :365

In the Ilocos region, the abundance of white clay explains the need to investigate, utilize and develop the raw material for earthenware products. White clays in Solsona have been studied using ternary formulation in which it passed the physical standard for earthenware bodies.

This study focused on the development of binary formulation of earthenware bodies utilizing only Solsona white clay and Ventura feldspar.

Wet screen method was used to homogenize the particle size and remove bigger size of organic materials present in the clay. Improvised radio magnet was also used in order to get or minimize iron content present in the local white clay.

Four (4) formulations were tested (90:10, 80:20, 75:25, and 70:30 of clay feldspar ratio). The test specimen was fired at 850°C, 950°C and 1050°C. It was conducted to determine the physical (fire) properties and evaluate the formulated bodies for earthenware product.

Results of the study show that majority of 90:10 (clay:feldspar) formulation exhibits the highest results in linear shrinkage, change in weight, water absorption and apparent porosity at 850°C.

However, all the experimental binary formulations are possible to produce an earthenware product using the slip casting method based on the product results and data produced in the research study. **(Author's abstract)**

Binary formulation. Earthenware bodies. Local feldspar. Local white clay. Slip casting.

- 0013 Blood protein polymorphisms and association with some morphological characters in different breed groups of goats (*Capra hircus*) in the Philippines. Bondoc, Orville L., Solis, Chester D., Garcia, Beatriz R., Beltran, Elizabeth D., Salces, Agapita H., Cruz, Emilio C., Lambio, Ivy Amor F., Tec, John Daniel P.. **Transactions of the National Academy of Science and Technology Philippines**, , :307-308

The genetic characteristics of 516 goats from the Philippines Goat Breed Registry were analyzed using the biochemical polymorphic loci controlling blood protein. Blood proteins from heparinized blood samples of goats belonging to different breed groups (i.e. purebred Anglo Nubian, Boer, Saanen, Toggenburg, Native, and crosses among them) were examined using vertical polyacrylamide gel electrophoresis (PAGE). Mature weights and some body measurements (i.e. body length, wither height, heart girth, midriff girth, flank girth, head length, and head width) of the animals were also determined. The electrophoretic typing revealed variations at the protein level attributable to six polymorphic loci [i.e. albumin (Alb), α_2 -microglobulin (Sa₂), hemoglobin (hb), esterase (Est), alkaline phosphatase (Alp), and carbonic anhydrase (Ca)] between different breed groups. Assuming autosomal codominant genes, the gene frequencies of the polymorphic protein loci were calculated from which measures of genetic variability and genetic distances were estimated. Genetic distances between goat breeds ranged from 0.007 to 0.076. Significant differences ($P < .01$) between breeds were also found for the various morphological characters. The computed least square means of the parameters were used to establish performance standards for each breed group. Using a univariate linear animal model that included the fixed effects of breed and sex and the random effects of farm location and individual additive genetic values, the genotypic effects of blood proteins on morphological measurements both between and within breeds were found to be small to moderate. While information on some biochemical polymorphic markers is found useful to clarify genetic constitution and characteristics of registered goats, more data will be needed to confirm the effects of the genotypes on production and reproduction traits, before blood protein genotypes can be considered in the selection of breeding animals. **(Author's abstract)**

Registered goats (*Capra hircus*). Blood proteins. Polyacrylamide gel. Electrophoresis (PAGE). Mature weight. Body measurements. Genetic distance. Polymorphic loci. Genotype.

- 0014 Border effect on sugarcane variety trials. Barredo, A.T.. **Victorias Agricultural Research Reports**, , 22-31:35-47

Specific effects of four border treatments on brix, stalk counts and plot weights of VMC67-611 and Phil56-226 were computed by manipulation of data gathered from the inside 6r x 7m of a 10r x 11 meter experimental plot. These effects were, when one (T_{11}), two (T_{12}) border rows were discarded or rejected for consideration of data. Similarly, effects of discarding one (T_{21}), two (T_{22}) and three (T_{23}) meter border ends were computed using data collected from half of the plot (T_2) or from the first 3 rows of the 6r x 7m inside plot.

Results show that brix was the most affected character. VMC67-611, as a border, depressed brix content of Phil56-226 while Phil56-226 improved that of VMC67-611. Stalk counts and plot weights were not significantly affected. Only when half of the plot was used as a reference (T_2) did the border treatments (subplot) appear to have a significant effect on plot weight. The effect was reduced to non-significance when 1 meter border end was discarded (T_{21}).

Agriculture. Sugarcane variety trials. Border effect.

- 0015 Cage culture of juvenile seahorses, *Hippocampus kuda*, in the Philippines. Santos, Melchor A.. **Transactions of the National Academy of Science and Technology Philippines**, , :319

There is very little scientific information on the basic biology of seahorses. A limited amount of literature has concentrated on raising seahorses intensively in tank cultures fed with live prey organisms, in the hopes of establishing breeding populations that can likely lessen pressure on natural populations. While these investigations show promise of improving our knowledge of the culture requirements of seahorse, it is costly for large-scale production, especially for developing nations. This study concentrated on an alternative technique for raising juvenile seahorses, *Hippocampus kuda*, in the field. A caging protocol with high and low stocking densities was conducted across two habitat types (seagrass bed and mangrove) for the period of five weeks. Seahorse growth and survival was monitored along with physico-chemical data (sea water temperature, salinity, turbidity, dissolved oxygen content, including total suspended solids and total organic matter). This study observed that juvenile seahorses grew to 37.9 ± 0.7 mm in length with survival of $57.6 \pm 11.8\%$ after 5 weeks at the seagrass site. The growth rate obtained from this study was four times higher than aquarium raised seahorse juveniles. *H. kuda* juveniles at the mangrove site, however, suffered 100% mortality after 2 weeks in captivity. This was probably due to fouling and associated factors. No stocking density effects were detected for growth and survival in the seagrass site. This benchmark investigation indicates that extensive culture of seahorses is possible and may serve as a low technology and less costly alternative for seahorse culture, highly relevant for sustenance fishers in developing countries. **(Author's abstract)**

Caging. Seahorses. *Hippocampus kuda*. Stocking density. Habitat type. Physico-chemical parameters. Growth rate. Mortality. Extensive culture. Intensive culture.

- 0016 Cassava storage for small farmers. **Technology!**, , 6(2):1-11

Storing cassava underground improves farmer's income. Cassava (balinghoy or kamoteng kahoy in Tagalog) is one of the main sources of calories in many tropical countries. In the Philippines, cassava is a reliable substitute or supplement for the staples, rice and corn. Together with sweet potato, cassava is an important part of the small farmer's diet and a source of cash income.

Owing to its inherent characteristics, cassava roots deteriorate fast after harvest. Once harvested, chemical and physical changes occur that make

cassava roots unfit for consumption or processing within two days without proper storage. To circumvent this, the farmer either harvests all of his crop and sells them immediately, or leaves the crop in the field and harvests them as needed. These options are not exactly beneficial to the farmer. In the first, he has to sell the product regardless of the prevailing market price. In the second, he ties up his land to cassava.

Harvesting cassava roots at one time and storing them underground by burying them in trenches and covering them with soil is a simple postharvest technology for small cassava growers. Researchers at the Philippine Root Crop Research and Training Center (PRCRTC)

at Baybay, Leyte have established the types of soil to be used and the maximum storage period for cassava tubers with minimum postharvest losses

With this technology, the farmer can store cassava tubers in trenches for six months. The farmer can, thus, dispose of his cassava when the price is high. At the same time, he can plant another crop on the lot previously tied up to cassava.

Agriculture.

0017 Charcoal as supplementary fuel for cement production. **Technology!**, , 4(5):1-12

The programmed coal-conversion of the cement plant of the Marinduque Mining and Industrial Corporation, and the establishment of coal-fired power plants by the National Power Corporation created a surge in demand which the fledgling coal industry cannot cope. Based on the estimates of the Bureau of Energy Development and the Bureau of Energy Utilization, a local supply shortfall of 225,000 t (metric tonnes) is projected to occur in 1982 and increase to 2,341,000 t by 1985. The government, through the National Coal Authority (NCA), is now mapping out the importation of coal from the United States, Australia, Canada, and the People's Republic of China to meet the needs of local coal users.

The cement sector alone consumed 125,826 t of coal of varying quality in 1979, accounting for 53% of the total consumption during the year. As coal conversion is pushed through to its completion, the coal requirement of the cement industry is expected to increase to 630,000 t in 1982 and further soar from 1.25 to 1.8 million tonnes by 1985.

The use of charcoal as supplementary fuel for cement manufacture could help ease the pressure on the coal industry. Mr. Virgilio Aganon of C.V. Management proved the technical and financial feasibility of using coal-charcoal to fire a cement kiln. The research project showed that charcoal can supply 6% to 10% of the fuel needed for kiln burning, with a little modification in the process flow and kiln design on a reasonable additional cost.

A ten-percent charcoal supplement represents 63,000 t of the cement industry's projected coal requirements for 1982. At the prevailing importation price of P500/t, coal displacement will mean \$4.3 million in foreign exchange savings for 1982 alone or \$30 million for the four-year period from 1982 to 1985.

Charcoal for cement manufacture can be derived from logging residuals, milling wastes, coconut shell, and wood from tree plantations. These indigenous sources are plentiful and renewable. By tapping them, we could minimize our dependence on imported fuels and lengthen the life indices of

our exhaustible energy resources.

Agriculture. Charcoal. Cement production. Supplementary fuel. Logging residuals. Milling wastes. Coconut shell. Wood.

- 0018 Chemical characteristics of rice wine residue as affected by drying air temperature. Villaver, Ma. Consolacion L., Candelaria, Nestor M., Ayap, Juma Novie B.. **Transactions of the National Academy of Science and Technology Philippines**, , :311-312

Rice wine has great potential in the Philippine market. However, with it comes the big bulk of residue that is generally discarded; a by-product that may still have some economic uses. This study was conducted to evaluate the chemical composition of the residue, and develop an optimum drying condition for better storage. Three drying temperatures (50, 60 and 70°C) and mass thickness (5, 10 and 15 mm) were evaluated together with their effect on proximate composition, calcium and phosphorus contents. As expected the thinner the mass being dried, the faster was the rate of drying. However, this directly proportional relationship was not distinctly observed between temperature and drying time. The drying temperatures did not significantly affect the proximate composition and phosphorous content. Results showed a mean of 18.33% moisture content, 0.60% crude ash, 3.53% crude fat, 0.17% crude fiber, 16.65% crude protein, 60.72% nitrogen-free extract and 0.12% phosphorous. Calcium content, on the other hand, was significantly higher (2.42%) when 50oC was used for drying. These data will give some baseline information for future studies on the feasibility of using rice wine residue as feeds or a component of feeds. **(Author's abstract)**

Rice wine residue. Drying temperature. Mass thickness. Proximate composition. Calcium. Phosphorous. Feeds.

- 0019 Chemical induction of flowering in mango. **Technology!**, , 2(11):1-12

Mango is one of the most popular and important fruits of the Philippines. As an export crop, its full potential is yet to be exploited. But the crop is notorious for its erratic flowering and highly seasonal bearing habits.

Mango growers have traditionally smudged trees to induce off-season flowering. Smudging is the building of smoky fires under the trees and letting the dense smoke pass through the tree canopy. This practice, however, is laborious, very unreliable, not widely accepted and hazardous.

Research conducted by horticulturists in UP at Los Banos led to the discovery of flower inducing chemicals and the development of technology for off-season mango production. The use of flower inducers is simpler, more convenient, effective and profitable than smudging.

The most common chemicals used contain potassium nitrate (KNO₃) and are available in commercial quantities locally. Now, the technology is widely practiced throughout the country resulting in the lengthening of the mango season, improved productivity of mango trees, and increased farm income.

To commercial growers the technology offers a conservative net income

within four months of P36,307 per hectare with 50 full-grown trees compared with only P2,976 per hectare in crops in which no flower inducers are used.

For sustained yields, flower inducers should not be applied indiscriminately. Trees to be induced should be properly selected and recommended practices such as pest and disease control and fertilization should be followed. Irrigation may be employed if this is economically feasible.

Agriculture. Off-season mango production. Flower inducers.

- 0020 Chemical ripening of sugarcane with glyphosate ripeners. Gonzales, Manuel Y. , Tianco, Antonio P.. **Victorias Agricultural Research Reports**, , 16-21:18-29

Two glyphosate ripeners at 0.22, 0.45, 0.67 and 1.12 kg a.i./ha were evaluated together with Polaris at 6 and 12 kg commercial product/ha using a plant crop of Phil56-226 sprayed eight weeks before harvest. The trial was laid out in a RCB design with three replications and a plot size of 4 rows x 8 meters.

Symptoms of plants treated with Mon 0139 and Mon 2139 are yellowing of the leaf blades starting from the midrib and advancing toward the margin, shortening of internodes and emerging of several side shoots from a single bud.

Mon 0139 at 0.67 and 1.12 kg a.i./ha and Mon 2139 at the same rates gave significant increases in PS/TC over the control of 14.8, 14.8, 15.4 and 16.0 percent respectively. Polaris at the two rates used had no significant effect on rendement. In general, the cane tonnage of treated plots that gave a good response was lower by about 5 percent compared to the control though this was not significant under the conditions of the experiment.

In the ratoon, the new chemicals had no adverse effect on germination percentage, tiller number, and height at rates up to 0.67 kg a.i./ha. However, as in the plant crop, average cane tonnage of the ratoon of plots treated with glyphosate in the plant crop was lower by about 12 percent compared to the control which difference was not significant under the conditions of the experiment.

There is a need to evaluate further the effect of glyphosate on the ratoon at one and two times the anticipated use rate in the plant crop.

In a similar study on a plant crop of VMC67-611, Mon 2139 at 0.67 kg a.i./ha increased significantly PS/TC by 27.3 percent over the control. No significant differences were observed on weight per stalk between the treated and untreated plots.

Agriculture. Sugarcane chemical ripening. Glyphosate ripeners.

- 0021 Chinese cabbage seed production through artificial vernalization. Bongato, Elena P.. **Technology!**, , 10(5):1-16

The locally improved and developed seeds of Chinese cabbage variety Reyna Elena can adapt to lowland areas and produce 14-18 t/ha of marketable heads.

In the past, production of heading Chinese cabbage (*Brassica campestris* subsp. *pekinensis*) in the hot-humid tropics was confined to the highlands. However, with the development of heat-tolerant varieties, Chinese cabbage can now be grown profitably all year-round in the lowland tropics. The most promising variety is Hybrid 62 (Asveg 1), which was approved by the Philippine Seed Board in 1983 as variety Reyna Elena for commercial production in the lowland areas. It has a mean marketable head yield of 14-18 t/ha, head weight of 600-800 g and high quality.

A study on seed production through artificial vernalization showed that the hybrid seeds of Reyna Elena can be produced locally in the highlands of Baguio in about four months.

From a 224-m² plot, 1 kg dry and clean hybrid seeds was produced, which cost P1,053. Based on the value of P4,196 with a return on investment of 398%.

Agriculture. Chinese cabbage seed production. Reyna elena variety. Artificial vernalization. Cost-benefit analysis.

- 0022 Chromosomes of gobies from Taal Lake, Luzon. Masagca, Jimmy T., Ordoñez, II, Jose A.. **Transactions of the National Academy of Science and Technology Philippines**, , :324

Despite the great diversity of freshwater forms in the Philippines, the Cytogenetics of riverine and lacustrine populations of fishes is still unexplored. This on-going study on the Cytogenetics of freshwater teleosts in the CALABARZON Area, Luzon Island focuses on the chromosomal complements of naturally occurring gobies (including eleotrids) to benchmark future studies in fish genetics and chromosomal evolution.

Fish specimens of an eleotrid, snakehead gudgeon (*Ophieleotris aporos*) and two species of gobiids, tank goby (*Glossogobius giurus*) and rock goby (*Glossogobius celebricus*) were obtained from Taal Lake and rivers of Cavite for this investigation. A routine solid tissue technique with conventional staining was used in preparing metaphase cells from head kidneys of fish specimens. Different concentrations of colchicines and sodium nitrate for hypotonization were tried to get the appropriate amount in arresting cells at metaphase stage.

Initial findings indicate that *O. aporos* and *G. giurus* both showed diploid chromosome number of $2n=46$ similar with the eleotrids: *Oxyeleotris marmoratus*, *Eleotris acanthopomus* and *Dorminator maculatus*. The snakehead gudgeon, *O. aporos* has a tentative *Nomen Fondamental* (NF) of 48 (2 bi-armed chromosomes and 44 mono-armed chromosomes), while *G. giurus* has NF of 46, confirming the previous works. The other goby (*G. celebricus*) inclusive in the present study, has a tentative diploid chromosome number of $2n = 44$. **(Author's abstract)**

Fish chromosomes. Gobies. Taal lake. Cytogenetics. Teleosts. Eleotrids. Diploid chromosomes.

- 0023 Coal trade prospects in selected countries in east and southeast asia around the year

2000. Puno, Recto H.. **Philippine Engineering Journal**, , 5(2):150-160

Countries in East and Southeast Asia feel the need of resorting back to coal as a major source of energy. Most of the projected requirements would have to be imported from outside the region which would entail a tremendous amount by the year 2000. But economies of scale in ocean shipping exist and a substantial reduction of cost can be achieved using bigger vessels. This paper looks into the possibility that economies of scale could justify construction of one or more transshipment depots in the region at which large loads from the supply sources are broken up and re-distributed in small vessels to small consumers. **(Author's abstract)**

0024 Coffee rejuvenation. Cabangbang, Ruben P.. **Technology!**, , 12(3):1-16

Rejuvenated 40-year-old Robusta Coffee trees can still give, in less than two years, yield comparable to the newly established coffee plantation.

About 92% of the coffee growers are small farmers with less than 10-ha landholding. They contribute about 58% to the total coffee production of the country.

Yield of coffee in the Philippines is one of the lowest in the world. It averages only 0.4 kg/tree per year or 400 kg green beans/ha per year compared with 3 t green beans/ha per year in other coffee-producing countries. The factors that contribute to the low yield of Robusta coffee are maintenance of old, tall trees and wide planting spaces.

An extensive study showed that rejuvenated 40-year-old Robusta trees can still give, in less than two years, yield comparable to the newly established coffee plantation.

A hectare of old, tall trees gives a yield of 0.3-1.5 t green beans per year, while a hectare of rejuvenated coffee plantation gives a yield of 1-3 t green beans per year.

Agriculture. Robusta coffee tree rejuvenation.

0025 Comparative study of papaya mite control strategies. Velasco, Clara J., Arano, Benjamin, Pableo, Fe B.. **Plant Industry Bulletin**, , 9(2):47-52

Tetranychus kansawai the red spider mite and *Brevipalpus californicus* or the flat mite are the two identified species of mites infesting papaya. *T. kansawai* is the most important one where it infest the matured leaves.

There were four treatments evaluated for the control of *T. kansawai* namely 1) Use of acaricide (Formetanate) 2) Acaricide (Formetanate + leaf pruning) 3) Leaf pruning alone and 4) Control. Population counts of the different stages from egg, nymph and adult were considered among the treatments. Acaricide (Formetanate) yield the highest Net Benefit of P89,480 then followed by leaf pruning alone which is P76,380 per hectare.

Agriculture. Papaya mites. Red spider mite (tetranychus kansawai). Flat mite (brevipalpus californicus). Control strategies.

- 0026 Comparison of latex preservation of different para rubber clones with the use of ammonia. Callano, Reynaldo S., Fordan, Estrella M.. **USM Research Journal**, , 3(1):46-52

This study was conducted to compare the preservability of rubber latex extracted from Harbel 1, TJIR-1, PR 107, RRIM 600 and from seedling trees with the use of ammonia and to determine the effect of ammonia on the quality of the ribbed smoked sheet of these clones. This was conducted at the Rubber Production Technology, Department of Horticulture, College of Agriculture, University of Southern Mindanao, Kabacan, North Cotabato from March 4-11, 1981.

The latices from Harbel 1 and TJIR-1 were observed to be the earliest to pre-coagulate. The duration for pre-coagulation of these clones were 3.183 and 3.416 hours, respectively. These were significantly earlier compared to those of the latices from PR 107, RRIM 600 and the seedling trees. This result means that latices from Harbel 1 and TJIR-1 could not be effectively preserved by ammonia as anti-coagulant. The clones that showed the shortest pre-coagulation time were also the ones that showed early complete coagulation. The color of the serum and firmness of the coagulum did not vary among the different para rubber clones. The color of RSS showed a significant difference among the different clones. RRIM 600 and seedlings had pale and light brown color while Harbel 1, TJIR-1 and PR 107 had brown color.

Para rubber clones. Latex preservation. Ammonia. Agriculture.

- 0027 Make composting easy with trichoderma. **Technology!**, , 9(5):1-16

The use of fungus compost activator offers a solution to the waning interest of farmers in the use of organic fertilizers.

Composting is not a new technology but the discovery of Trichoderma, a fungus compost activator, is a breakthrough in organic farming.

The technology was a result of basic and applied researches carried out by the Institute of Biological Sciences of the University of the Philippines at Los Banos (UPLB-IBS) in collaboration with the Institute of Environment Science and Management (IESAM), also at UPLB, and the Department of Science and Technology (DOST).

In places where there are sufficient waste materials for composting, it is cheaper to produce organic fertilizer than buying commercial inorganic fertilizer. One ton of mature compost amounting to P266.25 can substitute 85.62 kg ammonium sulfate, 31.50 kg ordinary superphosphate and 29.40 kg muriate of potash which cost a total of P374.65. Thus, for every ton of compost fertilizer, a savings of P108.40 can be realized if hired labor is used, or P214.65 using family labor. Moreover, compost is a good soil conditioner which cannot be equaled by chemical fertilizers.

Agriculture. Composting. Trichoderma. Organic farming.

- 0028 Converting household waste into a resource for food production and soil rejuvenation. Aganon, Clarita P., Romero, Ellen S., Mercado, Alfonso, Burleigh, James R., Chin-Hua-Ma. **Transactions of the National Academy of Science and Technology Philippines**, , :310

The burgeoning population in Philippine cities threatens environmental sustainability from waste accumulation and food scarcity. To abate the condition, waste management and food production should be linked. This is the model being developed by the Central Luzon State University in collaboration with the Asian Vegetable Research and Development Center, Technische Universität München and the Local Government of Marilao, Bulacan. A collection and processing scheme was adopted to turn biodegradable household waste into a valuable resource compost. Household waste (HW) is composed of kitchen refuse, backyard litter, and weeds. Studies conducted at CLSU, and at San Leonardo, Nueva Ecija – a peri-urban vegetable area-showed that household waste reduced our dependence on inorganic fertilizers. Trials conducted on four farms showed that pechay with household waste as a replacement for half of the required inorganic fertilizer did not suffer yield reduction. Yield of pechay from plots treated with 3.5 t/ha composted HW plus half the recommended rate (1/2 RR) of inorganic fertilizer and yield from plots treated with the full recommended rate of inorganic fertilizer were not significantly different. Similar results were obtained for tomato grown under rain shelter.

A residual effect from composed HW was noted on kangkong seeded after successive applications to six preceding crops. Yields from plots treated previously with HW alone or with 1/2 HW + 1/2 RR were significantly greater than yield from unfertilized plots.

The utilization of HW as a fertilizer may be compromised by the presence of lead. Analysis of the individual components of household waste compost from Marilao, Bulacan showed that some components contain lead, probably because of their tendency to accumulate lead. **(Author's abstract)**

Compost. Household waste.

- 0029 Cotton production. **Technology!**, , 4(1):1-12

Cotton is now successfully grown in different areas of the country. From an initial area of 194 ha in 1974, production has increased to 17,117 in 1981. The cotton industry increases farm income, cuts down on the country's annual importation of about P 40 to P 60 million worth of cotton lint, and is a potential export product.

There are about 34,000 Filipinos engaged in cotton farming. Approximately 17,000 ha of land are planted to cotton. In 1981, total cotton production was worth P 63 million, P 7 million of which was exported. Based on cotton

verification trials, an average farmer can expect a net income of P 4,969/ha. For every peso invested there is a return of P 1.87.

The development of the cotton industry started in 1969. With the increasing import cost of cotton, the Philippine Textile Research Institute and other agencies studied the feasibility of growing it in the country.

A more comprehensive research program worked on the various aspects of cotton production. This was jointly undertaken by the Central Luzon State University, the University of the Philippines at Los Banos, and the Bureau of Plant Industry.

The Cotton Research Development Institute also functioned to generate and disseminate the much needed cotton technology. It was responsible for the development of the variety UPLC 1 or Batac 1.

This new variety averages 2.5 t (tonnes) of seed cotton per hectare. It is already approved by the Philippine Seed Board for distribution.

Agriculture. Cotton production.

- 0030 Cultural management of exportable foliage plants. Nicdao, Amelia M., Gabertan, Herminigilda A.. **Transactions of the National Academy of Science and Technology Philippines**, , :297

There are inherent advantage of the country for the production of exportable foliage. One is the ideal climate for all years round production. The proximity of the Philippines to major Asian countries and the competitive wages and location costs. The study was conducted from July 1996 to December 1999 at the Bureau of Plant Industry-Los Baños National Crop Research and Development Center and was funded by DOST-PCARRD. The project aimed to collect, propagate and evaluate materials used as cutfoliage, to determine the response of each group of foliage plant varieties to different rates of fertilizer, spacing, pruning and shade and to establish a technology on the production and management of exportable foliage. Height of shoots of *Dracaena marginata* Lam. "Tricolor" was significantly affected by fertilizer treatments and distance of planting. Plants fertilized with 180-0-0 spaced at 60 cm significantly produced the tallest shoots with a mean of 53.19 cm. Significant differences were observed on the height of *Pleomele reflexa* (Lam.) N.E. Br. "Song of India" as affected by different levels of N. fertilizer (60, 120 and 180 kg/ha) and time of pruning (monthly, bi-monthly and quarterly). The significantly tallest plants (100.06) were from those given with fertilizer rate of 120-0-0 and pruned two months. Plant height of *Dracaena sanderiana* Hort. Sander ex M.T. Mast "Gold" was significantly affected by the rate of N fertilizer (3, 6 and 9 gm/pot) and percent shade, using calibrated nets (30, 50 and 70% shade). Plants fertilized with 6 gm N/pot at 70% shade significantly yielded the tallest plants with a mean height of 132.92. For *Dracaena godseffiana* Sander "Florida Beauty" fertilization with 3 gm N/pot and grown at 30% shade produced significantly the tallest plants with a mean height of 48.36 cm. Significant differences were observed on the height of *Murraya paniculata* (L) Lack "Kamuning" as affected by different rates of N fertilizer (50, 100 and 150 gm/pot) and Ca (10, 20 and 30 gm/pot). Kamuning plants applied with 100 gm N plus 20 gm Ca/pot were significantly the tallest with a mean of 125.29 cm.

(Author's abstract)

Cutfoliage. Exportable foliage. *Dracaena marginata*. Tricolor. *D. Sanderiana*. Gold. *D. godseffiana*. Florida beauty. *Pleomele reflexa*. Song of India. *Murraya paniculata*. Kamuning. Agriculture.

- 0031 Deleting a species from a pest checklist is not simple. Caasi-lit, Merdelyn T., Apricho, Ma. Amabel A., Lit, Jr., Ireneo L., Bernardo, Christopher DC.. **Transactions of the National Academy of Science and Technology Philippines**, , :286

Erroneous records of pests have wide-ranging implications in plant quarantine, pest management and commerce. Among the negative impacts of these erroneous records are non-acceptance of local produce of export to certain countries and proliferation of misidentification and "inherited" errors in the literature. These are difficult to rectify and the processes involved like nationwide field surveys, taxonomic studies, rearing and feeding experiments are outlined in this paper.

A specific example, the cacao mealybug *Planococcus lilacinus* (Cockerell), erroneously recorded on Philippine bamboos, is discussed. A 3-year nationwide survey of bamboo pests did not yield any cacao mealybug specimen on any bamboo species. Simultaneously, a taxonomic study of mealybugs attacking Philippine bamboos revealed the existence of 9 species but not *P. lilacinus*. Rearing and feeding experiments showed that *P. lilacinus* would rather starve to death than feed on any bamboo species. Therefore, bamboos are not among the many host plants of *P. lilacinus* and this mealybug species is hereby deleted from the list of bamboo pests in the Philippines. **(Author's abstract)**

Agriculture.

- 0032 Density of sowing *anthocephalus chinensis* (Lank). rich ex. walp seeds. Bholachai, P., Domingo, I.L.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :68-70

Different densities of sowing Kaatoan bangkal *Anthocephalus chinensis* (Lank.) Rich. ex Walp., seeds in seedflats were compared. Sowing seeds at one gram per 30 cm x 45 cm seedflat gave the greatest number of seedlings suitable for potting, followed by sowing seeds at 1.5, 2.0, 2.5, 3.0 and 0.5 grams. The lower number of seedlings suitable for potting in the higher densities of sowing was believed to be due to more severe attacks of damping-off. **(Author's abstract)**

Damping-off.

- 0033 Development of new papaya ringspot virus coat protein and replicase gene constructs for papaya transformation. Aquino, Vermando M., Perez, Pierriden A., Flasiniski, Stanislaw. **Transactions of the National Academy of Science and Technology Philippines**, , :302-303

Pathogen-derived resistance has been successfully used in the

management of virus diseases in crop plants. The CP-mediated or replicase-mediated resistance has been found to be sequence-specific and effective if the challenging virus has a high degree of sequence identity with transgene. In this study the collection of papaya ringspot virus (PRSV) isolates from infected papaya grown in different geographical areas of Philippines was obtained. Viral RNA was extracted from PRSV-infected leaves and reverse transcriptase was used to synthesize the complementary DNA (cDNA) using oligo dT as a primer. To amplify the 3' part of viral genome, which includes the C-terminus of nuclear inclusion protein (CP) genes, three sets of primers were made in the conserved regions of the PRSV genome. Sequences of the different isolates were compared and virulence between isolates was determined. Based on sequence data, one isolate of PRSV. Specific primers for the coat protein and replicase were made and used to amplify gene fragments. PCR products for the CP and replicase gene were cloned into plant expression cassettes under the control of enhanced 35S promoter. The vectors will be used in papaya transformation to generate resistance to PRSV. **(Author's abstract)**

Papaya ringspot virus (PRSV). Pathogen-derived resistance. Coat protein-mediated resistance. Replicase-mediated resistance. Transgenic papaya. Agriculture.

- 0034 Development of quick and efficient greenhouse testing for nematode resistance and salt tolerance for transgenic rice.. Gergon, Evelyn B., Galam, Dominique, Rosario, Marischelle M., Aldemita, Rhodora R.. **Transactions of the National Academy of Science and Technology Philippines**, , :290

Crop improvement through genetic engineering requires the generation of a number of transgenic plants containing the gene for resistance, subsequent screening for the presence of the transgene and its correlation to phenotypic expression. Due to the delicate nature of the transgenic plants, screening for the phenotypic expression of the transgene should be conducted with utmost care and should be conducted in a contained greenhouse as per the National Biosafety Committee of the Philippines. At PhilRice, a quick and efficient greenhouse testing was developed for nematode resistance based on the procedures at IRRI and PhilRice. The testing was conducted in non-transgenic hybrid rice for 2 months. In addition, an efficient greenhouse testing for salt tolerance using sandy loam soil was developed using non-transgenic inbred rice in the greenhouse. Results of these evaluations and its application to large scale transgenic rice testing will be presented. **(Author's abstract)**

Greenhouse evaluation. Nematode resistance. Salt tolerance. *Oryza sativa*. Agriculture.

- 0035 The diversity of onion arthropod fauna in Nueva Ecija. Peñalva, Fredelino P., Adorada, Jessamyn R., Padilla, Carlos L., Cayabyab, Bonifacio F., Bayot, Rolando G., Aquino, Alice G.. **Transactions of the National Academy of Science and Technology Philippines**, , :285

The diversity of onion arthropod fauna in Nueva Ecija was studied from December 1999 to March 2000 in the towns of Gabaldon, Laur Bongabon, and Pantabangan. A standard sweep net with 50 sweeps per plot replicated three

times was done in three farmers field per location. Other arthropods were visually counted and collected. Sorting and identification was done at the Plant Quarantine Support Laboratory, NCPC – UP Los Baños.

A total of 51 species from 34 families, and 8 orders were observed. The American serpentine leafminer *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae) an exotic pest was the most conspicuous and dominant pest throughout the growing period of onion. This pest originated from the Americas. Coccinellid beetle, predators and hymenopterous parasites were the dominant natural enemies.

Knowledge of arthropod fauna diversity is an important step in formulating pest management options in onion. **(Author's abstract)**

Sweep net. Coccinellid. Nueva Ecija. Arthropod fauna. Onion. Diversity. Hymenopter. Agriculture.

- 0036 Documentation of descriptive morphology of mango varieties and other fruit crops. Dannug, Danilo T.. **Plant Industry Bulletin**, , 8(1):1-75

Result of the study conducted in the four (4) National Crop Research and Development Center namely; Davao, La Granja, Los Banos, and Baguio; stations of the Department of Agriculture and farm cooperators showed fourteen (14) species with 44 varieties and 32 citrus (scion/stock trees) evaluated and characterized.

For mango, Manila Super Mango exhibited the best qualities from the 12 varieties evaluated. Its characteristic features like firm flesh, delicate, very juicy, aromatic, spicy, very sweet and thin seeded made it promising. It has total soluble solids of 20.5° brix. This is followed by Pico and Pahutan in respect to sweetness, registered at 18.2 and 18.0° brix. For Avocado, Calma variety exhibited the highest in gram weight, of 611 grams as compared to De Leon which is 405 grams but both have good eating quality. The two varieties of Caimito (Lunti and Lila) all commendable because both have distinct quality taste. For cashew, a strain Quezon, Palawan proved very promising because of its kernel weight of 5.8 and 4.4 grams as compared to other evaluated trees which have less than 3 grams. Sao Manila for chico recorded the highest in TSS at 20° brix and 166 grams compared to other varieties evaluated. For Guava, the Vietnam variety registered the highest in weight followed by seedless variety which recorded 1200 and 1000 grams average of 10 fruits, respectively. Both ave good eating quality. Katasim and Dulce of Guayabano are both promising because both are preferred for juices and processing while the latter is good as table food. For jackfruit, a selection from Mandawe Experiment Station proved promising as it exhibited 12 kilograms of weight with good eating quality. This is the MES-SO1 now included in the Philippine Seed Board for Fruits. For Lanzones, Paete variety is proved to be more sweeter and of greater number per bunch than the Duku variety. Seematjan variety of Rambutan exhibited the best qualities from the two others evaluated because of 18° brix TSS and bigger in size. However, Maharlika variety is very juicy but both have firm flesh texture. These are the tuklapin varieties.

Gillette Navel and Clementine proved to be sweeter from the rest of the citrus scion/stock relation trees ranging from 10 to 11.75° brix. Gillette Navel

however proved to be the largest in fruit size from 379.9 to 435.2 grams.

Agriculture. Mango varieties and other fruit crops. Descriptive morphology.

- 0037 DRIS. Escano, Crisanto R.. **Scientia Filipinas**, , 1(1):58-61

The dependence of critical nutrient concentrations on local climatic, soil and cultural conditions, as well as with cultivar, age and portion of the plant sampled place serious constraints on the conventional \"critical level approach\" as a flexible tool in diagnosing the nutrient requirements of crops and soils. The DRIS methodology, an improvement over old techniques that leave wider room for errors, is drowned in the heat of oversophistication and the complexity of scientific publications in which it is described. Many potential DRIS users have probably been dissuaded by the formidable prose and roughshod organization of some earlier descriptions. The following article explains in simple and direct language the basic methods and hypotheses of the system and presents some examples of its use.

Diagnosis Recommendation Integrated System (DRIS). Agriculture. Plant nutrition. Methodology.

- 0038 Effect of cooking method on amylopectin staling as monitored by Instron Hardness. Juliano, Bienvenido O., Roferos, Leslie T.. **Philippine Journal of Science**, , 128(3):253-258

Among high-amylose rices, glycemic index, an index of amylose staling of cooked rice, is affected by starch gelatinization temperature (GT) when cooked in optimum water level but not when cooked in excess water to minimum cooking time. Regardless of amylose content (AC), low GT rice cooked by rice cooker showed less amylopectin staling than cooked intermediate GT rice. Hence we studied the effect of cooking by excess water method on amylopectin staling of cooked rice on three high AC rices, PSB Rc 6 (low GT) and PSB Rc 2 and PSB Rc 56 (intermediate GT), two low GT low-AC rices, IR24 and sinandomeng, and two waxy rices, Malagkit Sungsong (low GT) and Tapol (high GT). The results suggest that although cooking by excess water method reduced Instron hardness values, varietal differences in amylopectin staling were still evident and in the same ranking as that established by the rice cooker method. Varietal differences in staled amylopectin melting endotherm in rice flour cooked in excess water were verified by differential scanning calorimetry. **(Author's abstract)**

Agriculture.

- 0039 Effect of different levels of nitrogen and phosphorus applied singly and combined on the growth and flower yield of gladiolus (*Gladiolus* spp). Calibo Cecilia N., Gabertan, Herminigilda A.. **Transactions of the National Academy of Science and Technology Philippines**, , :292

The study was conducted at the Bureau of Plant Industry-Los Baños National Crop Research and Development Center, Los Baños, Laguna. The study aimed to identify the best rate of nitrogen and phosphorus fertilizers applied singly and combined on the performance of gladiolus (Red Long variety) particularly on flower quality and corn yield and to evaluate the economic profitability of the nitrogen and phosphorus applied at different rates. Plant parameters were statistically analyzed following the Randomized Complete Block Design (RCBD) with three replications. Results of the study showed that for single element, plants that were fertilized with phosphorus (0-60-0) produced the most number of floret with a mean of 9, the longest spike with a mean of 66.95 cm. the biggest corn equatorial with a mean of 4.5 cm and the tallest plant with a mean of 56.04 cm. Plants given phosphorus at a rate of 0-30-0 produced the biggest diameter of floret with a mean of 10.53 cm. Treatment combinations of N and P at a rate of 30-90-0 produced the most number of florets with a mean of 9, the biggest floret with a mean of 10.25 cm and the longest spike with a mean of 65.68 cm, the biggest corn equatorial with a mean of 4.54 cm while the rate of 30-30-0 gave the tallest plant with a mean of 56.87 cm. Plants fertilized at a rate of 30-60-0 yielded the highest number of corns with a mean of 260,000 corns per hectare. The highest computed net benefit was recorded in plants fertilized with N and P at the rate of 30-60-0 with P 386,357.00. **(Author's abstract)**

Flower yield. Fertilization. Gladiolus. Agriculture.

- 0040 Effect of different planting methods on growth and yield of 71-238, 56-226 and 74-527. Barredo, A.T., Palasol, H.V.. **Victorias Agricultural Research Reports**, , 22-31:67-83

A test on variety by system of planting had been conducted to identify a planting system best suited to two of our commercial varieties, Phil56-226 and VMC71-238, and one promising variety, VMC74-527.

Results showed that regardless of varieties, Treatment C, (conventional horizontal - uncovered three weeks after planting), acquired highly significant differences over the rest of the treatments in percent germination, tiller and stalk population at the early stage, and comparatively higher values in terms of stalk length, cane and sugar yields at harvest.

However, except for Treatments D (slanted angular system with 1 bud exposed) and B (conventional horizontal - with primary tillers cut after one month) which showed highly significant lower yields, the rest of the treatments were statistically similar in cane and sugar yields compared to Treatment C.

VMC74-527 got a higher value in sugar yields with Treatment A (conventional horizontal system). Although Phil56-226 and VMC71-238 showed higher yield values at Treatment C, results obtained from Treatments A (conventional horizontal), E (slanted angular - fully covered) and F (vertical position at planting) followed very closely. Hence, Treatments A, E and F could still be employed depending on the convenience and growing conditions at the time of planting.

Agriculture. Sugarcane planting methods.

- 0041 Effect of glyphosate ripener on growth response and sugar yield of sugarcane. Tianco,

Two small plot field trials were conducted in Victoria, Negros to evaluate the effect of glyphosate ripener as the Mon 2139 formulation using full test analysis of stalks partitioned from the top downward and by expressing results on a per cane basis.

There was an average increase of 26% in grams sucrose per stalk with 0.3 kg ai/ha Mon 2139 with relatively mature 8-mo. old variety Phil 56-226 at spraying 6 weeks before harvest. Sugar increase was not accompanied by a reduction in the weight per stalk. Spraying immature 8-mo. old cane of the same variety 8 weeks before harvest with 0.6 kg ai/ha resulted in a 21% increase in sucrose per stalk. This increase would have been higher had the stalk weight not been reduced by 4%.

Partitioning of stalks showed that while increases in "pol % cane" or sucrose % dry matter were greatest in the top portion (internodes 7-15, the bottom section can account for for a large part (30-70%) of the sucrose increase because of the bigger weight of this portion and by a process of "loading" whereby sucrose accumulates even in the more mature parts of the stalk. This storage of sucrose is paralleled by an actual increase in total dissolved solids with little or no increase in juice purity.

There was no adverse effect on ratoon germination, tillering, and height with 0.3 kg ai/ha Mon 2139 in one site and regrowth is not expected to be a problem in the other location because there was little or no reduction in the stalk weight and length of the plant crop at this rate. The effects of glyphosate on ratoon regrowth and sugar yield require further study.

Agriculture. Sugar yield of sugarcane. Glyphosate ripener.

- 0042 Effect of grass type and cattle grazing on soil compaction in the upper talavera river basin. Sims, Bruce D.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :53-55

The study was conducted in the Upper Talavera watershed in Nueva Ecija to investigate the interrelationship of grass type, cattle grazing, and soil compaction on range land.

The data indicated that ungrazed areas of *Themeda triandra* Frosk. (2.43 kg/cm^2) and *Imperata cylindrica* (Linn) Beauv (1.30 kg/cm^2) were substantially less compacted than overgrazed areas of *Themeda* (3.48 kg/cm^2) and *Imperata* (4.03 kg/cm^2). The data also indicated that the ungrazed *Themeda* was more compacted than the ungrazed *Imperata*. In addition, the pocket penetrometer appeared to give good results with a minimum of effort and could easily be used by land managers to help determine proper grazing capacities.
(Author's abstract)

Themeda triandra Frosk. *Imperata cylindrica* (Linn.) Beauv.

- 0043 The effect of household detergent on the deterioration of hand-cut cane in the field. Serra, R.J., Tianco, A.P.. **Victorias Agricultural Research Reports**, , 32-41:36-43

The rate of sugarcane deterioration after cutting under warm and humid field condition was apparently high as invert sugar content increased significantly with the number of days delay from harvesting to milling. Correspondingly, the bacterial population recovered from the juice also increased while the sucrose content decreased. The deterioration rate was significant two days after harvest and thereafter. Losses ranged from 8.0 kg sugar/ton cane after two days to as much as 24.8 kg sugar/ton cane after seven days.

In another experiment, a thorough wetting of the cane stalks by spraying with a household detergent inhibited inversion of sucrose and increased recovery by an average of 17 kg sugar/ton cane after a delay of 1-6 days. Bacterial population recovered from the juice of the treated cane was kept at a significantly lower population than the control until the fourth day.

Agriculture. Hand-cut cane. Household detergent.

- 0044 The effect of nitric acid (HNO_3) treatment on the germination and yield of corn. Nequin, Merlyn N., Baltazar, Remy B., Clarete, Celso L.. **USM Research Journal**, , 2(2):31-38

A three-month study on the Effect of Nitric Acid (HNO_3) Treatment on the Germination and Field of Corn was conducted at the University of Southern Mindanao, Kabacan, North Cotabato, from September to December 1979 at Agronomy Department, College of Agriculture.

Results of the study showed a marked influence of the nitric acid dilute on the average plant height and the average number of damaged ears. In addition, number of days to tasselling, average number of good ears, and grain yield was also significantly affected by different soaking duration. However, no significant effect was observed on the germination percentage of corn.

Agriculture. Corn germination and yield. Nitric acid (HNO_3) treatment.

- 0045 Effect of volume and time of application of distillery slops on the growth and cane and sugar yield of sugarcane. Gonzales, M.Y., Tianco, A.P.. **Victorias Agricultural Research Reports**, , 32-41:14-35

Two small-plot field trials were conducted to determine the effect of various concentrations/volumes of distillery slops and the best time of slops application on the growth and yield of plant and ratoon cane.

Distillery slops at the rates of 83,166 and 249m³/ha. in addition to the regular fertilization significantly increased cane yield of the plant crop of Phil 56-226 by 12.3, 10.4 and 10.4% over the fertilizer control, respectively. PS/TC or juice quality was not adversely affected by addition of distillery slops. Cane plants applied with slops at the rate of 249m³ slops/ha. had significantly 5.5 and 4.2% higher PS/TC than the control and 83m slops/ha. treatment, respectively. Distillery slops at the rates of 83, 166 and 249m /ha increased the sugar yield by 15.4, 13.4 and 16.8% over the control, respectively. Increase in cane tonnage contributed about 79% of the increase in sugar yield while

increase in PS/TC contributed 21%.

Application of distillery slops to the ratoon of VMC71-238 at the rates of 166 and 249m³/ha decreased PS/TC by 3.7 and 5.3% when compared with the control, respectively. However, cane and sugar yields regardless of time and rates of slops application were comparable with the control.

Soil pH, available K₂⁰, calcium and magnesium were increased by distillery slops application while ash % juice increased with slops application in both tests.

The response of different cane varieties to different volumes and time of application of distillery slops requires further investigation. There is also a need to determine the maximum amount of slops that can be applied without adversely affecting final sugar yield and/or factory performance.

Agriculture. Cane and sugar yield of sugarcane. Distillery slops application.

- 0046 Effect of weed management on the leaching loss of nitrogen in lipa clay soil. Navarro, A.A., Corpuz, I.T.. **USM Research Journal**, , 3(1):60-76

The effect of weed management on the leaching loss of nitrogen and on the leachability of N from ammonium sulfate and urea as N sources when applied to Lipa clay soil which was planted to corn were studied in two croppings. The first crop was grown from November 23, 1979 to January 18, 1980 while the second crop was grown from February 26 to April 13, 1981.

The results in both first and second croppings did not show significant effect of weed clipping on the leaching loss of N. However, through weed clipping, around 41 mgm/plot was conserved. Unclipped or undisturbed weeds significantly reduced leaching loss of N in both croppings.

Nitrogen from ammonium sulfate was leached more easily than nitrogen from urea during the first cropping. Only about 6% of the applied N from urea was leached while around 13 percent from ammonium sulfate was leached. The second cropping did not have the results obtained during the first cropping. Instead, an inverse relationship between the amount of N leached from both sources and the growth period (days after planting) of crops was observed in the second cropping.

Nitrogen uptake by corn and weeds in the first cropping was significantly higher with urea than with ammonium sulfate. Results of the second cropping showed that higher N uptake by corn and weeds was obtained from ammonium sulfate.

Nitrogen uptake by corn was significantly reduced when weeds (R. Exaltata) were allowed to grow undisturbed. About 26 percent reduction of N uptake by corn was observed in the first cropping and around 50 percent N uptake reduction was obtained in the second cropping. Weed clipping did not significantly reduce N uptake in the first cropping. However, the opposite was true in the second cropping.

Nitrogen leaching loss. Weed management. Agriculture. Soil science. Lipa clay soil.

- 0047 The effects of dissolved acetate salts on the vapor-liquid equilibria of the ethanol-water mixtures. Saquing, Carl D., Remoroza, Alvin I., Arquiza, Apollo C., Bugante, Elizabeth. **Transactions of the National Academy of Science and Technology Philippines**,

The effects of the potassium acetate and sodium acetate at 10% and 15% concentrations on the vapor-liquid equilibria (VLE) of the binary ethanol-water mixture were studied at atmospheric pressure using a modified Othmer still. Calibration using the ethanol-water mixture was done to check the reliability of the VLE apparatus on VLE determination. The results showed that the measured VLE data are closed to published data.

The VLE data of the ternary mixtures of ethanol, water and salt were measured using the calibrated apparatus. Samples were collected at different temperatures ranging between the boiling points of pure ethanol and pure water, and were then analyzed by gas chromatography. Data showed that the addition of the two salts broke the ethanol-water azeotrope at all salt concentrations except for sodium acetate at 10%. The addition of acetate salts increases the relative volatility of ethanol from 5 up to about 77, and the increase becomes higher as the salt concentration increases. Between the two salts, the increase in relative volatility is higher with potassium acetate than sodium acetate may be explained by the stronger interaction of the former with water as indicated by its higher solubility in this solvent.

Moreover, activity coefficients (\tilde{a}) of the liquid samples were calculated from the experimental data and results manifested that the system with dissolved salts have higher \tilde{a} than that of no-salt system. At one particular composition, the \tilde{a} changed from 4.7 to 27.2. Thermodynamic consistency tests were performed on the data and were thermodynamically correlated using Wilson and NRTL activity coefficient models. Both models show good fit, but the Wilson model appears to be superior. **(Author's abstract)**

Vapor-liquid equilibria (VLE). Sodium acetate. Potassium acetate. Azeotrope. Azeotropic distillation. Extractive distillation. Relative volatility. Activity coefficient. Entrainer. Ethanol.

- 0048 Effects of soil moisture stress on the shoot growth of *anthocephalus chinensis* rich ex. walp. and *albizia falcataria* (L.) fosb.. Fernando, E.S., dela Cruz, R.E.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :66-67

The effect of soil moisture stress on the shoot growth of seedlings of Kaatoan bangkal, *Anthocephalus chinensis* Rich. ex. Walp., and Moluccan sau, *Albizia falcataria* (L.) Fosb., was studied. Moluccan sau seedlings exhibited a more rapid rate of shoot growth at 90 percent of field capacity and Kaatoan bangkal at 70 percent. Inhibition of shoot growth was greater in Moluccan sau than in Kaatoan bangkal under all levels of soil moisture stress. **(Author's abstract)**

Water relations. Drought tolerance.

- 0049 Effects of some nematicides/insecticides on parasitic nematodes and sugarcane yield. Gargantiel, F.T.. **Victorias Agricultural Research Reports**, , 22-31:48-57

Three rates of Counter and Geofos were evaluated and compared with Nemagon, Temik and Furadan for controlling parasitic nematodes and their effect on the yield of Phil 56-226.

In the two experimental locations, ten genera of parasitic nematodes were observed in the soil and root samples. They were *Tylenchorhynchus*, *Pratylenchus*, *Helicotylenchus*, *Xiphinema*, *Hoplolaimus*, *Trichodorus*, *Criconemoides*, *Meloidogyne*, *Longidorus* and *Hemicriconemoides*. Some of the identified species are *Tylenchorhynchus martini*, *Pratylenchus zeae*, *P. brachyurus*, *Helicotylenchus nannus*, *H. dihystra*, *Xiphinema americanum* and *Meloidogyne incognita*.

Counter and Geofos both 5G, Nemagon 10G, Temik 15G, and Furadan 3G showed varying degrees of controlling parasitic nematodes especially during the early stages of cane growth. Geofos at the rate of 60 kg/ha. was observed to have longer residual effect on parasitic nematodes.

An evidence of correlation between tonnage with number of tillers and plant height existed. In general, Counter and Geofos at higher rates were comparable with Furadan and Nemagon in their effects on cane and sugar yield.

Agriculture. Nematicides. Insecticides. Parasitic nematodes.

- 0050 The effects of spraying ethrel on the tillering and yield of a sparse tillering sugarcane variety. Gonzales, M.Y., Tianco, A.P.. **Victorias Agricultural Research Reports**, , 22-31:84-95

Since higher populations are essential for higher yields, an experiment was conducted to determine if spraying a chemical on growing cane could increase tillering. Ethrel (2-chloroethyl phosphonic acid) at 0.25 and 0.50 kg ai/ha was sprayed on variety Phil53-33, one month after planting at the rate of 4 lacsas/ha. For comparison, planting rates of 2, 4, 6 and 8 lacsas/ha were also entered.

Plants treated with Ethrel at 0.25 kg ai/ha were significantly 8.6, 8.2, and 8.9% taller than the 2, 4, and 8 lacsas/ha treatments, respectively at harvest. Plants sprayed with Ethrel at 0.50 kg ai/ha showed symptoms of leaf chlorosis one week after the chemical application. Stem elongation was reduced in the early and middle stages of growth.

At harvest, Ethrel-treated plots at 0.50 kg ai/ha and the 8 lacsas/ha plots had significantly 10.7 and 13.1% more millable stalks than the 4 lacsas/ha or control plots, respectively. About 32% of the total tillers emerging survived. The lower rate of Ethrel gave statistically the same number of stalks as the higher rate and the 8 lacsas/ha treatments.

The final cane yield showed that plots treated with 0.25 kg ai/ha Ethrel significantly outyielded the 2, 4, 6, 8 lacsas/ha plots by 17.5, 15.4, 11.8, and 9.9% respectively. Ethrel at 0.50 kg ai/ha did not effect a significant increase in tonnage probably due to the stresses (as shown by leaf chlorosis and retarded stem elongation) the cane underwent at the early and middle stages of growth which may have slightly affected the final weight per stalk at harvest.

Ethrel at 0.25 kg ai/ha gave a 12.8% increase in sugar yield compared to the untreated control. The difference while suggestive did not reach significance. Since the tonnage was increased significantly by 0.25 kg ai/ha Ethrel without adversely affecting the PS/TC, it would not be unreasonable to assume that with the right moisture conditions and with a poor-tillering variety, Ethrel can show a significant increase in sugar yield if more replications were

used.

Agriculture. Tillering sugarcane variety. Ethrel spraying.

- 0051 The effects of various fertilizers on the growth of tomatoes. Dumencil, Josephine A., Salang, Eriberto. **Research Journal**, , 10(1):29-37

The study was conducted to determine which of the various fertilizers would give the highest yield of tomatoes. The application of various fertilizers (ammonium sulfate, complete fertilizer, chicken dung, cow manure, standard check) gave highly significant result in terms of the diameter of the fruits, height of the plants in centimeter, number of fruits as well as the yield in kilograms of tomatoes as analyzed statistically.

Among treatments, treatment 2 (chicken dung) gave the highest yield in kilograms per plant followed by treatment 3 (cow manure). Data proved that of all fertilizers applied, the chicken dung increased the weight of the tomato.

Agriculture. Tomato growth. Application of various fertilizers.

- 0052 Effects of varying duration of bark ringing on the success of brown budding in para rubber seedlings. Payawan, Norma Aurora A., Alocelja, F.D., Cayud-ong, F.O.. **USM Research Journal**, , 2(1):33-38

Girdling the budwood (brown budding) at zero, one two, three and four weeks before budding operation did not affect budding success and plant height of the budded transplants but it caused easier stripping off of the bud eye from the budwood. Girdling at two and four weeks before budding significantly increased stem diameter of the budded transplants measured four months after budding. This practice may therefore reduce the untappable years of rubber plants.

Bark ringing. Brown budding. Rubber seedlings. Horticulture. Agriculture.

- 0053 Effects of varying rates of carbofuran on nematode population and sugarcane yield. Gargantiel, F.T., Barredo, F.C.. **Victorias Agricultural Research Reports**, , 16-21:9-17

The effects of 0, 1, 2, 4, and 8 kg a.i. per hectare of Carbofuran on nematode population and sugarcane yield of Phil 58260 were evaluated.

At 1, 2, and 4 kg a.i. per hectare, a highly significant increase in sugar yield over the control was obtained. However, no significant differences were noted between 1 and 2 kg a.i. per hectare. Application of 8 kg a.i. per hectare did not increase sugar yield significantly over the control.

Tonnage and number of millable stalks increased significantly with the application of 1, 2, and 4 kg a.i. per hectare over the control. Rendement was not affected by Carbofuran application.

Application was in two equal doses at planting and 3 months after. There was a decrease in nematode population after the first dose and a more

pronounced decrease after the second dose. Population started to build up 6 months after the second dose application.

The plant-parasitic nematodes observed were: *Pratylenchus*, *Hoplolaimus*, *Tylenchorhynchus*, *Xiphinema*, *Criconemoides*, and *Longidorus*. Of these genera, *Pratylenchus* and *Helicotylenchus* were predominant in the population.

Agriculture. Carbofuran varying rates. Nematode population. Sugarcane yield.

- 0054 Effects of wood preservative concentration in glue formulation on plywood bond quality. Binoya, R.G., Casilla, R.C., Tesoro, F.O., Cariño, H.F. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :47-52

An investigation on the effect of varying acid copper chromate (ACC) wood preservative concentrations in glue formulations on the bond quality of red lauan (*Shorea negrosensis* Foxw.) plywood using urea formaldehyde and resorcinol-phenol formaldehyde resins was conducted. Increasing amounts of preservative in the glue mix correspondingly decreased bond strength. Preservative concentrations used were 2.5, 3.75, 5, and 6.25% based on the weight of the resins. **(Author's abstract)**

- 0055 Efficacy of agronex (lindane) 3.75 G and inexit SC 1000 against white grubs and moth borers of sugarcane. Fajardo, A.M., Porquez, P.H., Barredo, F.C., Serra, R.J.. **Victorias Agricultural Research Reports**, , 32-41:58-64

Two rates of Agronex (Lindane) 3.75 G and Inexit SC 1000 were tested for effectiveness against white grubs and moth borers of sugarcane in the pot and field experiments.

In the pot experiment against white grubs, Agronex (Lindane) 3.75 G applied at 4.0 kg. a.i./ha gave significantly higher control than the other chemical treatments. The second highest grub mortality was noted from Agronex (Lindane) 3.75 G applied at 2.0 kg. a.i./ha. Percent grub mortality in all chemical treatments were significantly higher compared to the control indicating the potential effect of the chemicals against the target pest.

In the field experiment only the two rates of Agronex (Lindane) 3.65G gave significantly higher tons cane and piculs sugar yield per hectare compared to the untreated plots. Difference in yield between Carbofuran, Inexit SC 1000 and the untreated plots were statistically insignificant. Gain in yield between Carbofuran, Inexit SC 1000 and the untreated plots were statistically insignificant. Gain in yield from the two rates of Agronex (Lindane) 3.75 G principally could be attributed to the effectiveness of the chemical against white grubs. On the other hand, moth borer infestation count conducted 45 days after planting was very low to evaluate the effect of the chemical treatments.

The species of white grub introduced in both experiments was *Leucopholis irrorata* Chev. and the moth borer observed attacking the young canes were the striped borer, *Chilotrea infuscatella* Snell. and the grey borer, *Tetramoera schistaceana* Snell.

Agriculture. Sugarcane white grubs. Sugarcane moth borers. Agronex (Lindane) 3.75 G. Inexit SC 1000.

- 0056 Efficacy of surfactants in smut inoculation. Gargantiel, F.T., Barredo, F.C.. **Victorias Agricultural Research Reports**, , 22-31:3-8

Screening for smut resistance is a very important aspect of sugarcane breeding program in the Philippines. Improving the various inoculation techniques is the thrust of any breeding institution, and it was found worthwhile testing the different surfactants to improve the cohesiveness of the teliospores on the waxy buds of the cane setts.

In a Randomized Complete Block Design, six surfactants were tested, each at three different concentrations: Tween 80 at 500, 750 & 1000 ppm; Surfac H at 100, 250 and 500 ppm; Tergitol NPX at 100, 250 and 500 ppm and Household detergent at 500, 750 and 1000 ppm.

Results showed that Tergitol NPX at 250 and 500 ppm gave the highest per cent infection at 56.6 and 58.8, respectively. Citowett gave a considerably satisfactory result with 50.9 and 54.6 percent infection at 250 and 500 ppm, respectively. Surfac H at 100 ppm was likewise considerable with 51.8 percent infection. However, higher concentration gave lower percent infection. Tergitol NPX and Citowett at 250 and 500 ppm are recommended for smut inoculation using the dip method of inoculation.

Agriculture. Sugarcane breeding. Smut inoculation. Surfactants.

- 0057 Engineering cropping systems. David, Wilfredo P.. **Scientia Filipinas**, , 2(1):45-53

Most serious problems in land and water resources utilization for crop production today stem from the tendency to view things in isolation, not as an integral blend of the total landscape. An agricultural engineer outlines a strategy for integrating some parameters relevant to the development of productive and ecologically stable cropping systems. Presented from a land and water resources management point of view, it invites inter-disciplinary scrutiny.

Agriculture. Cropping systems. Agricultural engineering.

- 0058 Enhanced effects of potato extract and reduced nutrient level on anther culture response in rice. Villalba, Wilhelmina E., Desamero, Nenita V., Romano, Lenie P., Julaton, Maria Corazon N., Sta. Maria, Laila B., Chico, Martha V.. **Transactions of the National Academy of Science and Technology Philippines**, , :298

Reducing the amount of basal salts in in vitro culture medium, and using locally available nutrient supplement, such as potato, will lessen the cost of the technology. We evaluated the effect of potato extract and nutrient level reduction in anther culture response of nine genetically diverse rice genotypes.

The treatments included N6 basal salts in full, one-half and one-fourth strength, with the addition of 10% potato extract in each callus induction medium. The full strength N6 salts without potato extract served as control. Results indicated varied genotypic response. Anthers of five of the nine genotypes formed calli. Three of the responding genotypes performed better in potato extract-enriched medium. Further enhancement in callus formation was obtained in potato extract-enriched medium with nutrient level reduced by half. Likewise, plant regeneration was obtained in two genotypes, with higher frequency in potato extract-enriched medium containing half strength N6 salts. More double haploid plants were obtained in medium with full strength N6 salts and potato extract. Moreover, reduction in incidence of necrosis was observed in potato extract-enriched medium. Further study will be conducted using higher levels of potato extract in callus induction medium and adding the extract in the regeneration medium for enhanced plant regeneration.
(Author's abstract)

Potato extract. Anther culture. Callus. Plant regeneration.

- 0059 Evaluation of aliette applied as paint for the control of black stripe of rubber. Presto, Romulo S., Soria, Juan A.. **USM Research Journal**, , 3(1):53-59

This study was conducted to determine the efficacy of Aliette when applied as paint fungicide against black stripe of rubber.

Findings show that Aliette was moderately effective for the control of black stripe. However, it proved to be better than Difolatan which was used as standard check when compared based on the percentage reduction in disease index.

Nevertheless, the efficacy of Aliette as a cure for black stripe varies with the rates used. So far, the best rate for Aliette is 16 g ai/liter of water.

Aliette. Black stripe . Rubber. Agriculture.

- 0060 Exchange-relations, economic history and Philippine institutions. de Dios, Emmanuel S.. **Transactions of the National Academy of Science and Technology Philippines**, , 26(2):202-222

Institutions have come to be recognised among the "deep determinants" of economic development. Institutions are defined [7] as "social factors – rules, beliefs, norms, and organizations – that guide, enable, and constrain the actions of individuals, thereby generating regularities of behavior." Institutions surrounding and affecting exchange are particularly important in economic development in light of the principle that in giving rise to specialisation, exchange are particularly important in economic development in light of the principle that in giving rise to specialisation, exchange promotes productivity growth. Both in history and in principle, an expanding scope of exchange creates a demand for impersonal rules that go beyond immediate personal relationship to include more comprehensive common responsibility systems, and on to third-party enforcement mechanisms including the state.

This paper contributes to the hypothesis that a good deal of past Philippine under-development was due to the restriction of trade, and more importantly, that such a restriction bore consequences for the subsequent development of Philippine institutions. The Spanish conquest suppressed the pre existing free trade that existed between native communities and China and the South, replacing this instead by the mercantilist institutions, notably the galleon trade. For a great part of the Spanish occupation, domestic trade itself was also discouraged through arbitrary impositions, confiscation of goods by the colonial authorities, as well as the mis-guided formal restriction of credit transactions. The effect was not merely to severely limit wealth generation among the native population of the time, but more importantly to prevent the emergence of institutions that would facilitate impersonal exchange separated in time and covering long distances. In particular, an experience of effective and impartial law failed to develop. What law there was, as embodied, e.g., in royal ordinances, failed to correspond with facts on the ground and was violated arbitrarily by colonial officials and agencies.

It is then suggested that from this pattern may have originated some of the problems that plague even current Philippine institutions, including the continuing reliance on exceptions-based personal relationships rather than on impersonal rules, the weak definition of property rights and enforcement of contracts, and the lack of restraints on the actions of the powerful actors and hence their inability to make credible commitments. **(Author's abstract)**

Institutions. Trade restrictions. Development. Exchange-relations.

- 0061 Farmer-scientists R&D/E training program in a corn-based production system for sustainable agricultural development. Davide, Romulo G.. **Transactions of the National Academy of Science and Technology Philippines**, , :79-94

With the aim of empowering farmers for socio-economic progress, the Farmer-Scientists Training Program demonstrated its effectiveness in changing the farmers' outlook in life. The farmers gained confidence in making a business enterprise. Through their adoption of scientific methods and new technologies, they were able to increase their rice and corn production from 0.5 – 2.0 tons/ha before their training to 6.0 tons/ha. Through sales of their surplus rice, corn, vegetables, and other produce, the farmers generated an increased income of P100,000 or more cropping season compared to their original income of about P6,000.

Improvements in the farmers' quality of life are shown by their construction of new concrete houses to replace their old nipa huts and the purchase of refrigerators, TV sets, radios, motorcycles, and other home fixtures. Above all they were able to support their children's college education.

This innovative program produced not only a new breed of agricultural scientists who could conduct participatory R&D directly with the farmers in the latter's farms but also a new breed of farmers who are technically equipped with scientific methods of farming and trained as community leaders and businessmen.

The program has also strengthened the research and extension

capabilities of SCUs and LGUs to render better services to the farmers.
(Author's abstract)

Agriculture. Farmer-scientists. Corn. Empowering farmers.

0062 Fertilization of coconut. **Technology!**, 4(3):1-12

The coconut industry of the Philippines provides roughly 25% of its foreign exchange earnings, and supplies about 70% of the world's market supply of coconut products. Nevertheless, the crop's productivity appears to be low. Very few coconut farms yield over 40 nuts per tree or a ton of copra per hectare annually.

One reason behind low productivity is that a very small portion of coconut lands are fertilized. Based on surveys, coconut areas in the country are deficient in nitrogen, potassium, phosphorus, chlorine, sulfur, and magnesium. With the establishment of the importance of these nutrients, especially of nitrogen and chlorine, to the growth and development of coconut, there are recommended fertilizer or fertilizer combinations for each province. With judicious application of fertilizers, nut and copra production can increase by as much as 230%.

Although fertilizers are expensive and copra price is low, it is estimated that a farmer can realize a net income of about P 2,088 with fertilization in contrast to only over P 739 without fertilization.

Agriculture. Coconut fertilization.

0063 Fertilizer study on gabi. Delfin, Abella D.. **Plant Industry Bulletin**, 9(2):42-46

The study was conducted at La Granja National Crop Research and Development Center, La Carlota City from 1989-90 and 1990-91 to evaluate the level of complete fertilizer (14-14-14) on yield of gabi and determine cost and return using different fertilizer level.

Randomized complete block design was employed using six treatments replicated three times.

The result showed that plants from treatment 42-42-42 kg NPK/ha gave the highest corn yield of 8.74 t/ha followed by 49-49-49 kg NPK/ha with 8.18 t/ha. The tallest plant came from treatment 35-35-35 kg NPK/ha with 71.34 cm while the shortest was from the control treatment (0-0-0 kg NPK/ha) with 46.61 cm.

Treatment 42-42-42 kg NPK/ha gave the highest marginal rate of return of 97 percent although all MRR were viable.

Agriculture. Fertilizer study on gabi.

0064 Field evaluation of coated and uncoated thimet 10G against parasitic nematodes on

sugarcane. Serra, R.J., Barredo, F.C., Guzon, S., Talaman, N.T.. **Victorias Agricultural Research Reports**, , 32-41:50-57

Three rates of both coated and uncoated thimet 10G were evaluated against parasitic nematodes attacking sugarcane. Based on the germination count, it was evident that the test chemicals had no phytotoxic effect on the seedpieces even at the highest rate of application.

Tiller population was generally highest in plots treated with carbofuran 3G from the third to the fourth month. All treatments had significantly higher tiller population than the control at four months but only carbofuran 3G and terbufos 5G remained statistically better than the control during the sixth month.

Satisfactory nematode control was observed in all treatments from the first until the seventh month. However, population increased in all treatments from the eighth month until harvest but highest in the control.

Carbofuran 3G gave the highest cane yield in terms of tonnage followed by uncoated thimet 10G (2.00, 1.00 & 3.00 kg. a.i./ha) which gave better results than the coated. The same trend was observed in the picul sugar production per hectare.

Agriculture. Coated and uncoated Thimet 10G. Sugarcane parasitic nematodes.

- 0065 Field evaluation of varying rates of triforine 20EC as preventive treatment against pineapple disease of sugarcane (*Ceratocystic paradoxa* M.). Serra, R.J., Barredo, F.C., Guzon, S.. **Victorias Agricultural Research Reports**, , 32-41:65-68

Germination count of treated seedpieces was significantly better than the untreated check one month after planting at 1% probability level. Triforine 0.75% had a perfect germination while thiophanate methyl 9.6 g/gal and triforine 0.50% had identical 95.00% germination. The lowest among treatments was triforine 0.25% with percent germination mean of 92.00% but was better than the control with germination mean of 78.75%. Comparison of the varied rates of the test chemical with the standard (thiophanate methyl) using LSD test was not significant.

Tops in the total tiller population after one month of planting was the highest rate of triforine with mean of 38.75. Triforine 0.50%, thiophanate methyl 9.6g/gal and triforine 0.25% succeedingly followed with respective population means of 38.00, 36.25, and 35.00. All treatments were significantly better than the untreated check (at 1% probability level), the mean of which was 28.25.

Statistical analysis of the tiller population 1.5 and 2.0 months after planting was not significant, though the distinct differences in population are expected to ultimately spell a difference at harvest. Apparently, based on the results, preventive seedpiece treatment is recommendatory.

Agriculture. Sugarcane pineapple disease. Triforine 20EC.

- 0066 A field study of the tamarao, *bubalus mindorensis*. Kuehn, D.W.. **The Pterocarpus**, , 2(1):26-34

A field study of the tamarao (*Bubalus (Anoa) mindorensis*) at the Mt. Iglit Game Refuge, Occidental Mindoro, was conducted in 1972-1974. Tamarao were largely solitary and only two persistent associations of self-sufficient tamarao were observed. Cow tamarao usually bore calves at two year intervals, and many calves became independent at age 2-4 years. The preferred habitat of the tamarao was the juncture of forest or talahib stands with expanses of cogon or other grasses, but here were sex and age differences in habitat use.

Agriculture. Tamarao (*bubalus mindorensis*). Mindoro.

- 0067 Fortified cassava tuber meal as substitute for yellow corn in poultry feeding. Lopez, Perla L.. **Technology!**, , 11(3):15

Fortified cassava tuber meal as substitute for yellow corn in poultry feeding will entail considerable savings on the dollar reserves of the country through the reduction of corn importation.

Cassava (*Manihot esculenta*, Crantz), a tropical root crop, is a potential alternative to corn in animal feed because of its high energy content. If birds are given quality booster feed during the first ten days, cassava tuber meal may be incorporated into the starter/finisher diets up to 40% in meal form without any effect on performance.

Higher returns are realized with the use of cassava tuber meal fortified with copra meal, soybean oil meal, or fish meal than use of yellow corn. If local legumes can be produced at a reasonable price, these can also be used to fortify cassava tuber meal.

Because of the increased amount of expensive protein and high energy feeds in the ration, the economics of fortification should be considered, since this is the most important factor in determining when to use cassava tuber meal as substitute for corn in livestock and poultry feeding.

This package of technology offers an alternative solution to the problems of high import cost and unstable corn supply.

Agriculture. Fortified cassava tuber meal. Yellow corn. Poultry feeding.

- 0068 Fruit and vegetable storage and ripening methods for the countrysides. Bautista, Ofelia K.. **Scientia Filipinas**, , 2(1):62-69

The reported staggering postharvest losses in the past few years have led people preoccupied with the food business to realize that production is only half the picture. Now, there is a growing awareness that if what is produced does not reach the intended consumer and utilized accordingly, all the sweat, headaches, worries and money that went into production have been spent in vain. In the country, the emerging field of postharvest handling must center on prolonging the storage life where it is needed most. In the countrysides, postharvest physiologist Ofelia K. Bautista asserts, the rural folks must be offered measures that are accessible, affordable, and acceptable.

Postharvest horticulture. Storage and ripening methods.

0069 Fruitfly control on mango for export. **Technology!**, , 2(12):1-12

The Philippine traditionally exports a good volume of mango to Hongkong. However, the Hongkong market cannot absorb all mangoes available locally for export.

To fully exploit the export potential of Philippine mangoes, the government has to develop alternate markets. One of these is Japan.

However, Japan has stringent quarantine regulations to prevent entry of crop pests. Since fruitflies infest local fruits, the entry of this commodity in Japan and other fruitfly-free countries is highly restricted.

To meet Japan's import requirement and thus promote mango export, fruitfly control was given high research priority in the national research thrust.

Fumigation studies conducted by the Bureau of Plant Industry (BPI) resulted in the development of a fumigation treatment capable of killing all fruitflies in the fruits. The technology led to the lifting of the Japanese ban in 1975 and opened new market for the commodity, notably Japan and Australia.

The fumigation technique includes exposure of fruits to ethylene debromide (EDB) gas at a concentration of 16 g/m^3 at 26°C for 2 hours. It provides 100% control of fruitfly eggs, larvae and pupae and is accepted by Japanese crop protection experts as satisfactory treatment of Philippine-grown mango for export to Japan.

Mango exports to Japan which began in 1975 with 56 metric tons worth \$78,400 increased 10 fold to 553 metric tons worth \$742,000 in 1980. Singapore and Australia are now importing mango from the Philippines. The Australian market averaged 100 metric tons per annum since 1979 valued at about \$120,000 annually. From 1975-1980, mango exports to Japan and Australia contributed more than \$2.3 million to the country's foreign exchange earnings.

Agriculture. Mango export. Fruitfly control.

0070 Gastrointestinal parasite control in swine. **Technology!**, , 5(6):1-11

Parasitism is a well recognized disease problem of the swine industry in the country. Losses are usually attributed to slow growth rate, reduced weight gain, decreased carcass value, poor feed conversion, and condemnation of carcasses unfit for human consumption. Farmers do not normally recognize these losses mainly because parasitism is not as fatal as bacterial and viral diseases.

The incidence of the most prevalent gastrointestinal parasites in swine, regardless of species, is about 84% and 60% for backyard and commercial pig farms, respectively. This is largely ascribed to the fact that generally hog raisers, primarily those at the backyard level, do not follow a proper deworming program, or do not deworm at all. Some even use inappropriate dewormers. Hence, there is a need to emphasize among hog raisers the importance of accurate diagnosis and proper deworming methods.

In an effort to eradicate these parasites, several government and private agencies have been doing research to fully identify these parasites and to effectively control them.

Farmers who deworm their pigs net more than twice those who do not practice it (P81,000 as against P35.00/pig). Deworming also insures meat products for human consumption that are parasite-free.

Agriculture. Swine industry. Gastrointestinal parasite control.

- 0071 Genetic Plasticity of Lepidoptera. Barrion, Adelina A., Barrion, Aimme Lynn A.. **Transactions of the National Academy of Science and Technology Philippines**, , :325-326

Lepidoptera, the second largest order of insects, consists of 140,000 butterflies and moths uniquely distinguished through their overlapping scales on wings, legs and most body parts. Their colorful appearance and elegant beauty earned popular appeal to collectors and hobbyists, however, their larvae are serious pests of agricultural crops. Ecological success of butterflies and moths is attributed to their genetic plasticity facilitated by specialized modes of reproduction and genetic systems. lepidopterans\' modes of reproduction include sexual reproduction and regressed sexuality = parthenogenesis, telytokous parthenogenesis which can be either automatic or apomictic. Genetic systems of lepidopterans include mendelian inheritance; halokenetic chromosomes with modal haploid number (n) of 31 capable of Robertsonian fusions and fissions; ZW >ýC?ý : ZZ >ýX?ý sex-determining system; achiasmatic meiosis and somatic polyploidy. The variations and adaptations of lepidopterans are products of evolutionary mechanisms such as genetic drift (e.g. bottlenecks and Founder\'s effects), mutations, migrations, selections, and effects of environmental factors. The summative product is genetic plasticity of Lepidoptera. **(Author\'s abstract)**

Butterflies. Lepidoptera. Moths. Insect genetics. Chromosomes. Reproduction. Parthenogenesis. Holokinetic. Evolution. Genetic plasticity.

- 0072 Genetic variability of karyotypic characteristics in relation to the genetic improvement of some economically-important traits of water buffaloes. Bondoc, Orville L., Santos, Izy T.. **Research Journal**, , :28-46

One hundred and thirty (130) water buffaloes grouped into: purebreeds[i.e.Philippine carabao(PC), Indian Murrah(IM), and Bulgarian Murrah(BM)], two-way crosses(i.e.50%PC,50%BM-50%PC,50%Nili-Ravi-50%C),backcross(i.e.75%I M-25%PC),and three-way crosses among PC,IM,and Nili-Ravi,were considered for karyotype analysis using the modified Leukocyte Culture Technique and evaluation of their production and reproductive performance using the ordinary least squares method. Karyotypic characteristics (i.e. modal chromosome number based on chromosome frequency, chromosome type, and percent relative length, centromeric index, and arm ratio for some chromosomes)were significantly different between breed groups.Significant differences between breed groups were also found for production traits

(i.e. 1-year and 3-year old body weights, withers height, heart girth, and body length) and reproductive parameters (i.e. total milk yield, lactation length, age at first calving, and semen volume). Significant linear correlation between karyotypic characteristics and some economically important traits in water buffaloes are also highlighted in the study. The significant correlation values imply that some karyotypic characteristics can be used as important markers or criteria to select potentially productive young water buffaloes. The high coefficient of variation (C.V.) values in karyotypic characteristics, production and reproductive traits imply potential and practical basis to accurately distinguish genetic differences between breed groups, especially in the absence of breeding history and factual pedigree and identification records on-farm. Results of the karyotype analyses and their relationships with production and reproductive traits in water buffaloes can be applied in the design and development of local selection, crossbreeding, and/or conservation programs. Differences between purebreds and their crosses in terms of percent heterosis and advantage over the Philippine carabao will be useful in the design and development of systematic crossbreeding programs useful in the dominant local production and marketing systems. Indirect selection for overall productivity based on the karyotypic characteristics of breeding animals can be practiced at a much earlier age, thereby reducing generation interval considerably. Because of the requirements for laboratory facilities and expertise, the use of karyotype analysis is however recommended for the gene pool and institutional herds such as those maintained by the Philippine Carabao Center (PCC) in aid of the establishment of a national buffalo registry and implementation of a national breeding program for water buffaloes.

Agriculture. Karyotype analysis. Chromosome number. Chromosome type. Relative length. Centromeric index. Production and reproductive traits. Water buffaloes.

- 0073 Genetic variation in abnormal and normal hatchery-bred milkfish (*Chanos chanos FORSKÅL*). Fuentes, Frances Rossanne C., Ignacio, Shalimar I., Constantino, Adrian M., Monje, Virginia D., Santos, Ameurfina D.. **Transactions of the National Academy of Science and Technology Philippines**, , :321

Milkfish (*Chanos chanos* Forskål) is one of the most important fish commodities in the Philippines. Significant advances have already been achieved in its effective hatchery breeding, yet public acceptance has been hindered by mutations resulting in morphological abnormalities. To assess these abnormalities, PCR-RAPD was applied to both the normal and abnormal hatchery-bred milkfish juveniles. PCR amplification using UBC decamer primers 235, 267, and 268 produced 100 bp., 300bp, and 150 bp fragments, respectively from normal samples only. Statistical analysis using the chi-square test showed the dependence of these possible markers on the type of sample used. Restriction site analysis of the 12s mt DNA was also performed. PCR products were digested with Alu 1, Msp1, Hap II, Hha II, Hinf 1, Rsa 1, and Taq 1. Digestion with Alu 1 and Hinf 1 provided significant differences in banding patterns from agarose gel electrophoresis that can differentiate normal samples from abnormal ones. Sequencing and computer restriction site analysis show several unique restriction sites in abnormal milkfish samples. **(Author's abstract)**

Chanos chanos. PCR-RAPD. 12s mt DNA.

- 0074 Geothermal energy for salt-making. **Technology!**, , 3(4):1-12

High purity or industrial grade salt (97-99% NaCl) is an essential raw material in such industries as caustic-soda-chlorine manufacturing, food processing, soap, textile, chemical, and pulp manufacturing and baking. Unfortunately, the country does not produce enough industrial grade salt. In 1980, shortage was estimated at 200,000 tons.

Research conducted by three collaborating agencies-Project Sta. Barbara, Philippines Navy and National Science Development Board under the leadership of Commodore Alfredo Protacio, generated a salt-making process using geothermal steam which could improve the country's capability to produce high purity salt not only for industries but also for human consumption. Furthermore, the technology facilitates iodination of table salt which will boost the country's goiter prevention program. Crude or low purity salt contains impurities which endanger health.

On long term basis, the new technology will generate income through recovery of valuable by-products such as magnesium carbonate, calcium sulfate, calcium carbonate, potassium chloride and magnesium chloride, which go to waste under the traditional solar evaporation method.

Geothermal steam is an indigeneous energy resource, relatively abundant, renewable and non-polluting. Its main advantage over solar energy is that it provides for weather - independent production. Present production from the Tiwi Geothermal Salt Plant is 200 tons/hectare.

Agriculture. Geothermal salt-making process.

- 0075 Germplasm collection, selection and maintenance of indigenous plant species for agricultural and medicinal uses. Armones, Nora T., Villanueva, Nancy B.. **Plant Industry Bulletin**, , 17(1):1-14

A germplasm collection of indigenous plant species was established at the La Granja National Crop Research and Development Center of the Bureau of Plant Industry, La Granja, La Carlota City, Negros Occidental. The objectives are: 1) to collect, select, characterize and maintain species which have been found out to be effective as pesticide, parasiticide and medicinal and 2) to multiply/propagate these plants for distribution to end-users.

A total of 100 indigenous plant species collected from La Granja, La Carlota City, Negros Occidental and Sta. Barbara, Iloilo were planted and maintained since 1979 up to the present time. From this collection, 27 species were selected for agricultural and medicinal uses.

Indigenous plants species for agricultural use are: 1) bunga - parasiticide, 2) atis - insecticide, 3) neem - insecticide, 4) kasla - insecticide, 5) sambong/alibhon - insecticide, 6) lagundi - insecticide, 7) oregano - insecticide, 8) makabuhay/manunggal - insecticide, herbicide, parasiticide and nematocide, 9) tubli - insecticide, 10) alagaw/adgaw - insecticide, 11) artamisa - nematocide, 12) cosmos - insecticide and nematocide, 13) bulak-manok-insecticide, 14) tanglad - insecticide, 15) kalawag/dilaw - insecticide, 16) katumbal kutitot/siling labuyo - insecticide and fungicide, 17)

madre de cacao/kakawate - paratocide and insecticide, 18) abukado - insecticide and 19) oraro/arrowroot - insecticide.

Species for medicinal use are: 1) herba buena, 2) akapulko/palochina, 3) ampalaya, 4) ahos/bawang, 5) pansit-pansitan/sinaw-sinaw, 6) sambong/alibhon, 7) tsaang-gubat, 8) lagundi, 9) niyog-niyogan/pinyon, 10) bayabas, 11) bunga, 12) atis, 13) neem, 14) kasla, 15) oregano, 16) makabuhay/manunggal, 17) alagaw/adgaw, 18) artamisa/damong maria, 19) cosmos/marigold, 20) bulak-manok, 21) tanglad, 22) kalawag/dilaw, 23) katumbal kutitot/siling labuyo, 24) oraro/arrowroot, 25) madre de cacao, 26) abukado and 27) tubli.

La Granja National Crop Research and Development Center had produced and distributed 25,382 pcs of indigenous planting materials from the collection serving 587 farmers/other individuals and 51 institutions/others or a total of 638 recipients.

Agriculture. Indigenous plant species. Germplasm collection. Agricultural and medicinal uses.

0076 Gold panning. **Technology!**, , 7(2):1-16

Gold panning is a small-scale mining activity that may enable a person to earn P500 to P3,000 per month.

Gold panning is a simple mining operation that requires low, capital investment. This activity has naturally attracted many, especially those who have been economically displaced due to difficulties in the sugar, coconut and copper mining industries. High unit value, marketability, minimal cost of extracting from raw ores, abundance and wide distribution of deposits are some of the factors that make this commodity amenable to primitive and small-scale mining.

The Bureau of Mines and Geosciences estimated that in the first semester of 1985 there were about 160,000 gold panners throughout the country. Registered panners produce about 20.74 kg of gold per day or an estimated total of 3733 kg of gold during the year, amounting to P712,035,225.

Gold panning operations generate a number of benefits with strong economic and social impact. The government is therefore committed to promote the orderly development of this industry.

Agriculture. Gold panning.

0077 Grafted tomato for off-season production. Burleigh, James R., Bala, Anacleto F., Cacho, Dennis R., Mateo, Lun G., Ulrivhs, Christian. **Transactions of the National Academy of Science and Technology Philippines**, , :295-296

An experiment was conducted to determine the efficacy of grafting Apollo and CLN5915, a hybrid tomato onto two different rootstock, EG 203 an eggplant and H7996, a tomato variety. Both rootstocks are resistant to bacterial wilt. The beds for planting were raised 30 cm high and provided with rainshelter using 32 mesh plastic net.

One month Apollo and CLN5915 seedlings were grafted to the rootstock using plastic tube and put inside a chamber with approximate relative humidity of 85-90% for a week. The surviving newly grafted plants were transferred into a hardening chamber prior to transplanting.

Results for the two-year experiment on percent survival revealed that both grafted tomato varieties had significantly higher plant survival than the non-grafted plants. Grafted Apollo to EG 203 and H7996 gave 97.2 and 77.8 percent plant survival while non-grafted Apollo had zero survival. All plants were attacked by bacterial wilt. For CLN5915, grafted plants had 97.2 and 91.7 percent survival while the non-grafted plants had 70.8.

In terms of yield, both tomato varieties when grafted to either EG 203 or H7996 yielded significantly better than the non-grafted plants.

Grafted Apollo to EG 203 yielded 13.1 and those grafted to H7996 yielded 11.7 t/ha, respectively. Non-grafted plants yielded 1.3 t/ha. For CLN5915 grafting to EG 203 and H7996 gave comparable yield of 21.3 and 21.7 t/ha. However, significantly lower yield was obtained from non-grafted CLN5915 with an average of 10.4 t/ha. **(Author's abstract)**

Grafting. Tomato.

- 0078 Growth and nitrogen fixation by non-heterocystous filamentous cyanobacteria of rice fields of uttar pradesh, India. Tiwari, O.N., Dhar, Dolly Wattal, Prasanna, Radha, Shukla, H.M., Singh, P.K., Tiwari, G.L.. **Philippine Journal of Science**, , 129(2):101-107

Thirty four non-heterocystous filamentous cyanobacterial strains belonging to eight genera of the Order Oscillatoriales namely *Pseudanabaena* (one), *Limnothrix* (one), *Phormidium* (five), *Porphyrosiphon* (one), *Microcoleus* (two), *Oscillatoria* (nine), *Lyngbya* (ten) and *Plectonema* (five) were isolated from rice field soils belonging to various localities of Uttar Pradesh, India. Out of these isolates, six were selected based upon their capacity to grow in nitrogen deficient (-N) medium. These were examined for growth attributes and pesticide tolerance. A wide variation was exhibited by these isolates with respect to biomass production, generation time, nitrogen fixation and pesticide tolerance. *Porphyrosiphon notarisii*, *Lyngbya birgei birgei* and *Lyngbya semiplena* were found to exhibit appreciable nitrogen fixation. The different cyanobacterial strains varied in their tolerance to 2,4 - Dichlorophenoxy acetic acid, Malathion and Dimecron. While, *Lyngbya martensiana*, *L. semiplena* and *Plectonema boryanum* grew well only up to 25 ppm of Malathion, but *Lyngbya aestuarii*, *L. birgei* and *Plectonema boryanum* were able to tolerate up to 200 ppm of 2,4 D. In Dimecron supplemented cultures, the maximum concentration tolerated was 10 ppm by *L. birgei* and *L. aestuarii*. However, *Plectonema boryanum* grew well only up to 1 ppm concentration of Dimecron. **(Author's abstract)**

Cyanobacteria. Isolation. Characterization. Pesticide tolerance. Agriculture.

0079 Handmade paper from rice straw. **Technology!**, , 9(4):1-14

Every year, about 10.5 million tons of rice straw are available in the country. These are usually burned or left to rot in the field after harvest.

Rice straw is identified as a promising material for handmade paper. It is suited for production of high quality paper for special purposes like art paper, greeting cards, calling cards and other novelty paper items.

There is no reliable estimate on the local demand for handmade paper. However, one exporter ships a minimum amount of 3,500 sheets of handmade stationery paper per month to Japan, Australia and New York. It has been reported that the actual demand may be more than 8,000 sheets per month.

In the local market, handmade paper can be manufactured in various grades for different paper products like paper doilies, albums, envelopes, stationery, lamp shades, advertising specialty papers such as business greeting cards, posters, folders, art calendars, napkins, cut-outs, and other decorative papers. In 1986, the country's importation of these products reached to 114,774 kg amounting to US\$ 163,738.

This technology generated by the Forest Products Research and Development Institute (FPRDI) can provide additional income to farmers after the rice harvest. When established as a cottage industry, the monthly income derived is P22,875 with return per peso invested of P0.44. Moreover, the establishment of a handmade paper industry in the rural areas can uplift the economic condition of farmers and the country as well.

Agriculture. Handmade paper. Rice straw.

0080 New high yielding rice varieties. **Technology!**, , 8(3):1-15

In the Philippines, rice is the staple food for more than 80% of the population. Its production remains predominantly in the hands of small farmers. To them, rice provides their main source of income, food and employment.

The country has made substantial progress in improving irrigated lowland rice yields. The adoption of high-yielding varieties (HYVs), and use of fertilizers, pesticides and water management techniques, substantially increased rice yields and production. It started in 1959 with the introduction of BPI-76 variety developed by the Bureau of Plant Industry (BPI) at the Maligaya Rice Experiment Station now Maligaya Rice Research and Training Center (MRRTC) in Muñoz, Nueva Ecija. Other high yielding, dwarf to semi-dwarf, fertilizer responsive, photo-period insensitive, and pest resistant varieties emerged from and were promoted by the International Rice Research Institute (IRRI), University of the Philippines at Los Baños - College of Agriculture (UPLB-CA) and also BPI.

Before the introduction of modern varieties, average paddy yield was 1.3 t/ha. In 1985, the average yields for irrigated and rainfed lowlands were 3.0 t/ha and 2.0 t/ha, respectively. In that year, about 94% of irrigated lowland, 87% of rainfed lowland and 19% of upland areas were planted to HYVs developed by IRRI, UPLB, and DA-BPI.

The end-products of the rice varietal improvement program are breeding lines which will eventually be used for commercial production. Identification of

potential varieties among hundreds of selections requires a series of tests for high yield, resistance of pests, tolerance to adverse environments and grain quality over locations and seasons.

The National Cooperative Testing for Rice (NCTR) is an indispensable component of the breeding program. Test results are used to identify selections for seed increase and national/regional recommendations. These are also used in identifying selections that will serve as stop-gap varieties.

In 5 years (1981-1985), 9 irrigated lowland varieties were released by the Philippines Seed Board (PSB). These semi-dwarf, high yielding rice varieties developed by the rice breeding programs of IRRI, UPLB and DA-MRRTC are BPI Ri-3 (glutinous) released in 1981; IR 56 and UPL Ri-4 released in 1982; IR 58, IR 60 and BPI-10 released in 1983; IR 62, released in 1984; and, IR 64 and IR 65 (glutinous), both released in 1985. By 1986, two more were recommended as Seed Board varieties, namely, IR 66 and BPI Ri-2.

Agriculture. Rice production. High-yielding varieties (HYVs).

- 0081 Hydrothermal synthesis (by direct dissolution and via transformation of layered precursor) of an akaganeite-type iron oxide octahedral molecular sieve. Nicolas-Tolentino, Elaine, Alforon, Pamela. **Transactions of the National Academy of Science and Technology Philippines**, , :374

Iron oxide octahedral molecular sieve with akaganeite-type structure (2x2 tunnel), designated as FeOx-OMS (2x2) was successfully synthesized by hydrothermal method. The prepared FeOx-OMS (2x2) has high degree of purity based on X-ray powder diffraction (XRD) analysis and higher thermal stability than those of previously reported akaganeite-type materials. Thermal gravimetric analysis shows that the material is thermally stable up to 255°C in nitrogen atmosphere. At temperatures higher than this, the structure collapses and at 402°C, a new phase is formed which is hematite-magnetite based on its XRD pattern. The scanning electron microscopy (SEM) analysis reveals needle-like morphology which is a common characteristics feature of tunnel structures.

Synthesis of the akaganeite-type material via the transformation of a layered, lepidocrocite-type material, referred to as 1-FeOx-L2 to the tunnel structure is reported. This is the first successful conversion of a layered iron oxide as a precursor to a tunnel material. SEM micrographs further support this transformation as the plate-like morphology of 1-FeOx-L2 turned into needles. Thermal stability, however, of this material is much lower (195°C) than that prepared via direct dissolution using the hydrothermal method.
(Author's abstract)

- 0082 Identification of soil microflora at USM cacao plantation. Guinsatao, Lucrecia G., Jover, Edna M.. **USM Research Journal**, , 2(2):24-30

A study on the identification of soil microflora at USM Cacao Plantation was conducted from April 22, 1980 to May 16, 1980 at the Plant Pathology Laboratory of Southern Mindanao Agricultural Research Center (SMARC), Kabacan, North Cotabato. It was aimed at identifying soil microflora found at different depths of the cacao plantation of USM.

Twenty five main soil samples comprising six sub-samples per sample indicating every inch of soil depth were used as source of isolates. Various fungal flora were isolated under laboratory conditions and pure cultures were made from isolates after fungal growths were observed in the culture. Proper identification was based on the morphological and cultural characteristics of the organisms.

Results of the study showed that there were seven fungal flora present in the soil planted with cacao at USM. They were examined and identified at the generic level. These were: *Rhizoctonia* sp., *Botrytis* sp., *Aspergillus* sp., *Penicillium* sp., *Pythium* sp., *Monilia* sp. and *Rhizopus* sp.

It was found out that *Botrytis* sp., *Rhizoctonia* sp., *Rhizopus* sp., and *Aspergillus* sp. dominated the fungal flora of the soil because these were found to be at all depths.

Agriculture. Soil microflora. Cacao plantation.

- 0083 *In vitro* germination of freshly harvested and conserved indigenous orchid seeds. Pateña, Lilian F., Sotto, Rachel C., Altoveros, Nestor C., Bariring, Alice L., Dioneda, Mary Ann A., Barba, Ramon C.. **Transactions of the National Academy of Science and Technology Philippines**, , :301

This study was conducted to develop a technique for conserving the biodiversity of Philippine indigenous orchids using seeds. Our strategy was to conserve these materials under controlled environment. This method complements other existing conservation efforts which involve maintenance of live plants.

Orchids seed were excised from collected capsules, dried to d•7% and kept at 0°C in the cold storage facilities of the National Plant Genetic Resources Laboratory, IPB. They varied in size, shape and color. Prior to storage, initial viability and % germination *in vitro* were determined. A total of 74 accessions representing 32 known species and 22 known genera were tested for viability using the modified topographical tetrazolium test (TTZ). A total of 251 accessions representing 29 priority species were tested *in vitro*. Dried seeds were stored from 2 to 13 months and rehydrated prior to the TTZ viability and *in vitro* germination tests. Most of the conserved seeds still had high viability (>90%, e.g. *Acanthephippium*, *Dendrobium amethystoglossum*, *Dendrobium taurinum*, *Phalaenopsis amabilis*) during the 13-month storage period although viability of some species declined drastically (<10%, e.g. *Rhynchostylis retusa*). Results on *in vitro* germination of >80% was still obtained after one year of storage (e.g. *Dendrobium heterocarpum*, *Grammatophyllum scriptum*). These findings indicate that different species respond differently to low temperature and low moisture storage and consequently to *in vitro* germination. The above conservation technique is applicable to specific species of Philippine indigenous orchids. **(Author's abstract)**

Philippine indigenous orchids. Low temperature. Low moisture storage. In vitro conservation. Agriculture.

- 0084 Inbreeding depression of F_2 sorghum hybrids. Cena, Romulo L., Arquiza, Rubencio P.. **USM Research Journal**, , 3(1):34-45

The inbreeding depression of F_2 sorghum hybrids was conducted at the Plant Breeding and Genetics Research Field, University of Southern Mindanao, Kabacan, North Cotabato from November 1978 to October 1979. This study was meant to determine the effect of inbreeding in the F_2 generation of sorghum based on the number of days to flowering, plant height at maturity, length of panicle, number of days to maturity, grain yield of sorghum, weight of 250 seeds in addition to other agronomic characteristics of the F_2 generation of sorghum.

The experiment was arranged in a randomized complete block design (RCBD) replicated three times. The three varieties of sorghum F_1 and F_2 generations were planted in an area of 483 square meters.

Results showed a great depression of F_2 generation of sorghum hybrids in terms of number of days to flowering, plant height at maturity, number of days to maturity, length of panicle, grain yield of sorghum, and weight of the 250 seeds. All these, highly manifested the reduced yield and vigor of the second generation of sorghum hybrid.

Inbreeding depression. Agriculture. F_2 sorghum hybrids.

- 0085 Increased litter size and litter weight in gilts by prebreeding intrauterine infusion of killed boar semen. Capitan, Severino S., Penalba, Francisco F., Geromo, Francisco B., Dalumpienes, Joselito M.. **Research Journal**, , :47-52

The effects of uterine priming prior to first breeding on the reproductive performance of gilts were evaluated in two separate experiments. In experiment I twelve (12) gilts were randomly assigned to three treatments: T1 - control (infusion of distilled water), T2 - single infusion of killed semen (KS1), and T3 - double infusion of killed semen (KS2). Each treatment had 4 breeding gilts which were bred by natural insemination (NI). In experiment II, another set of twelve (12) breeding gilts were randomly allotted to the same treatments which were subsequently bred by artificial insemination (AI). Infusions, through the use of AI catheters, were done during the 2nd estrous cycle for T1 and T2, whereas infusions for T3 were made during the 1st and 2nd estrous cycles. Regular breeding were subsequently made during the 3rd estrous cycle. All gilts that returned to cycle were rebred within the 30-day period. In experiment I (natural breeding), total pigs born was higher ($P<0.05$) in T2 (12.75 piglets) and T3 (11.75 piglets) than in the control (10.50 piglets). T3 obtained the highest ($P<0.05$) litter size (10.25 piglets) and heaviest litter weight (74.12 kg) at 28 days weaning, followed by T2 (9.80 piglets and 65.60 kg, respectively). The control yielded the lowest ($P<0.05$) litter size (7.50) and the lightest litter weight (47.00 kg) at weaning. For experiment II-gilts (artificially inseminated), T3 gave higher ($P<0.05$) litter size born alive (10.88 piglets), total pigs born (11.72 piglets) and live litter weight at birth (15.30 kg) than those of T2 and the

control. Results indicate that prebreeding intrauterine infusion of killed boar semen (either single or double) improved litter size and litter weight of gilts.

Killed semen. Gilt. Agriculture. Litter size. Litter weight. Uterine priming. Reproduction.

0086 Indigenous phosphate rock as fertilizer. **Technology!**, , 7(1):1-15

Using indigenous phosphate rock as phosphorous fertilizer for corn yields a P1.18-return per peso invested.

Guano and phosphate rock are naturally occurring fertilizer materials usually found in caves. Relatively large deposits are known in Northern Leyte, Negros Oriental and Camarines Sur. The country's reserve are 0.8 million tons of guano and 2.1 million tons of phosphate rock.

Some farmers use guano and ground phosphate rock as fertilizer, but most use commercial products manufactured from imported phosphate rocks. From 1980 to 1984, the Philippines spent \$43,888,972 on phosphate rock imports.

Field experiments and researches on the direct application of indigenous phosphate rock have shown encouraging results. Phosphate rock composed mainly of apatite were found effective in acidic soils. Those with strengite and variscite show potential in alkaline paddy soils.

For soils with high phosphorus fixing capacity, the optimum level of apatitic phosphate rock application for corn (UPCA Var 1) is 80 kg P/ha, combined with 120 kg N/ha. The experiment produced a grain yield of about 4.5 t/ha. It was shown that apatitic phosphate rock is as effective as single superphosphate fertilizer. At lower levels apatitic phosphate rock is less effective. The broadcast method was found more effective than the band method at optimum level of phosphorus fertilization.

Cost-and-returns analyses show that a farmer gets net returns of P1,562/ha for every crop of corn, which represents P1.18 return per peso invested.

There is an added profit in form of savings of P1,143/ha for the use of phosphate rock instead of single superphosphate in corn. This amount is not much. However, commercial single superphosphate is produced from imported raw material while the apatitic phosphate rock is indigenous. The use of indigenous phosphate rock as fertilizer is in line with the national development thrust of import substitution and utilization of locally available materials as farm inputs.

Agriculture. Corn yields. Fertilizer materials. Indigenous phosphate.

0087 Influence of inoculation of different vesicular arbuscular mycorrhizal fungi on growth and nutrient of mungbeen and wheat. Singh, Satpal, Kapoor, K.K.. **Philippine Journal of Science**, , 129(1):19-25

An experiment was conducted under green house conditions to evaluate the effects of different vesicular-arbuscular mycorrhizal (VAM) fungi with and without Mussoorie rock phosphate (MRP) in P-dificient natural non-disinfected soil with mungbeen (*Vigna radiata* L. Wilczek) and wheat (*Triticum aestivum* L. emend Thell) as test crops. Root colonization by native VAM fungi was poor in

uninoculated soils which was improved with inoculation. The MRP amendment stimulated root colonization. The plant biomass and nutrient uptake were greater in the presence of MRP. Highest plant biomass, N and P uptake was observed on mungbean inoculated with *Glomus fasciculatum* in presence of MRP. In wheat *Glomus* sp. 88 promoted better plant growth and nutrient uptake than the other VAM fungi. There was increase in dry matter production, N and P uptake by 20.2, 110.5 and 160.4% respectively. **(Author's abstract)**

Vesicular-arbuscular mycorrhizae. Mussoorie rock- phosphate. Vigna radiata. Triticum aestivum. Nutrient deficient soils. Agriculture.

- 0088 Integrated control for corn borer. **Technology!**, , 7(3):1-16

Integrated pest management schemes for the control of corn borer are more economical and maximize the use of biological control agents and cultural practices, leading to minimum environmental disturbances.

Agriculture. Corn borer. Integrated control.

- 0089 Integrated fish-pig farming. **Technology!**, , 4(9):1-16

Raising fish and pigs at the same time offers several advantages. A fish farmer can produce more than 4,000 kg/ha/yr of fish using fresh pig manure instead of inorganic fertilizer and feeds. A piggery operator can use fish culture to dispose of animal waste with proper regard to health and sanitation. In addition, the practice maximizes uses of farm land, manpower, and facilities.

Fish-pig culture for backyard pond operations of 1,000 m² to a small-scale venture of 3 ha increases farm income. The integration of the two farming systems on a one-hectare farm earns a net income of more than P16,000 in six months.

The technology developed at the Central Luzon State University involves two culture patterns: a two 90-day or one 180-day fish culture cycle within the five-to-six-month pig-rearing period. Nile tilapia, common carp, and snake-head are raised in a fish polyculture system. Pig waste is washed directly from the pigpens to the fishponds. Only minimal modifications in the standard practices for pig and fish rearing are needed.

Agriculture. Fish-pig farming.

- 0090 Isovitexin-2"-O-β-[6-O-E-p- coumaroyl]glucopyranoside] from UV-B irradiated rice leaves inhibits fertility of *Helicoverpa armigera* (HUBNER). Whitecross, Malcolm I., Nayudu, Murali, Tanner, Gregory J., Caasi-lit, Merdelyn T.. **Transactions of the National Academy of Science and Technology Philippines**, , :282

Isovitexin-2" -O-β-[6-O-E-p- coumaroylglucopyranoside], a novel acylated c-glycosyl flavone isolated from UV-irradiated rice affected the viability of eggs laid by *Helicoverpa armigera* (Hubner) by over 90% when added to an artificial diet at 14 ppm.

The anti-fertility effect at this concentration was specific as the compound did not effect other insect growth parameters such as larval weight, duration and survival, pupal weight, duration and total time to adult emergence. When males that had consumed isovitexin-laced diet were mated with control females, there was still reduction in egg viability. This confirmed that the viability-reducing effect after mating could be male-specific.

The related compound is isovitexin-2" -O-β-[6-O-E-feruloylglucopyranoside] was much less effective. Other compounds such as isoorientin-2" -O-β-[6-O-E-coumaroylglucopyranoside], isoorientin-2" -O-β-[6-O-E-feruloylglucopyranoside] had little anti-fertility effect while the vitexin standard used as check flavonoid was significantly effective at higher concentration.

These novel compounds are possible candidates for use in Integrated Pest Management strategies. Many such natural products have been shown to be pest-specific, non-toxic to the environment and to the pest-natural enemies, thus representing an alternative to the use of synthetic pesticides. The low toxicity of the compounds to insects in these studies also suggests they might be appropriate for development as natural protectants for plants. With the advances of biotechnology, gene(s) for isovitexin maybe incorporated in the future into target crop varieties that are also host of this polyphagous and economically important major insect pest *Helicoverpa*. **(Author's abstract)**

Agriculture. UV-B. Isovitexin-2". *Helicoverpa armigera*. Hubner.

- 0091 *Isozyme* characterization and diversity among the Philippine populations of *Oryza officinalis* wall ex. watt conserved *ex situ*. Bon, Sancho G., Borromeo, Teresita H., Altoveros, Nestor C., Reymundo, Avelino D.. **Philippine Journal of Science**, , 135(2):93-104

Thirty-nine *ex situ* accessions of Philippine *Oryza officinalis* Wall ex Watt were characterized for isozyme electrophoretic profile and analyzed for diversity. Polymorphism was detected in phosphoglucosomerase, arginine aminopeptidase, alanine aminopeptidase, esterase-9, and leucine aminopeptidase. Zymograms revealed the electrophoretic profiles of the populations across enzymes. Polymorphism was shown in the number of resulting bands, positions of bands, and in the general banding pattern. Zymogram patterns showed that the experimental populations can be grouped into two sets: seed collections and vegetative collections. Vegetative collections showed more variations relative to banding characteristics, hence, indicating comparative diversity. Seed collections exhibited very low variation in isozyme features. Cluster analyses confirmed separation of the two sets. Vegetative collections also showed some degree of geographic association. Reduced isozyme polymorphism indicated loss of allelic variation among the seed collections and could be ascribed to factors relating to collecting sample size, and procedural practices in handling germplasm for *ex situ* regeneration and conservation. On the other hand, technical instability of the isozyme

system may have similarly contributed to the present results obtained. Further molecular investigation including studies on factors that influence genetic structure of populations under *ex situ* conservation are recommended to verify the results obtained. **(Author's abstract)**

Wild rice. Cluster analysis. Zymogram. Germplasm conservation. Agriculture.

- 0092 Kinetic and parametric study on enzymatic aqueous extraction process of pili kernel oil (*Canarium ovatum* ENGL.). Pham, Chay B., Demafelis, Rex B., Morada, Fiel Ethel A.. **Transactions of the National Academy of Science and Technology Philippines**, , :368-369

Pili nut is one of the most important oil seeds of commercial value in the Philippines. Pili oil was superior in quality as compared to coconut oil. This study was carried out to optimize the process conditions of the enzymatic extraction of pili kernel oil and to determine the quality of pili kernel oil from the enzymatic extraction process.

The effect of enzymes, pH, temperature, reaction time, agitation speed, substrate concentration and enzyme concentration on the oil yield was optimized in batch process in the stirred tank bioreactor equipped with controller and monitor systems. The oil yield was 93.4% as compared to the oil obtained by solvent extraction, at the extraction conditions of pH 7.0, 45°C, 300 rpm agitation speed, 1:8 (kernel:water, w/w) ratio and 4% enzyme concentration.

Results show that the reaction rate of oil extraction from pili kernel was greatly dependent on the enzyme concentration. At optimum process conditions, the reaction rates for both catalyzed and uncatalyzed extractions are: (a) for the uncatalyzed reaction: $r_s = 0.0546 C_s$ and (b) for the catalyzed reaction: $r_s = 0.281 C_s \cdot C_E$; where C_s = amount of oil in the substrate; C_E = enzyme concentration. **(Author's abstract)**

Pili. Kernel oil. Enzymatic extraction process. Kinetic and parametric study.

- 0093 Kinetics of shear band formation and propagation in glassy polycarbonate deformed in simple shear. Gopez, Adolfo Jesus R.. **Philippine Engineering Journal**, , 5(2):1-32

A technique involving surface marking of simple shear test specimens was used to investigate the formation of shear bands in polycarbonate. Plane simple shear testing was done to produce a single shear band in the test specimen. Testing was done at ambient temperature ($T = 23 \pm 1$ °C) and at a constant reference shear strain rate ($\dot{\gamma} = 3 \times 10^{-3}$ s⁻¹). Results showed that the shear band formed at yield and then propagated in two stages: first by elongation and later by widening. On the shear stress vs shear strain curve, the elongation stage corresponded to a stress drop after yield and the widening stage corresponded to plastic deformation with a low apparent strain hardening rate. Observation with markers showed that upon retesting, a previously deformed specimen no longer formed a shear band at yield. Instead

it deformed uniformly and homogeneously. End effects were also explored. The results of this study confirm previously obtained results in the preliminary testing of polycarbonate. Shear band formation and propagation were related to a defect theory of plastic deformation takes place when there are enough elementary defects or when these defects are made to move at the right velocity. Shear band formation was then explained to be the consequence of the difficulty with which elementary defects could be formed. **(Author's abstract)**

- 0094 Leaf trichomes as resistance factor in eggplant (*Solanum melongena* L.) against the leafhopper, *Amrasca biguttula* (ISHIDA). Rajotte, E., Talekar, N.S., Balagot, Gina E., Punzal, Belen S., Gapud, Victor P., Caasi-lit, Merdelyn T.. **Transactions of the National Academy of Science and Technology Philippines**, , :281

Seven farmers' and commercial eggplant varieties were screened for field resistance to the leafhopper, *Amrasca biguttula* (Ishida) at the PhilRice Central experiment Station, Maligaya, Muñoz, Nueva Ecija in rice-eggplant cropping systems during the 1999 dry season. SRO2, a farmer's variety from Nueva Ecija, was found resistant while Abar, a farmer's variety from Batac, Ilocos Norte, was tolerant. Most of the commercial varieties were susceptible to the leafhopper with Jackpot as the most susceptible entry.

To confirm the antixenotic mechanism of field resistance demonstrated by some eggplant varieties, trichome characters were measured. Results showed that SRO2 had the highest number of trichomes per field (40 sq mm) in all three sampling dates. This probably suggests that the trichome density in this variety could be the resistance factor that deters leafhopper feeding and oviposition on both 4th and 5th leaves of eggplant.

Longer trichomes were observed on Abar then followed by Dumaguete Long Purple in all sampling periods. Tolerance of Abar to leafhopper infestation could be due to longer trichomes of this eggplant variety. IPB GS1 had the shortest trichomes at 45 and 105 days after transplanting (DAT) and Jackpot at 90 DAT. Trichome characters in IPB GS1 probably do not confer tolerance or resistance mechanism as trichome density and length was lowest in this variety in all sampling periods.

The result show that trichome characters can serve as resistance factors in some eggplant varieties and probably a combination of trichomes and chemical factors on the surface of the leaves in other varieties of eggplants. **(Author's abstract)**

Agriculture. Leaf trichomes. Eggplant. *Solanum melongena* L.. *Amrasca biguttula*. Leafhopper .

- 0095 Legume inoculation with rhizobia. **Technology!**, , 9(1):1-16

Nitrogen fixation by legume-rhizobia symbiosis offers an opportunity for increasing nitrogen supply to crops. The nitrogen gas in the air is converted by the rhizobia into forms which the legume can utilize. On the other hand, host plants or the legumes provide energy for the process. This association has been estimated to fix about 35 million tons of nitrogen per year in agricultural ecosystem.

To maximize the efficiency of the symbiosis, effective strains of rhizobia are introduced through inoculation. The inoculant may be introduced through seed and soil inoculation.

Results of field studies at the University of the Philippines at Los Banos showed that inoculated legumes produced higher yields than plants fertilized with 30 kg nitrogen per hectare. In most instances, however, the benefit derived from inoculation is not an increase in yield but rather a reduction in the use of nitrogen fertilizer.

Partial budget analysis shows substantial savings derived from this technology. In Guimbalaon clay loam and San Manuel silt loam, inoculation and application of 0-30-30 increased soybean yield by 210 kg valued at P1,470 and 710 kg (P4970), respectively. Added costs incurred with this treatment total P453.50.

For mungbean, inoculation plus application of 0-30-30 in San Manuel silt loam with added cost of P314.50 gave an increase in income of P3,045.50. Similar treatment in Guimbalaon clay loam costing an additional P238.50, produced P1,921.50 more in income.

In peanut planted in Guimbalaon clay loam and San Manuel silt loam, inoculation plus application of 0-30-30 resulted in added income of P4,797.50 and P5,491.50, respectively.

Agriculture. Legume inoculation. Rhizobia.

0096 Leucaena: Alferez, Arturo C.. **Scientia Filipinas**, , 1(1):24-29

Containing a comparable amount of crude protein and a high carotene and xanthophyll content, leucaena leaves as livestock feed can substitute for the more popular alfalfa leaf meal. Mixed with weeds and crop residues plus minimum amounts of concentrates, leucaena leaves promote high liveweight gains in backyard goats and cattle fatteners. Tested as organic fertilizer, leucaena leaves proved effective in increasing corn, upland rice and paddy rice yields. A leucaena-based cropping system would enable a farmer to increase his income with minimum cash inputs.

Agriculture. Agronomy. Leucaena. High-protein animal feed. Nitrogen-rich organic matter.

0097 A life away from home. Manzanero-Galvan, Noemie M., Teotico, Angelita R.. **Philippine Scientific Journal**, , 43(1):25-29

Pregnancy of the caesarean scar is one of the rare types of ectopic pregnancy. it is a pregnancy implanted on a previous Caesarean Section (CS)

scar. The case presented aimed to report the demography, pathophysiology, clinical presentation, most appropriate methods of diagnosis and management, with their implications in clinical practice for this rare case of ectopic pregnancy. This is a 30 years of age Gravida 3 Para 1 (1-0-1-1) who developed pregnancy of the CS Scar after full term delivery via the abdominal route. Patient wanted to save her uterus contemplating for future pregnancy. Bioethics committee was consulted. A conservative management thru methotrexate injection was done. After the first cycle of the drug, there was no resolution of the placenta and a live pregnancy was noted. Patient was scheduled for another course of methotrexate therapy, but opted to undergo surgical hysterectomy. A thorough study on the best management of Cesarean scar pregnancy is needed in order to preserve fertility and reduce morbidity.
(Author's abstract)

- 0098 Life cycle and host range of the eggplant fruit borer. Tabalina, Juditha, Delizo, Merilyn B.
 . **USM Research Journal**, , 2(2):10-17

The eggs of the eggplant fruit borer hatched from four to five days after oviposition. The total larval period was 9.06 to 9.53 days while the pupal period was 9.08 to 9.41 days. Whether or not food was introduced, adult longevity period ranged from 3.25 to 4.76 days. The developmental period from egg to egg ranged from 27.09 to 27.90 days.

The eggplant fruit borer survived and completed its life cycle on tomato and eggplant fruits. It failed to complete its life cycle on string beans, maramais and corn.

Agriculture. Eggplant fruit borer. Life cycle. Host range.

- 0099 Mango fertilization for better production. **Technology!**, , 5(5):1-16

Fertilizer nourishes mango throughout heavy fruiting from flower-inducing chemicals and enhances grower's income.

The Philippines is a mango-exporting country and the industry has contributed moderately to the country's foreign-exchange earnings. Last year, the country exported mango products valued at more than \$9 million.

Delicious and juicy when ripe, the mango is a very popular fruit in the Philippines. The country has approximately 1.8 million mango trees. In 1982, mango production increased considerably partly because of the flower-inducing technology.

Fears have been expressed, however, that the life-span of the mango tree might decrease as a result of continuous fruit-bearing with the introduction of the technology. To forestall this threat, research has emphasized the nutrition of the trees for their continued well-being and sustained productivity.

Mango applied research by the Planters Products Inc. showed that applying 5 kg of complete fertilizer (14-14-14) per tree per year provides increased economic benefits. Based on 1983 prices (as of August), the farmer earns an additional profit of P250/tree/year over his net income derived from

the application of only the flower-inducing chemicals. This increase represents returns of P5.70 per peso invested on fertilizer, labor for fertilization and harvesting, and additional containers.

Agriculture. Mango production. Fertilization.

- 0100 Mapping salinity tolerance genes in rice (*Oryza sativa* L.) using RFLP and SSSLP analyses. Bonilla, Philbert S., Dvorak, Jan, Mackill, David, Deal, Karin, Gregorio, Glenn. **Transactions of the National Academy of Science and Technology Philippines**, , :327

A molecular map of rice chromosome 1, consisting of 11 restriction fragment length polymorphisms (RFLP) and eight simple-sequence length polymorphisms (SSLPs), was constructed using a population of F_8 recombinant inbred lines (RILs) of rice to map the major gene and quantitative trait loci involved in salt tolerance. The mapping population originally consisted of 80 RILs from the extreme tails of a population of 276 RILs developed via single seed descent from an intercross between the genetically divergent parents Pokkali and IR29. Pokkali is salt tolerant while IR28 is salt susceptible. The RFLP and SSLP markers were in the same order as in the published reference maps, thereby implying the reliability of the constructed map based on this particular RIL population. The integrated map of RFLP and SSSLP markers had a total of 129.9 cM, with an average interval size of 6.8 cM. Two RFLP markers, C52903S and C1733S, with 10.1 and 22.6 cM distance, respectively, flanked the major gene, Saltol. Two microsatellite markers RM23 and RM140 flanked the Saltol gene with 16.4 and 10.1 cM distance, respectively. PLABQTL for quantitative trait loci analysis was used to detect quantitative trait loci (QTL) associated with salinity tolerance (low Na^+ absorption, high K^+ absorption, and low Na^+/K^+ absorption ratio) in chromosome 1. A common QTL for these three quantitative traits was observed within a 50 to 65 cM segment of the integrated map with a peak Log of Odds (LOD) score greater than 6.7. RM140, a microsatellite marker, and C52903S, a RFLP marker, flanked the QTL peak within 1.9 cM. Using basic information derived from this study, further fine mapping using BAC libraries in a large backcross population (BC_3F_4) will be done. (Author's abstract)

- 0101 Metabolizable energy of mannanase-treated copra meal (MTCM) and growth performance of broilers fed with MTCM. Zamora, A.F., Sapin, A.B., Luis, E.S.. **Philippine Journal of Biotechnology**, , 7(1):39-51

Streptomyces sp. no. 17 which produces mannanase was used to hydrolyze copra meal through solid substrate fermentation (SSF). Four liters of culture broth were inoculated to 1 kg of copra meal in a fabricated bioreactor. Analysis of mannanase-treated copra meal (MTCM) showed significant reduction in crude fiber and a significant increase in energy value. Apparent metabolizable energy, determined by forced-feeding of 8-week old male broilers, increased by more than 100% in MTCM.

Feeding trial in broilers was also conducted to evaluate the performance of

MTCM as feed ingredient as compared to untreated copra meal (UCM). Highly encouraging results were obtained when crude fiber reduction of copra meal was more than 25%. Feed consumption was lower in broilers fed with MTCM diets, but on the average, they had consistently greater weekly body weight gain. Expectedly, broilers fed with MTCM diets had consistently better feed efficiency compared to those fed with UCM diets.

Streptomyces sp.. Mannanase. Copra meal. Metabolizable energy. Agriculture.

- 0102 Microsatellite DNA markers for genotype identification in Philippine papayas. Zaporteza, Maribel M., Garcia, Roberta N., Bernardo, Amy Emiliana N., Laurena, Antonio S., Tecson-Mendoza, Evelyn Mae. **Transactions of the National Academy of Science and Technology Philippines**, , :302

Very little is known on the extent of genetic diversity among the Philippine papayas and their wild progenitors. Hence, this study aimed to provide basic information on their genetic base in order to improve the efficiency of the papaya improvement breeding program. Microsatellite markers or simple sequence repeats (SSRs) are DNA markers that provide high level of certainty in genotype identification.

SSRs were obtained from the papaya sequence in the Genbank database and 8 primers were designed based on their highly conserved flanking regions. A Polymerase chain reaction (PCR) protocol was developed using these primers to amplify the SSRs. The PCR products were electrophoresed in a 3% agarose gel, stained with ethidium bromide and visualized under UV light.

Initial efforts using one primer pair generated SSRs from 32 papaya lines. A total of 21 bands, which translated to 27 banding patterns, were obtained. The observed similarity indices among the different lines ranged from 0.33 to 0.95. The samples clustered into three major groups with 0.5 to 0.6 degree of relatedness.

The high level of polymorphism observed demonstrates the microsatellite's capability to quantify genetic diversity and identify the different papaya genotypes. Six more primers will be used to develop SSR markers for our papayas. **(Author's abstract)**

Papaya. Genetic diversity. Microsatellites. SSRs. Agriculture.

- 0103 The mobile continuous flow flash dryer. **Technology!**, , 14(1):1-16

The Mobile Flash Dryer (MFD) facilitates drying of palay at the farmers' field; thus, minimizing losses due to handling and transporting. It also minimizes grain quality deterioration during the wet season when sun drying cannot be depended on.

The MFD is a vertical, columnar-type continuous flow grain dryer mounted on a trailer for easy transport. It operates using the "flash drying" technique

(the use of relatively high temperature) to dry rapidly grains with 24-35% moisture content (MC). It is primarily designed as the first stage dryer to allow longer grain storability before finally drying it in the sun when possible (two-stage drying). However, it can also dry the wet palay to desired moisture content even without sun drying.

The MFD has the following advantages:

- It can quickly dry very wet grains in 15-20 minutes to a safe 18% MC. Grains can then be stored without spoiling for a period of three weeks. Thus, MFD becomes handy especially during the wet season.
- The dryer is simple to operate. Its materials are locally available.
- Designed to be mobile, the trailer-type grain dryer can be easily transported using jeepney/truck or animal. Its mobility allows drying at any accessible site.
- Its mobility also will allow custom-drying scheme just like threshing, thus augmenting returns-on-investment.
- It has a heat recycling feature which uses hot unsaturated air from the drying section to be recycled. This feature saves energy consumption by 35%.
- Ongoing tests point to the potential of the MFD to dry corn grains. MFD also can help minimize the hazard of aflatoxin contamination when corn grains are dried well.

The MFD is intended for farmer-groups or cooperatives and private entrepreneurs who buy and sell palay. Through the MFD, adoptors can immediately dry their commodities thus preventing losses and quality deterioration. Return-on-investment is 93%. This technology affords the adoptors to procure stocks even during the rainy season.

With MFD, annual net income of about P80,000.00 could be realized. It has a maximum payback period of 2.93 years and a drying cost of P9.25 per cavan in drying wet palay (24% MC to 18% MC). To further dry it to 14% MC through sun drying, an additional cost of about P4.00 per cavan would be incurred.

Agriculture. Mobile flash dryer (MFD). Palay drying.

0104 Morphology and anatomy of the barks of Philippine erythrina and intsla species. Figarola, D.B., Quimbo, L.L.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :56-63

The morphology and anatomy of the bark of nine Philippine species were studied to find out what components and/or characters of their barks differentiate the genus *Erythrina* from the genus *Intsia* and to determine which anatomical and morphological characters could serve to delimit the different species under each genus.

Results showed that bark physical features in combination with the arrangement, average radial diameters, and lengths of sieve tube members, phloem parenchyma cells, and phloem fibers; seriation and cell types of

phloem rays; types of scleroids and occurrence of deposits, are of value in the identification and taxonomic treatment of the *Erythrina* and *Intsia* and their included species. **(Author's abstract)**

Bark taxonomy. Secondary phloem.

- 0105 Multiple cropping in coconut. **Technology!**, 3(6):1-10

A big problem among coconut farmers is the current low price of copra. Coupled with low production, income derived from coconut farms is low.

At the farm level, multiple cropping is an answer to the problem. Mixed cropping benefits both the coconut tree and the farmer. Weeds are controlled, the soil is conserved, and nut production is increased. For the farmer, the practice provides additional employment to the family, increases and stabilizes income, and efficiently utilizes the land and other resources.

A return of P 1.29 to P 3.34 per peso invested can be expected with intercropping of papaya, pineapple, banana, and gabi under coconut.

Agriculture. Coconut multiple cropping.

- 0106 Occurrence of *Caligus pelamydis*, a parasitic copepod, on local teraponid fishes. Lopez, Nellie C.. **Transactions of the National Academy of Science and Technology Philippines**, 3:323-324

Among the parasitic crustaceans that have been reported to cause mortality of fish hosts are species of *Caligus*. Caligid copepods are mainly parasitic on marine fishes; with increased aquaculture of marine fishes, the economic impact of these parasites will also increase. Teraponid fishes found in the coastal waters of the Philippines include *Pelates quadrilineatus* (Bloch) and *Terapon jarbua* (Forskål) locally called *bagaong* or *babansi*. They enter brackishwaters and freshwaters. Because of their migratory habit and the present practice of culturing fish in coastal areas, it is possible for terapons to enter fishponds or cages and for their parasites to infect cultured fish. Examination of *P. quadrilineatus* and *T. jarbua* obtained monthly from fishermen and fish vendors in La Union, Metro Manila, and South Cotabato resulted in the recovery of *Caligus pelamydis* from the gills and buccal cavity. Prevalence of infection in *T. jarbua* ranged from 19.6% (Divisoria Market) to 37.5% (La Union). In *P. quadrilineatus*, only those from La Union were infected. Parasite burden in *T. jarbua* ranged from 1-13; for *P. quadrilineatus*, 1. **(Author's abstract)**

- 0107 Occurrence of sugarcane downy mildew (leaf splitting) in San Carlos and Bogota-Medellin and suggested control measures. Gargantiel, F.T., Barredo, F.C.. **Victorias Agricultural**

Research Reports, , 22-31:29-34

Investigation of sugarcane downy mildew (SDM) was conducted during our subsequent visits to the VMC-JDI stations in San Carlos, Negros Occidental and Bogo-Medellin, Cebu.

It was observed last year that the disease situation in these areas was becoming serious. Stratified sampling in some of the fields in San Carlos and Bogo-Medellin showed that infestation was from 10 to 30 and 30 to 50 percent respectively.

A systemic fungicide, CGA 48-988 was tested using infected seedpieces of VMC 67-175. Encouraging results were obtained. Other probable measures of controlling the disease are discussed.

Agriculture. Sugarcane downy mildew (SDM). SDM control measures.

- 0108 Oil and hydrocarbon from plants:. Fernandez, Elvira C. **Scientia Filipinas**, , 1(1):3-9

Green plants offer a never-ending supply of oil, much of which, gallon for gallon, is worth more than petroleum. In the Philippines, attention has veered to Euphorbias, Aleurites and the like-plants that yield oil and hydrocarbons-to produce a wide range of products that are competitive with synthetic petrochemicals.

Agriculture. Oil and hydrocarbon. Euphorbias. Aleurites.

- 0109 On-farm planting of passion fruit (*Passiflora edulis* var. *flavicarpa*) under coconut at Lucban, Quezon. Villegas, Lina G.. **Plant Industry Bulletin**, , 9(2):18-29

The on-farm planting of passion fruit under coconut was conducted at Lucban, Quezon, involving 743 coconut farmers in 18 barangays covering an area of 405 hectares ending 1992.

From 1989 to 1992, total production of passion fruit was 5,055,846.21 kilograms amounting to P19,410,059.20. Productive life span of the crop is five years when properly maintained.

At Lucban, Quezon, it took an average of 195 days from planting to flowering and another 71 days to fruit maturity. Average fruit weight is 112.17 grams with juice recovery of 35.43 ml.

Horizontal and fence type are potential trellis for passion fruit growing. However, fence type is recommended for ease of operations (harvesting, pruning and spraying) and cost.

For efficient utilization of available space, close spacing showed high yield due to greater number of plants per hectare than wider distancing.

Continuous operation created employment of all available manpower in the community including out-of-school youths, students and neighboring farmers.

Additional income ranging from P5,641.00 to P30,342.82 per month can be realized in growing the crop. The average annual net income for coconut alone is P2,804.00 per hectare.

Fruit juice or puree extracted are being exported to major European

countries including United Kingdom, France, Germany and Netherlands.

Agriculture. Passion fruit. On-farm planting. Lucban, Quezon.

- 0110 Osmotic stress increased in plant regeneration of old rice callus. Aldemita, Rhodora R., Avellanoza, Eleanor S., Ilar, Glen, Rosario, Marischelle M.. **Transactions of the National Academy of Science and Technology Philippines**, , :326

Increase in rice production will entail the continued development and use of high yielding inbreds, hybrids and new plant type lines. In support of this strategy, genetic engineering for improved pest resistance will also focus on these genotypes. Optimization of conditions to increase plant regeneration in these genotypes was conducted as a prerequisite for successful genetic engineering. Tissue culture factors such as the type of explant, genotype, selection conditions, and artificial culture media were studied. However, plant regeneration is greatly affected by co-cultivation with *A. tumefaciens*. Old, unregenerable cells of three cultivars were subjected to different osmotic conditions that include physical and chemical osmoticants. Addition of sorbitol, mannitol, and exposure to drying conditions of the laminar flow hood increased the plant regeneration of unregenerable transgenic cells by three-fold. This finding will be very useful in succeeding attempts to regenerate transgenic plants with economically-important characteristics. **(Author's abstract)**

Oryza sativa. Genetic engineering. *Agrobacterium tumefaciens*. Sorbitol. Mannitol. Plant regeneration.

- 0111 Outstanding Philippine sugarcane varieties. **Technology!**, , 3(5):1-11

The breeding program initiated by the Philippine Sugar Commission in 1965 has produced a number of high yielding sugarcane varieties among which are Phil 6553, Phil 6607 and Phil 6723. These HYV's outyielded the more widely used Phil 56226 by an average of 25 piculs per hectare in plant crop and 28 piculs in the ratoon crop in ten mill districts in Visayas and Mindanao. These mill districts have a production area of 124, 422 hectares.

Phil 56226, an older variety, is planted in about 60% of the area devoted to sugarcane in these mill districts. If these areas are planted to the adapted and new recommended HYV's, increment in these mill districts alone is estimated to be P311 million (at P110/picul) in the plant crop and P383 million in the ratoon crop.

These newly recommended HYV's have better resistance to major sugarcane diseases than Phil. 56226. Their resistance to at least two major diseases will help stabilize production by preventing extreme fluctuation of sugar yields from season to season.

Success in this breeding program and effective seed piece distribution efforts may be attributed to the ingenuity and foresight of PHILSUCOM's sugarcane breeders and researchers in other disciplines and support staff.

As proof of this, Philippine sugarcane varieties occupy 95% of sugarcane areas in the country in the crop year 1979-80.

Agriculture. Outstanding sugarcane varieties. Phil 6553. Phil 6607. Phil 6723.

- 0112 Ovarian development of *Atherinomorus endrachtensis* from Taal Lake, Batangas and *Decapterus macrosoma* from Quezon Province. Gorospe, Vanessa Eve M., Bundoc, Mary Rose L., Lopez, Nellie C.. **Transactions of the National Academy of Science and Technology Philippines**, , :323

The silverside, *Atherinomorus endrachtensis* (Quoy and Gaimard), locally known as guno, is one of the economically important fish species found in Taal Lake, Batangas province. About twenty female specimens of guno were collected monthly from the lake for nine months (November 1999 to July 2000) to study its ovarian development.

Fifteen to twenty specimens of *Decapterus macrosoma* (Bleeker), commonly known as round scad, were obtained monthly from July 1999 to February 2000 from the coastal waters of Lucena, Quezon.

Histological sections of the ovaries of the two fishes showed the presence of oogonia chromatin nucleolar stage, perinucleola stage, yolk vesicle stage, vitellogenic and ripe oocytes. These were seen occurring in the ovaries simultaneously. However, ripe oocytes were only observed during the month of August in *D. macrosoma*. The monthly mean values of the Gonadosomatic Index (GSI) of *A. endrachtensis* were highest in the months of February and July. On the other hand, the GSI values of *D. macrosoma* peaked during the month of August. Present findings indicate that *A. endrachtensis* and *D. Macrosoma* are multiple spawners. **(Author's abstract)**

- 0113 The percentage success of patch budding, cleft grafting and inarching in durian seedlings. Uyanguren, Fe P., Flojo, Leterito, Payawan, Norma Aurora A.. **USM Research Journal**, , 2(2):47-52

Three asexual methods of propagation were tested on durian. No significant difference was found among mean percentage takes of cleft grafted, patch budded and inarched plants. However, the results showed that the mean number of days to appearance of first active bud was significant among various treatments. Inarched plants had a mean of 5.32 days, cleft grafting, 17.05 and patched budded plants, 27.97. The number of fully developed leaves observed three months after among various treatments: cleft budding and patch budding operations and after harvest of inarched plants showed high significant difference. As to the number of leaves, the inarched had the most, patch budded the least and cleft grafting, an intermediate number. Their respective means were 2.89, 1.71 and 2.3, respectively.

Agriculture. Durian seedlings. Patch budding. Cleft grafting. Inarching.

- 0114 Performance of bunch type peanut at different seeding rates. Santos, Alberto B.. **Nucleus**, , 2(2):31-35

This trial was conducted on a red soil (Alfisol) at the International Crops Research Institute for the Semi Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh, India with the aim of determining the performance of Robut 33-1 (T_1) and TMV-2 (T_2) peanut varieties planted at a density of 133,000 (D_1), 266,000 (D_2) and 399,000 (D_3) plants per hectare.

Results showed that TMV-2 produced more pods compared to Robut 33-1 but had significantly lower test weight. The lowest density significantly produced more pods than the highest rate of seeding. The same result was noted on the number of matured pods per plant. The combination of the two factors failed to show any significant interaction effect.

Agriculture. Bunch type peanut. Seeding rates performance.

- 0115 The performance of peanut to tillage practices and calcium levels. Inson, Rodolfo T., Alcala, Eugenio A.. **USM Research Journal**, , 3(1):1-22

The effects of different tillage (zero, minimum, conventional and maximum) and calcium levels (0,150, 300, 600 kg/ha) on the bean yield of two peanut cultivars (Spanish red and UPL Pn-2) grown during wet season (June-October 1980) were studied at the Southern Mindanao Agricultural Research Center (SMARC) experimental area, University of Southern Mindanao, Kabacan, North Cotabato. Other important plant characteristics studied were: days to blooming, plant height, fresh weight, total dry matter yield, number of pods, weight of 100 dry pods, shelling percentage and dry pod yield.

Calcium sulfate (CaSO_4) application up to 300 kg/ha significantly influenced the number of pods, weight of 100 dry pods, bean yield and dry pod yield but not plant height, fresh weight, total dry matter yield and shelling percentage of Spanish red and UPL Pn-2(moket) peanut cultivars. The plants applied with CaSO_4 at the rate of 600 kg./ha showed the highest shelling percentage for both cultivars.

Tillage practices had significantly affected the number of days to flowering and the total dry matter yield of the plants. However it had no significant effect on the other plant characteristics measured. Generally, zero tillage appeared to be best at June Planting for both Spanish red and UPL Pn-2 (moket) cultivars.

Higher bean yield was obtained for UPL Pn-2 (moket) with 3689.42 kg/ha as compared to Spanish red variety with 2264.20 kg/ha.

Podding capacity of both cultivars did not differ significantly for all tillage practices employed, although UPL Pn-2 (moket) produced more pods than Spanish red variety.

Calcium levels. Tillage practices. Peanut. Agriculture.

- 0116 Performance trial of promising peanut accessions/lines in major peanut growing areas. Concepcion, D., Abilay, R.M., Hautea, R.A., Domingo, J., Pamplona, P. , Pascua,

The project was started in February 1985 and aimed to identify the best peanut varieties for specific locations. In 1985, three new testing sites were established in the major peanut growing areas. These were Isabela State University (ISU), Cagayan State University (CSU) and Tupi Seed Farm. In 1986, the yield trial at Tupi Seed Farm was transferred to the University of Southern Mindanao (USM).

In the 1985 wet season trials, ICGS 35, ICGS 64 and JL-24 were the high yielding entries at Tupi Seed Farm, CSU and ISU, respectively. ICGS 50 and ICGS (FDRS 17) were identified to have resistance to rust and late *Cercospora* leaf spot at IPB.

The 1985-86 dry season preliminary yield trials at 4 locations indicated that FDRS 27 had the highest yield of 1.78 tons/ha, followed in descending order by UPL Pn-4, UPL Pn-6, JL-24 and NCAC 17090 with their respective yields of 1.77, 1.64, 1.64 and 1.52 tons/ha.

JL-24 was the highest yielder among the maturing peanut cultivars grown at IPB and ISU during the 1986 dry season.

The mean pod and seed yields of all peanut entries grown at IPB CSU and USM during the 1986-87 dry season general yield trial were 1.54 and 1.02 tons/ha, respectively. JL-24 was the top yielding entry across locations with average pod and seed yields of 3.45 and 2.33 tons/ha, respectively. The other promising entries were Robut 33-1, ICG (FDRS) 10, ICG (FDRS) 11, RLRS 12 and RLRS 2.

Agriculture. Peanut growing areas. Peanut accessions/lines.

- 0117 Philippine agriculture in a globalizing world. Balisacan, Arsenio M.. **Transactions of the National Academy of Science and Technology Philippines**, , 26(2):223-242

The paper reviews the performance of Philippine agriculture in an Asian context. It shows that domestic policies and institutional bottlenecks, rather than global environment for agricultural trade, explain much of the country's comparatively weak performance in food production, employment creation, agricultural trade, and poverty reduction. Poor governance has also weakened the sector's capacity to respond efficiently to urbanization influences, especially changes in consumption patterns and land use owing to the combined impact of population growth, rising incomes, and developments in information and technology. The "business as usual" approach to governing agriculture and the rural sector needs to be abandoned in favor of more aggressive governance reforms and strategic investment aimed at raising agricultural productivity and sustaining gains in farm incomes, reducing the "cost of doing business" in rural areas, and taking advantage of opportunities for growth offered by globalization. **(Author's abstract)**

Philippine agriculture. Globalization. Urbanization. Domestic policies. Agriculture.

- 0118 Phytotonic effect of carbofuran on sugarcane. Serra, R.J.. **Victorias Agricultural Research Reports**, , 22-31:96-107

Carbofuran is a systemic insecticide/nematicide widely used to control insect pests of rice, sugarcane and other crops. The application of this chemical in a field plantation was reported to have improved crop yields significantly. The effect was previously attributed to its direct effect on the target pest. Later reports, however, mentioned a physiological response of the plant enhanced by the application of the chemical.

In greenhouse experiments using sterilized soil where soil micro-flora and fauna were eliminated, the application of carbofuran at 2 kg a.i./ha produced significantly taller plants, increased tiller production, more vigorous root development and better plant stand, after a three-month growing period. A more pronounced tiller production was observed on Phil56-226, a variety with good tillering capacity.

Further studies are being undertaken to investigate other possible avenues for research in this regard. Confirmatory reports are available concerning the presence of this mechanism in rice. However, there are no available literatures yet confirming the presence of this mechanism in other crops, e.g., corn, tobacco, cotton, etc. under controlled soil conditions. The presence of this mechanism in other crops would certainly help improve the crop production of our country.

Agriculture. Insecticide/nematicide. Carbofuran.

- 0119 Pilot scale production of *Agaricus bitorquis* in tunnel. Agualin, Layda C, Macalinao, Patrocinio O., Medalla, Angelita P.. **Transactions of the National Academy of Science and Technology Philippines**, , :296

The successful result of the laboratory investigation (bench scale production) for growing *Agaricus bitorquis* (Hot *Agaricus*) necessitated a larger scale cultivation to determine its economic feasibility. The research was undertaken using hybrid strains of high temperature tolerance. Yield and quality of fruit bodies from selected strains were tested without artificially controlled cooling facilities. The selected strain was grown following the same procedures for spawning, casing, pinning and cropping of *A. bisporus*; the same media composition was likewise used.

Results showed that during the vegetative stage, a significant mycelial run was exhibited by *Agaricus bitorquis* (Strain 101-Australia). There was a profuse mycelial run during the first week of incubation covering 85% of the compost. Complete ramification within 12 to 14 days was noted; casing was applied once ramification was seen to be completed. Pins were observed to develop when the carbon dioxide content of air was recorded at 800 ppm or lower. Harvestable mushrooms appeared 18 to 20 days after casing. Harvest were made within 35 to 42 days from the day of first flush and were recorded for as long as 150 days from the first day of flush.

A significant mycelial and case runs were exhibited by the strain indicative of good fruiting yields. After eight flushes, an average net yield of 70% was recorded. A biological conversion efficiency (BCE) ranging from 30% to 35% was obtained.

These findings showed that the *Agaricus bitorquis* has a great growing adaptability to environment and can be cultivated under conditions with

temperature from 28 to 30°C. **(Author's abstract)**

Agaricus bitorquis. Semi-temperate mushrooms. Tunnel production of mushroom. High temperature-tolerant mushrooms. Urban mushroom growing. Hot buttons. Tropical mushrooms. Agriculture.

- 0120 Poly(3-methyl thiophene)-modified electrode for electrochemical determination of dopamine. Vergara, Regina Aileen May V., Binag, Christina A.. **Transactions of the National Academy of Science and Technology Philippines**, , :372-373

Dopamines occur naturally in our body. Dopamine is localized in certain regions of the central nervous system where it is an important neurotransmitter. Detection of dopamine in the human body is of great importance to neuro scientist.

A poly(3-methylthiophene) modified (P3MTp) electrode offers substantial improvements in voltammetric sensitivity towards dopamine. Thin films of P3MTp have been electrochemically coated onto a platinum electrode and used for dopamine measurements. This P3MTp modified electrode enhances the oxidation peak current of dopamine while voltammetric response of ascorbic acid peak potential is greatly attenuated compared with that of a bare electrode. Surface morphology of the electrode has been analyzed with SEM while the elemental composition of the modified electrode surface has been studied using XPS analysis. **(Author's abstract)**

Dopamine. Poly(3-methyl thiophene). Ascorbic acid. Cyclic voltammetry. Surface morphology.

- 0121 Potential production modelling of the rice crop. Jensen, Jens R., Balderama, Orlando F.. **Nucleus**, , 2(2):61-66

This paper presents the result of a study for three rice cultivars namely: Suphenburi 1, RD 23, and RD 7, grown to establish their potential production parameters in a Bangkok plain environment and compute the dry matter accumulation rate using a simple model introduced by H. Van Kenlen in 1986.

Calculation of potential production was determined by the parameters established in this experiment such as Leaf Area Index, Specific Leaf Area, Total Dry Matter, and Partitioning Factors. From these, the potential production in terms of dry matter accumulation were found to have an average growth rate of 201.3, 187.97 and 173.76 kg/hr/day for RD 23, RD 7, and Suphanburi 1 respectively. The computed values were reasonably close to the actual observation at 166.67, 164.30, and 160.71 kg/hr/day for RD 23, RD 7, and Suphenburi 1, respectively.

Production modelling potential. Agriculture. Rice.

- 0122 Potentiometric iodide-selective electrode based on conducting polyaniline membrane. Santiago, Karen S., Binag, Christina A.. **Transactions of the National Academy of Science and Technology Philippines**, , :370

Doping is necessary during the electrochemical oxidation of conducting polymers in order to achieve electroneutrality. This study involves the use of a dopant in fabricating an inorganic anion sensor, specifically the iodide-selective electrode (I-SE) based on polyaniline (Pan) film.

In devising the iodide sensor, electrochemical polymerization was carried out using the following optimized conditions: 1:1 mole ratio of aniline monomer and potassium iodide, 0.10M potassium hydrogen phthalate buffer solution at pH 4, 30-minute polymerization time without stirring, platinum wire support and 9.34 mA cm^{-2} current density.

The sensor showed a hyper-Nernstian response of -73.05 (m) and a linearity of $0.9855 \text{ (r}^2\text{)}$ at a concentration range of 1.96×10^{-5} to $9.56 \times 10^{-3} \text{ M I}^-$, and an average response time of 2.2 minutes. Through cyclic voltammetry, the growth of Pan onto a platinum disc was monitored which exhibited its oxidized form at $X0.9 \text{ V}$. Its membrane has been likewise investigated via Scanning Electron Microscopy (SEM) and X-ray Photoelectron Spectroscopy (XPS) that showed the semi-fibrous and elemental compositions of Pan, respectively. The characteristics of the devised Pan-based potentiometric I-SE proved its wide applicability in industrial and biological purposes. **(Author's abstract)**

Polyaniline. Conducting polymer. Potentiometric sensor. Nernstian. CV. SEM. XPS.

- 0123 Processing performance of four silkworm hybrids based on cocoon quality, reelability, and yarn properties. Casero, Roberto O.. **Samay**, , :36-42

Cocoon quality and yarn properties of four Mindanao silkworm hybrids-SW 101, SW 102, SW 103, and SW 104-were studied to determine their processing performance for silk yarn production. Cocoon quality based on weight, size, and length of filament; processing performance in terms of reelability; and properties of the raw silk yarns such as tenacity, elongation, cohesion, neatness, evenness, and cleanness were evaluated. Results showed that SW 101 gave the longest and heaviest cocoon filament, highest percent reelability, and highest mean cohesion. Highest tenacity, neatness, and evenness percentage were observed in SW 103. SW 102 gave the highest cleanness percentage, highest elongation, and finest cocoon filament. The overall assessment of silkworm hybrids SW 101, SW 102, and SW103 can verify their commercialization in terms of processing performance and raw silk quality.

Agriculture. Sericulture. Textile. Silkworm hybrids. Cocoon quality. Reelability. Yarn properties.

- 0124 Production of activated carbon from pili (*Canarium ovatum* ENGL.) nutshells by ammonium

chloride activation. Movillon, Jovita L., Demafelis, Rex B., Valencia, Sixto A., Prometila, Michael Angelo B., Gomez, Madelaine V.. **Transactions of the National Academy of Science and Technology Philippines**, , :371

Present technology regarding the utilization of pili nut into activated carbon (AC) is yet to be determined and explored. Zinc chloride is commonly used as the activating agent but for this study, ammonium chloride was tested because it is readily available, inexpensive, and its low sublimation temperature of 330°C made further extraction of activating agent unnecessary. The main objective of the study was to produce activated carbon from pili nutshells by ammonium chloride (NH₄)Cl activation.

Crushed and sieved nutshell (obtained from Sorsogon, Albay) was carbonized in pyrolyzer and activated in a muffle furnace. The activated carbon samples were subjected to direct activation and a two-step activation.

Results showed that the charcoal yield ranges from 20.9 to 30.4%, 31.8 to 40.6% and 30.3 to 34.6% for untreated, direct activation and two-step activation process, respectively. The highest and lowest yield occurred at temperature of 400°C and 800°C, respectively. The direct activation process provided a better yield compared to untreated and two-step activation process. However, the direct activation carbon gave higher moisture content and ash content compared to two-step activated carbon. In terms of fixed carbon, the untreated carbon has the lowest value (28.1%) while the two-step activated carbon (88.7%) has the highest value. The bulk density of untreated carbon, direct activated carbon, and two-step activated carbon are 0.546, 0.449, and 0.489 g/ml, respectively. The two-step activation at 800°C gave the highest iodine number of 305.9 mg/g but the value is still substandard compared to commercial carbon that ranges from 600 to 1100 mg/g Iodine Number. Further characterization and parametric studies regarding the production of activated carbon from (NH₄)Cl activation are recommended. **(Author's abstract)**

Activated carbon. Pili nutshells. Chemical activation. Ammonium chloride activation.

- 0125 Production of virus-free and true-to-type planting materials of garlic (*Allium sativum* L.). Pateña, Lilian F., Bariring, Alice L., Dolores, Lolita M., Miranda, Marisa B., Barg, Erhard, Green, Sylvia K., Barba, Ramon C.. **Transactions of the National Academy of Science and Technology Philippines**, , :299-300

Garlic (*Allium sativum* L.), one of the most important vegetable crops in the Philippines, is grown in about 7,674 hectares with an average production of 19,314 MT (BAS, 1998). Average yield is quite low, 2,78 t/ha compared to up to 10.6 t/ha in Thailand, due to low quality planting materials which is attributed to accumulated diseases (particularly virus diseases) through generations of asexual propagation.

Until 1970, the only recorded virus disease of garlic in the country was the tangle top disease. In March 2000, results of our collaborative work with AVRDC and BBA showed that poty (OYDV – onion yellow dwarf virus, LYSV – leek yellow streak virus), carla (GCLV – garlic common latent virus, SLV – shallot latent virus) and allxi (MbLV - miteborne latent virus, GarVA – garlic virus A, GarVB – garlic virus B, GarVD – garlic virus D) viruses were present in

our garlic planting materials.

We have devised a technique for producing virus-free planting materials of garlic through a combination of shoot tip and meristem culture. With this technique, 2 accessions from Indonesia (12G – Lumbukuning, 17G – Kuning) and 3 accessions from the Philippines (16G – Tanauan, 22G – Laguna, 30G – Ilocos White) were tested free of the above viruses using ELISA, PCR and electron microscopy indexing techniques. Field trials showed that *in vitro*-derived bulbs had higher yield in terms of number and size of cloves compared to conventionally propagated bulbs. These results indicate that yield of garlic can be increased using virus-free planting materials. Initial study also showed that tissue culture did not alter the genetic fidelity of the micropropagated materials. **(Author's abstract)**

Garlic. *Allium sativum*. Virus-free. Poty. Carla and allexi viruses. Genetic fidelity. Agriculture.

- 0126 Prospects and problems of producing alcohol from root crops:. Villanueva, Marianito R.. **Scientia Filipinas**, , 2(1):27-35

The joyride is over. Over the long sweep of history, human beings will look back and note with awe (and chagrin) that their ancestors stripped the planet of most of its hydrocarbon fuels - coal, oil, gas, which biology and geology conspired to trap underground millions of years ago - within the span of a few hundred years. Rootcrops expert Marianito R. Villanueva, however, believes that despite the current frenzied search for new deposits, it is still best to harness the biomass. In rows of rich green plants, solar energy work the silent miracle of photosynthesis, transforming water and carbon dioxide into carbohydrate, channelling it to growing tubers from which can be extracted ethyl alcohol or ethanol. But to understand the alcohol movement, Villanueva explains, one must also understand its economics.

Agriculture. Alcohol production. Root crops. Prospects and problems.

- 0127 Proximate analysis of durian seed. Bahandi, Evelyn P., Astillero, Nhilda. **Research Journal**, , 7(2):3-12

The nutritive value of the durian seed was analyzed. The presence of starch and gluten-forming capacity was also tested for its industrial application because these were suspected to be present from the physical characteristics of the seed. Determination of its chemical composition was also made in terms of water (moisture), carbohydrates, fats, proteins, and mineral matter.

Results showed 0.468 percent of glucose, 9.98 percent water, 3.52 percent crude fat, and 3.65 percent protein. Mineral matter was also found to be about 2.77 percent. A qualitative test for starch was positive and when the refined sample was mixed with water, it developed a dough-like structure which indicates the presence of gluten.

Agriculture. Durian seed analysis.

- 0128 Raising market hogs to the right slaughter weight. **Technology!**, 6(1):1-12

The growth of the swine industry is reflective of its profitability which is the ultimate goal of any enterprise. To increase profit and to provide consumers with quality pork, raisers must be guided properly as to the best weight at which to raise their market hogs. Some factors to consider are the growth rate of the pigs, their feed-conversion efficiency, the kind of feed used, and the quality and quantity of pork at different slaughter weights.

The Department of Animal Science (now the Institute of Animal Science), College of Agriculture, UP at Los Banos (UPLB), in collaboration with the Philippine Council for Agriculture and Resources Research and Development (PCARRD) initiated a project to determine the best weight in which to market hogs.

Optimum growth rate of hogs is reached at 110 kg body weight. Beyond this, growth rate declines. However, hogs raised to only 90 kg body weight are more efficient in converting feeds into body weight gain. Hogs fed with high-energy rations need lesser feed per unit gain in weight than those fed with low-energy food. Hogs slaughtered at 90-130 kg have a higher dressing percentage compared with those slaughtered at lighter weights. As the animals grow bigger, however, the fat increases more in relation to the lean portion of the meat.

Economic analysis indicates that maximum profit is obtained at 130 kg when high-energy feed is given; and at 90 kg when low-energy rations are used. At 130 kg slaughter weight, however, the proportion of fat in relation to lean meat is higher.

Agriculture. Market hog raising. Proper slaughter weights.

- 0129 Rat control in coconut. **Technology!**, 2(8):1-12

The coconut industry is one of the top dollar earners of the Philippines. For 1979, the industry earned US\$1.03 billion. Coconut occupies one-third of the total cropland of the country.

On a per hectare basis, coconut production is only about a ton of copra per year. One of the causes of low production is rat damage. Two to 85% of total immature nutfall may be due to rats.

Researches showed that rat damage can be effectively controlled either by trunk banding, ground baiting or crown baiting.

Trunk banding is initially more expensive with an expected cost-benefit ratio per hectare over a three-year period of P25.00 per peso invested.

In crown baiting, the expected cost-benefit ratio is P24.75 per peso invested per month per hectare.

Rodent control will be more important with the implementation of the coconut development program.

The program will especially introduce hybrids which are shorter, more productive, and potentially more susceptible to rat damage.

Agriculture. Coconut rat control. Trunk banding. Ground baiting. Crown baiting.

- 0130 The rate of growth of *Siganus guttatus* fed with brown alga (*Sargassum polycystum*) and green alga (*Ulva lactuca*) in cages in the marine waters of San Francisco, Cebu. Tanduyan, Serapion N.. **Transactions of the National Academy of Science and Technology Philippines**, , :322

Sargassum polycystum and *Ulva lactuca* are two kinds of algae abundantly found at the coast of Northern Poblacion, San Francisco, Cebu. They are just used by fish vendors to cover their fishes during marketing time and just drifted by the current ashore, dried up and decomposed. Thus, these two kinds of algae were tested as feed for cultured siganids (*Siganus guttatus*) to maximize their utilization.

These study used the Randomized Complete Block Design (RCBD) with three treatments and in each treatment has two replicate cages. Treatments 1, the cages fed with brown alga: Treatment 2, fed with green alga and Treatment 3, no feed given as control.

Each cage was stocked with 52 siganids fingerlings and fed daily with the two kinds of algae based on 30% of the mean body weight of the stock for five months using body weight, total length and body depth as indicators for growth. The whole plant in each species of alga were utilized as feed in the study.

Results of the study show that the siganid fed with *Ulva lactuca* (green alga) had heavier body weight, longer total length, greater body depth and high survival rate than the siganids fed with *Sargassum polycystum* and the control.

Based on the analysis of variance (ANOVA), it shows that there is significant difference in terms of body weight, total length and body depth among the treatmentst. (Author's abstract)

Siganus guttatus. *Ulva lactuca*. *Sargassum polycystum*. Cebu.

- 0131 Response of converted BT corn hybrids against *Ostrinia Furnacalis* Guenee infestation under limited field release condition. Fernandez, Eduardo C., Logroño, Manuel L.. **Transactions of the National Academy of Science and Technology Philippines**, , :291-292

Corn borer, *Ostinia furnacalis* Guenee remains the number one insect pest problem in corn production causing yield loss from 20 to 80 percent and under heavy infestation will result to total crop failure. In this study, three locally adapted corn hybrids converted with *cryIAb* (MON 810) gene expression from *Bacillus thuringiensis* var *kurstaki* were evaluated under limited field release condition in the Agroseed Research Station at Lagao, General Santos City together with their isogenic hybrids and local checks. The objective of the field test was to verify the resistance reaction of these materials against *Ostrinia furnacalis* Guenee observed under containment condition, and compare their

agronomic performance. Natural infestation was augmented by artificially infesting about-to-hatch corn borer eggmass at the late vegetative and silking stage. All safety guidelines required by the National Committee on Biosafety of the Philippines (NCBP) in the conduct of the trial were rigorously followed. The Bt corn hybrids exhibited highly resistant reaction in terms of leaf, stalk, and ear feeding damage rating. Significantly, lower counts in the number of entrance holes and length of tunnel in the stalk, number of entrance holes and length of tunnel in the ear and the number of larvae and pupa recovered from plants sampled 90 days after planting was noted on the Bt corn entries compared with the non-Bt entries. The trial also demonstrated the high specificity of the Bt protein (delta-endotoxin) against the corn borer since many beneficial non-target insects particularly Green lacewing, spiders and coccinellid beetles were abundant both in the Bt and non-Bt plots. Aphid population was also higher on the Bt plants. Bt corn yield of 7.1 to 8.5 t/ha was significantly higher compared to the non-Bt corn yield of 4.4 to 5.1 t/ha resulting in a yield difference of 1.6 to 3.4 t/ha or 30 to 69%. The susceptible check, Supersweet yielded only 1.44 tons. The harvested ears of the Bt corn also had better quality because of lower incidence of *Diplodia* ear rot and *Fusarium* ear rot as a result of no corn borer damage on the ears. (**Author's abstract**)

Fusarium ear rot. *Diplodia* ear rot. Ear quality. Feeding damage. *Bacillus thuringiensis*. NCBP. Bt corn. CryIAb. Corn borer. *Ostrinia furnacalis*. Agriculture.

- 0132 Response of soybeans (BPI-L-114) as affected by different types of inoculants. Baltazar, Jr., Luciano A. , Salang, Eriberto. **Research Journal**, , 10(1):18-28

The study was conducted to determine the response of soybeans (BPI-L-114) as affected by different types of inoculants. This was conducted from August to December, 1985 at the College of Agriculture, Experimental Area, San Ramon, Zamboanga City.

The experimental area of 576 square meter was divided into 20 plots with the dimension of 3x7 meters per plot. Randomized Complete Block Design (RCBD) was used with five treatments replicated four times.

The average weight, height, number of pods and number of modules of the plant were significantly affected by the different types of inoculants. This revealed a significant increase as statistically analyzed. This is perhaps due to the action of bacterial (rhizobia species) as a result of high production of nodules in the plant. This rhizobia convert nitrogen from the air to usable form for the growth and development of soybean plants. However, the number of days maturation was not significantly affected. This proved that the genetic characteristics of soybean plants could not be altered by the application of inoculants.

The study revealed that out of the different types of inoculants used, soybeans-stain inoculants showed the best result compared to the rest of the treatments. This might be due to the compatibility of the inoculant suitable and the kind of legumes being inoculated effective modulation and more site for nitrogen fixation for maximum yield.

Agriculture. Soybeans response to inoculants.

- 0133 Rice-fish culture increases farmer's income. **Technology!**, , 1(6):1-12

Rice-fish culture technology is simple and requires little additional labor expenses and inputs. Ultimately the practice will:

1. Improve the nutrition of low income farmers and rice farm families in remote inland areas where fish and other protein sources are scarce and
2. Provide additional income to rice farmers of about P680 per hectare each cropping season or P1,360 annually.

The socio-economic benefits are significant considering that the country's 1.4 million hectares of irrigated rice fields when utilized for rice-fish culture may increase the total fish production by at least 20%.

Even if only 30% of these fields are converted to rice-fish culture, a conservative fish yield of more than 100,000 metric tons may be realized from two cropping seasons per year, which is about equal the present total production from fishponds.

Agriculture. Rice-fish culture.

- 0134 Root rot *swietenia macrophylla* king. seedlings. De Guzman, E.D., Eusebio, E.C.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :64-65

A root rot disease affecting mahogany, *Swietenia macrophylla* King, seedlings is becoming a serious problem in the Philippines. The important symptoms include wilting, browning and curling of the leaves; necrosis at the base of the stem; and decay of the root system.

The incidence of the disease during the last 3 years ranged from 1% to almost 50%. Two isolates of fungi were consistently isolated from diseased seedlings. **(Author's abstract)**

Mycelium. Sclerotium. Conidiophores.

- 0135 Root-zone application of carbofuran during dry season against major insect pests of rice. Pascual, L.I., Gragasín, R.P., Barril, V.T., Balleque, E.R., Cahatian, R.P., Camarao, G.C.. **USM Research Journal**, , 2(1):57-72

Root-zone application of carbofuran (2-3-dihydro-2,2-dimethyl-7-benzofuranyl methyl carbamate) was evaluated under field conditions during dry season at the University of Southern Mindanao, Kabacan, North Cotabato.

Carbofuran applied in the root-zone of each hill by incorporating it in the top soil at transplanting and applying it in the paddy water twice at transplanting and at 25 days after transplanting (DAT) was found to be significantly effective to stemborers (deadheart up to 65 DAT), green leaf-hoppers up to 65 DAT,

brown planthoppers up to 85 DAT, whorl maggots at 25 DAT, and rice gall midge at 45 DAT. These methods of applying carbofuran also protected the rice plants from the attack of virus diseases especially up to the maximum tillering stage which is critical to attack of virus. The aforementioned treatments gave significantly higher yield over other treated and untreated plots.

Carbofuran root-zone application. Agriculture. Rice. Entomology.

0136 Rubber intercropping. **Technology!**, , 4(10):1-15

Although rubber is considered a minor crop in the Philippines, it has high export potential. In 1980 the country exported about 7000 t, worth \$8.5 million, of rubber latex. It is expected that this figure will increase since the World Bank projects an overall increase in demand of 4.5% per year.

With the present domestic production of only about 72,000 t and a local requirement of not less than 70,000 t, the prospects for the expansion of rubber plantations from the present 58,000 ha are very encouraging.

However, one drawback to rubber farming, especially for the small growers, is the absence of income between planting and tapping. Usually, it takes from six to seven years for a farmer to wait before he can receive any financial returns from rubber.

Any technology that can make this waiting period productive would encourage more farmers to plant rubber. Intercropping with some selected cash crops was found to be a viable means of utilizing this idle interval.

Based on rubber intercropping studies at the Southern Mindanao Agricultural Research Center (SMARC), the average returns of four years of intercropping mungbean, soybean, peanut, mecan pea, sorghum, and corn with rubber per hectare would be worthwhile for the farmer.

Agriculture. Rubber intercropping.

0137 A science career in rice. Vergara, Benito S.. **Transactions of the National Academy of Science and Technology Philippines**, , :51-58

The importance of focus in one's science career is presented through the development of rice with high yields and tolerance to adverse environment. The role of Plant Physiologists at IRRI in the green revolution is presented. Morphological and physiological basis of high yielding plant types; increasing grain yield potential; tolerance of rice to low temperature at different growth stages; flood tolerance; and development of screening methods for adverse climatic conditions are discussed. The present high yielding rice varieties have reached their potentials. The physiological and morphological considerations for the new plant type for higher grain yields is also presented. **(Author's abstract)**

Agriculture. Rice. Green revolution.

- 0138 Screen barriers reduce infestation of cabbage webworm and diamondback moth on pak-choi. Roxas, Aurea C., Patricio, Marilyn G., Aganon, Teotimo M., Bayugan, Manolito A., Pagaduan, Rolando V., Mactal, Marlon A., Murleigh, James R., Ulrichs, Christian, Talikar, N.S.. **Transactions of the National Academy of Science and Technology Philippines**, , :306-307

Pak-choi (*Brassica rapa*) grown in screen barriers, 2 x 18 x 18 m, constructed from GI pipe and 16-mesh nylon netting, effectively reduced infestations of cabbage webworm (*Hillula undalis*) and diamond back moth (*Plutella xylostella*), but not stripped flea beetle (*Phyllotreta* sp.). In one trial conducted in January-March 1999, screen barriers reduced the incidences of plants damage by cabbage webworm and diamondback moth by 98 and 95%, respectively. Mean yield was 1.14 kg m⁻² within the barrier, but nil in the open field. In contrast, during a second trial conducted in May-June 1999, screen barriers reduce the infestation of cabbage webworm by 76%. The screen barrier reduced but did not prevent infestation of pak-choi by the stripped flea beetle. In the open field all plants were infested by the stripped flea beetle, whereas 77% were infested within the barrier. Diamondback moth was not present in the screen barrier and in open field. Marketable yield were 0.13 and 0.004 kg m⁻² in the screen barrier and open field, respectively. These data indicate that screen barriers reduce infestations by diamondback moth and cabbage webworm and increase yield. **(Author's abstract)**

Screen barriers. *Hellula undalis*. *Plutella xylostella*. *Phyllotreta* sp.. Pak-choi.

- 0139 A simple and reliable proto for somatic embryogenesis and plantlet regeneration in mango (*Mangifera indica* L.). Pateña, Lilian F., Carlos-Refuerzo, Luzminda R., Barba, Ramon C.. **Transactions of the National Academy of Science and Technology Philippines**, , :300

The 'Carabao or Manila Super' mango, a virtually neglected fruit before the advent of KNO₃ flower induction in the early 1970's has surged as the 3rd leading Philippine export fruit after banana and pineapple. By 1997, it ranked 1st in value of P10.34 billion overtaking banana and pineapple. Prolonging the shelf life of the fruits to further increase the value of mango can be done through biotechnology. The bottleneck is a reliable embryogenesis and regeneration protocol since after gene transfer, plants must be regenerated from the transformed tissues to complete the process.

In our tissue culture studies, we have developed a simple and reliable protocol for somatic embryogenesis and plantlet regeneration in mango: 8 strains of 'Carabao' and 2 unidentified varieties, PHL 12384 and PHL 12378. Over 40 batches of nucellar explants from immature fruits (0.75-5.0 cm long) were cultured *in vitro* from April 1999 to April 2000. Two media were identified, MMSE, Mango Medium for Somatic Embryo Induction, Proliferation and Germination, and MMPR, Mango Medium for Plantlet Regeneration. These are now routinely used. The protocol is reproducible in 14 other varieties of mango. A new revelation is that shifting the base medium from Gamborg's B5 Medium to our own formulation, R Medium (Barba and Pateña formulation), browning was effectively controlled, which is very crucial in any transformation work. This breakthrough may pave the way to solving the problem of phenolic exudation in plant tissue culture. Browning has limited the successful *in vitro*

culture of many woody species including the mango. **(Author's abstract)**

Mango. *Mangifera indica* L.. Carabao. Manila super. R medium. Somatic embryogenesis. Protocol. Nucellus. Browning. Agriculture.

0140 Sipa pump for low-lift irrigation. **Technology!**, , 8(2):1-16

The sipa pump is an improved design of low-cost axial-flow pump much needed by small farmers and fishpond operators.

The sipa pump combines the modern technology of axial-flow pump with cost reducing innovations from Bicol and Central Luzon. It has a propeller designed for high efficiency pumping; a flexible hose made from available low-cost materials; and a wooden frame which is inexpensive and adapted to gasoline or diesel engines or electric motors.

The sipa pump is the result of a collaborative effort of the Bureau of Plant Industry of the Department of Agriculture (DA-BPI), formerly the Ministry of Agriculture and Food (MAF) and the International Rice Research Institute (IRRI).

Experiments were carried out to compare axial-flow pump with centrifugal pump for low lifts. The pumping capacity of the axial-flow pump is 3 times higher than that of the centrifugal pump at 1-meter lift, and 2 times higher at 3-meter lift, for the same horsepower engine.

The sipa pump involves an operating cost much lower than that of the centrifugal pump commonly used by farmers. Its initial price is cheaper than that of the axial-flow pump which was developed earlier.

Because of its high efficiency and low cost, the sipa pump is gaining the farmers' acceptance in areas where it is currently promoted.

Agriculture. Sipa pump. Low-lift irrigation.

0141 Sloping agricultural land technology. **Technology!**, , 8(5):1-16

Over the years, upland areas have deteriorated rapidly due to excessive soil erosion and illegal cultivation (kaingin). The uplands need to be conserved because their degradation affects the lowland and coastal areas.

Aware of this, the Mindanao Baptist Rural Life Center (MBRLC) has evolved the sloping agricultural land technology (SALT) over ten years of experimentation and on-farm verification in Bansalan, Davao del Sur. Income from upland farms using this scheme has increased from the traditional level of P300 to P2,000 to as high as P12,000 to P15,000 per hectare per year in the fourth to fifth year of operation.

Planting leguminous tree or shrub species closely as belts, this technology conserves soil and water, making the uplands more favorable for the sustained production of many annual and perennial agricultural crops.

The success of SALT has spread to the different provinces of Mindanao. To date, about 200 farmers practice this technology in an aggregate area of about 250 hectares. Selected agricultural schools and universities throughout

the country are also putting up hill-side SALT farms. SALT has also been adopted as a viable project under the Kilusang Kabuhayan at Kaunlaran (KKK) program and has benefited 2,000 farmers in Davao del Sur alone.

The government is currently piloting SALT in the different parts of the country through programs such as the Integrated Social Forestry Program (ISFP) of the Department of Environment and Natural Resources (DENR) and the Rainfed Resources Development Project (RRDP), funded by the United States Agency for International Development (USAID) and the government of the Philippines.

Today, with the rapid deterioration of our uplands, adoption of this technology throughout the country is highly recommended with some modifications, if necessary, to suit local conditions.

Agriculture. Sloping agricultural land technology (SALT). Tree legumes. Technology adoption.

- 0142 Smallhold coconut farmers in Negros Oriental:. Cubelo, Jose Edwin C.. **Silliman Journal**, , 48(1):43-62

The study analyzed the status and constraints of smallhold coconut farmers in Negros Oriental, Philippines to provide the basis for interventions geared towards boosting their productivity and income. Primary data were obtained from key informants at the Philippine Coconut Authority (PCA), and from coconut farmers in nine municipalities in the province using survey methodology. Secondary data were also collected. The participating farmers are small scale with coconut landholdings averaging 1.40 hectares, slightly larger than the provincial average of 1.32 ha, but about a hectare smaller than the national average of 2.4 ha. Almost all are members of small coconut farmers' organizations (SCFOs). Among the PCA-initiated programs, majority (56.4%) have availed of the corn seed dispersal project for intercropping, 39.8% participated in trainings on coconut-related technologies, and not many (19.5%) have availed of the "plant-now-pay-later" program (PNPL) involving improved coconut varieties. Majority have experienced a decline in coconut yield that was mainly attributed to poor crop nutrition, the most neglected agronomic practice. Many follow a corn-coconut intercropping scheme in about one-third of their coconut land holdings. Practically no product diversification and very little value-adding activities are taking place with almost everyone opting to produce and sell only copra from their coconut trees. Based on the existing realities of the responding farmers, the following problems and constraints were ascertained: 1) low coconut yield due to poor agronomic practices; 2) low farm productivity due to underutilization of land resources; 3) low farm income due to, among others, the absence of product diversification and value-adding activities; 4) inefficient marketing system; and 5) lack of access to support services, particularly in the area of production credit. A set of interventions is suggested to address the plight of this farming sector.

Agriculture. Smallhold coconut farmers. Status, problems, and recommendations. Negros Oriental.

- 0143 Soybean production after rice. **Technology!**, , 9(2):1-16

Today, production has not kept pace with the expanding demand for soybeans. However, availability of production packages could increase the present average yield and the income of farmers as well.

The country's present soybean production could hardly meet the requirement of the food and feed industries. In 1986, the country imported 370,712 tons of raw soybean and products to augment the national production of 6,488 tons. Balance of trade during the same year was negative at US\$65.987 million.

Past researches on soybean were focused on the development of varieties with stable yield, good agronomic characters and resistance to major pests. Studies on the cultural management such as time and rate of planting, plant density and cropping systems, nutrition, nodulation and nitrogen fixation were also conducted.

To evaluate the applicability of soybean production technologies under various agro-climatic conditions and to promote the commercial planting of soybean in areas where it has a comparative advantage over other traditional crops, the Soybean Pilot Production Program was launched in December 1983.

Soybean production technology. Agriculture. Agro-climatic conditions. Rice-based dry season cropping areas.

- 0144 Static and dynamic hugoniots of $ZnSe_xS_{1-x}$ single crystals. Tiong-Palisoc, Shirley. **Transactions of the National Academy of Science and Technology Philippines**, , :373

Static phase transition points of $ZnSe$ and $ZnSe_xS_{1-x}$ (0.40 d" x d" 1) single crystals in the high pressure region are determined based on the transformation pressures of Bi I-II, Bi III-V and ZnS using the cubic anvil method where the pressure-induced variation of resistance is measured. The transition pressures of the samples vary linearly with the composition of ZnS in the $ZnSe_xS_{1-x}$. The shock compression curves of $ZnSe_{0.85}S_{0.15}$ single crystals are also investigated. The pressure -particle velocity Hugoniot is found to agree with the corresponding Hugoniots of ZnS and ZnSe up to the phase transition point. The P-V isotherm of $ZnSe_{0.85}S_{0.15}$ derived from the $U_s - U_p$ Hugoniot is consistent with the calculated P-V curve based on Bridgman's static data of ZnS and ZnSe. **(Author's abstract)**

Dynamic. Static. $ZnSe_xS_{1-x}$. Hugoniot. High pressure. Phase transition. Cubic anvil. Shock wave. Bridgman. Semiconductor.

- 0145 Studies on the ecology of diaphorina citri, kuway, in Batangas. Panaligan, Dante R., Celino, Ciriaco S. **Plant Industry Digest**, , :4,5,18,19,30,31

The duration from egg to adult was found to vary from 17-24 days. Flushing

of citrus is generally controlled by rain particularly in non-irrigated area. Although the population fluctuation of psylla has relation to the growth and flushing rhythm of citrus, their relationships are not strongly indicated in this study. However, seasonal abundance of citrus psylla is low during hot dry period when the trees are semi-dormant in which there is a sudden population rise at the onset of the rainy months of June, July and August. The powerful mortality factor observed in this study is the knockdown effect of successive typhoons on the population of *Diaphorina citri*, Kuway.

Agriculture. Kuway (*diaphorina citri*). Ecology.

- 0146 Study on effect of fermentation-conditions and modeling of submerged batch process for citric acid production. Pham, Chay B., Marquez, Raquel B., De Guzman, Jocelyn T.. **Transactions of the National Academy of Science and Technology Philippines**, , :361-362

The demand of citric acid requirement in the country is met by importation. Citric acid is used in food, pharmaceutical, feed and medical industries. This study was carried out to optimized the effect on initial ammonium and glucose concentrations and pH using multiple regression equation and to model the kinetics of submerged batch fermentation of citric acid production by *Aspergillus niger*.

Initial ammonium concentration effects on glucose, biomass and citric acid concentrations are shown by ANOVA ($p > F = 0.01\%$). The highest citric acid concentration 84.10 g/l was obtained from 0.1 g/l initial ammonium concentration at 30°C, pH 3.5, 0.8 vvm aeration and 400 rpm agitation rate.

The fermentation kinetics related to growth model, production formation, substrate consumption were used to determine the kinetic parameters (μ , q_m , k , C , D) using Leudeking-Piret equations. At the optimum fermentation conditions, the specific growth rate μ for 1 g/l initial ammonium concentration was 0.071 h^{-1} . The non-growth related parameter, q_m (0.0095 g.product/g.biomass.h) was obtained at 1.0 g/l initial ammonium concentration indicating that product formation is growth related. Substrate consumption was also growth related since higher value of growth related parameter C (1.6558 g.substrate/g.biomass) was obtained as compared to the non-growth related parameter D (0.0458 g.substrate/g.biomass.h). **(Author's abstract)**

Citric acid production. Optimization of fermentation-conditions. Modeling of submerged batch process.

- 0147 Sugarcane breeding and selection in Victorias Milling., Inc.. Jalando-on, R.R., Barredo, A.T.. **Victorias Agricultural Research Reports**, , 16-21:53-62

In 1967, the Victorias Milling Company reactivated and expanded its sugarcane breeding program to complement the existing breeding and variety improvement programs in the country.

Topics discussed in the paper are working hypothesis of the breeding program, breeding procedures, the different stages of testing and selection

criteria, the experimental designs used, descriptions of the different regional stations and the propagation and distribution of setts prior to the commercial release of a variety.

Agriculture. Sugarcane breeding and selection.

- 0148 Supervised credit. Panol. Francisco Y., Flores, Virgilio R. . **Victorias Agricultural Research Reports**, , 22-31:58-66

The present scheme of providing crop loan to the planters does not relate to productivity objectives. The system has no provision for the rapid adoption of new production technology, and expansion in previously uncultivated area. Moreover, the loan is not tied up with a technical assistance mechanism to ensure maximum benefit from the inputs.

A supervised credit program jointly undertaken by Victorias Milling Company, Inc. and Republic Planters Bank for the Victorias Mill district is presented as a new approach in sugarcane crop financing. Primary consideration in this approach is productivity. In essence, it provides financing based on actual requirement considering the production potential of the farm. The program is a pilot project which if found successful can be used as model for wider implementation in the industry.

Agriculture. Sugarcane crop financing. Supervised credit.

- 0149 A survey on the incidence of sugarcane rust (*Puccinia melanocephala* H. & P. Sydow) in the VMC Mill district, Negros Occidental. Serra, R.J., Barredo, F.C., Tianco, A.P.. **Victorias Agricultural Research Reports**, , 32-41:44-49

In a stratified random survey conducted during the period of disease occurrence, sugarcane rust (*Puccinia melanocephala* H. & P. Sydow) was found rampantly associated with Phil56-226 and to a lesser degree with Phil58-260 and VMC67-611. The other commercial varieties, viz. VMC71-238, Phil65-53, Phil71-15, Phil66-07 and the upcoming VMC71-39 were found highly resistant to the disease.

The extent of infestation ranged between 40.0% - 46.4% of the total area planted to Phil56-226 which was about 3,656-4,240 hectares regardless of stratification (lowland, intermediate and upland). Based on the characteristics and nature of occurrence, the species was believed to have been endemic. The temperature, rainfall and relative humidity were some of the major factors which favored the development and dissemination of the disease.

Agriculture. Sugarcane rust (*Puccinia melanocephala* H. & P. Sydow). VMC Mill District, Negros Occidental.

- 0150 Survival and growth of *vitex parviflora* juss grown in various potting media. Lasmarías, Victoria T., Aumentado, Generosa C., Bucad, Armando U.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :21-24

Molave, *Vitex parviflora* Juss., seedlings were potted in 7" x 8" polyethylene bags in 10 different soil media. Eighteen weeks after potting, the sand and humus mixture (equal volume) appeared to be the best medium in terms of height grown, percentage survival and shoot-root ratio. Ordinary garden soil (OGS) and humus (1:1) mixture, and OGS and sand (2:1) mixture were the next two desirable media. Humus performed best in height growth, but had the highest shoot-root ratio which was undesirable. Sawdust and sand did not appear to be suitable soil media. **(Author's abstract)**

Molave. Shoot-root ratio.

- 0151 Test on soil sampling techniques for plant parasitic nematodes on sugarcane. Serra, R.J., Reyes, T.T.. **Victorias Agricultural Research Reports**, , 32-41:6-10

Four sampling techniques were tested for appropriateness and efficiency regarding nematode population and survey experiments on sugarcane. The Bartlett's and F - Tests showed significant differences only with the two sets of comparison: between the stratified systematic sampling and the stratified random sampling, and between the stratified systematic sampling and the systematic sampling. Though the stratified systematic sampling was not statistically significant compared to simple random sampling, the relative efficiency analysis proved that the stratified systematic sampling was the most appropriate and most efficient with regard to nematode population and survey experiments.

Agriculture. Sugarcane nematodes. Soil sampling techniques.

- 0152 The advertisement calls of two endangered species of endemic Philippine frogs:
. Brown, Rafe M., Dolino, Cynthia N., Alcala, Ely, Diesmos, Arvin C., Alcala, Angel C. **Silliman Journal**, , 43(1):91-109

We provide the first published accounts of the acoustic mate-recognition signals of the Negros cave frog, *Platymantis spelaeus*, and the Gigante Island frog, *P. insulatus*. Both species are endemic to the Visayan Pleistocene Aggregate Island Complex (and are from Negros and Gigante islands, respectively), and both species are considered to be at some level of vulnerability of extinction due to the activities of humans in their very restricted geographical ranges.

On the limestone outcrops of the Municipality of Basay in southern Negros Island, *P. spelaeus* calls in and around caves and crevices of porous limestone karst. The mating calls of males of the species are unusually complex, consisting of paired calls of two separate (=notes) each. Each note is a tonal frequency arc, and one portion of the second note is vibrational and amplitude modulated. In paired calls, the first note of the second call possesses relatively rich harmonic structure (up to five distinct harmonics of the fundamental frequency); remaining notes may have up to three harmonics.

The Gigante Island group endemic *P. insulatus* still persists despite near complete removal of original vegetation on the islands in this small land-bridge archipelago. *Platymantis insulatus* calls from crevices and small cave openings in limestone cliffs and outcrops following heavy rains. The mating call of this species is pulsed and highly amplitude-modulated, consisting of a long pulse train, with a gradually increasing pulse rate and decreasing interpulse interval throughout the call until concluding with an extremely rapid final burst of pulses. Each pulse possesses four distinct frequency components and two separate subpulses; examination of expanded waveforms indicates that each pulse is also a brief descending frequency sweep.

We compare the mating calls of each species to other taxa in the previously-defined species group to which each belongs and we note call characteristics that uniquely diagnose each species. Call bioacoustics are powerful techniques for studying species-specific behavioral and neurophysiological attributes of Philippine frogs; we expect that several more endemic Visayan species may be discovered in the near future through on-going application of these techniques to problems in Philippine frog taxonomy and behavioral ecology. **(Author's abstract)**

- 0153 The implications of decentralization for integrated coastal management sustainability in the Philippines
 . Sievanen, Leila **Silliman Journal**, , 44(1):230-264

In 1991, the Philippines passed the Local Government Code (LGC) which transferred many coastal management responsibilities from the Central Government to Local Government Units (LGUs). Based on a decentralization framework proposed by Cohen (1999), this paper compares two case study sites to determine the effects of two forms of decentralization on coastal management outcomes and resulting sustainability implications. Mabini-Tingloy, a popular tourist destination, is used to represent a case of "institutional pluralism" while Bais bay is used to illustrate a case of a "distributed institutional monopoly." While decentralized approaches are often critiqued for limited resources, failure to encourage commitment of local officials, lack of coordination between groups, and low local-level technical and managerial capacity, this paper argues that a situation of institutional pluralism has the potential to better allow non-central and private sector institutions and firms to carry out task-related roles more accountably, effectively, and efficiently than governmental institutions holding monopolies over public sector tasks. In the Philippines, these institutions must have a good relationship with the LGU since LGUs have a great deal of political power in the current framework. Task will be carried out more accountability, effectively, and efficiently in situations with an accountable private sector, political space necessary to accomplish public sector task, and an expressed agenda to accomplish these task. **(Author's abstract)**

- 0154 Third cropping residual effectivity of inoculant in combination with NP fertilizer on the growth and yield of mungo. Pahm, Kundo E., Canoy, Evelyn C.. **USM Research Journal**, , 2(1):13-32

The residual effects of inoculant with varying rates of NP fertilizer did not differ significantly on the third cropping. However, the third seed crop exceeded the first and the second cropping in terms of growth parameters such as plant height, growth increment, number of leaves formed, total dry matter yield and bean yield.

NP fertilizer. Agriculture. Mungo growth and yield. Cropping residual effectivity of inoculant.

- 0155 Tolerance of corn to some insecticides for corn borer control. Gergon, Henry S., de los Santos, Roy B.. **USM Research Journal**, , 3(1):23-33

This study was conducted to determine the rate of monocrotophos, cypermethrin and fenvalerate which could effectively control corn borer; the levels of insecticides that can cause phytotoxicity in corn; the best time to apply chemical after corn emergence; and, the rates that could effectively control corn borer.

Slight phytotoxicity was the effect shown by cypermethrin, monocrotophos and fenvalerate during the early stage of corn when applied at rates higher than recommended for insect control. No phytotoxic effect was observed on corn plant at 65 DAE. Fenvalerate was observed to be effective in controlling corn borer even at lower rates as shown by lesser number of tunnels and borers per plant. Monocrotophos effectively controlled corn borer at higher rates. Cypermethrin was the least effective.

Agriculture. Corn borer control. Insecticide tolerance. Corn .

- 0156 Use of salt (sodium chloride) as fertilizer for coconut. Magat, Severino S.. **Technology!**, , 10(4):1-15

A nationwide survey conducted by the Philippine Coconut Authority (PCA) revealed that 24 out of 54 coconut-producing provinces have widespread chlorine deficiency.

The application of sodium chloride (NaCl) or common table salt can effectively control this problem. Its addition to chlorine-deficient 'Tugbok' soil (Typic Tropudalfs) planted to local tall, 'Laguna' coconut trees increased nut production, copra weight/nut, and copra yield/tree. Moreover, NaCl has been established as the best and cheapest source of chlorine in areas where chlorine is required and potassium (K) is not deficient.

The most economical rate of 1.76 kg NaCl/tree per year resulted in 36.6% increase in nuts, 44.8% increase in copra/nut and 96.7% increase in copra/tree. A net income of P11,258.50/ha per year could be generated if this technology is used.

Agriculture. Coconut production. Salt (sodium chloride) as fertilizer.

- 0157 Utilization of local materials for the manufacture of fireclay refractories. Franco, Samuel S.. **Transactions of the National Academy of Science and Technology Philippines**, , :366

Fireclay is a basic refractory consisting of primarily hydrated alumino silicates with a silica (SiO_2) content of up to 78% and an alumina (Al_2O_3) and other minor constituents remaining not more than 38%. Fireclay materials vary widely in composition and in properties. Generally, firebricks based on kaolin show higher refractoriness and load resistance. Increase in the porosity of firebrick reduces the amount of spalling that occurs. Resistance to chemical attack is reduced with increasingly porosity. It is believed that a higher Al_2O_3 content increases the resistance to attack by molten materials that contact the refractory materials.

Local clay materials and river sand were used in the formulation of the different refractory bodies. To increase the porosity and refractoriness of the refractories, local materials were used like saw dust, rice hull ash and coal. The proportions of the organic materials range from 2 to 10%. The refractories were fired at 1050°C , 1150°C and 1200°C . Slabbing was used in the making of refractories.

Local clay materials were found to be suitable for the manufacture of refractories for the construction of kilns of low firing ceramic products as well as for bakeries.

The porosity and the degree of refractoriness of the materials are directly proportional to the organic content. However, the strength of the refractories is inversely proportional to the organic materials added. The firing temperature of 1150°C was found to be the optimum temperature for firing refractories for local application. **(Author's abstract)**

- 0158 Utilization of local red clay for the production of terra cotta by slip casting. Rivera Virtudazo, Raymond V., Pugat, Coronaly, Puyaoan, Alma, Tamayo, Bernie, Esquierdo, Cristeta, Apollo, Ben Ezra, Dejeeto, Rodrigo V.. **Transactions of the National Academy of Science and Technology Philippines**, , :364-365

Majority of local red-firing clays do not fit the slip casting method because red clays have a very complex behavior.

The study of casting properties of local red clays is deemed important to address the need of ceramic small company to find local red clay casting bodies with stable rheological properties, behavior and low production cost. The development of local red clay with identified fillers will provide a relative inexpensive raw materials or finish product and create additional income to the

community.

This research study focused on the development in casting behavior of the local red clay (Ilocos Norte) for Nangguyudan red clay, Macayepyep red clay and Baligat red clay. Slip casting method was used in order to evaluate the experimental red clay (Nangguyudan, Macayepyep and Baligat red clay) for the development of Terra Cotta Product.

Result of the study show that Nangguyudan and Macayepyep red clays exhibit good casting properties based on the fluidity, physical properties and the experimental product that was produced in the research study. However, Baligat red clay can be costable at formulation 70:30 (clay – sand ratio) provided that it will follow specific procedure for casting methods. **(Author's abstract)**

Fluidity. Local red clays. Slip casting. Terra cotta.

- 0159 Variations in karyotypic characteristics of different breed groups of water buffaloes (*Bubalus bubalis*). Bondoc, Orville L., Flor, Ma. Carmela Grace T.. **Transactions of the National Academy of Science and Technology Philippines**, , :309-310

Karyotype analysis was carried out on blood samples of 106 water buffaloes (45 males and 61 females) belonging to different breed groups (i.e., Philippine Carabao, Murrah, and crosses among them), using the Leucocyte Culture Technique. The modal chromosome numbers of the Carabao, F₁ 50% Murrah - 50% Carabao, 75% Murrah - 25% Carabao, and purebred Murrah are 2n = 48, 49, 50, and 50, respectively. Diploid chromosome numbers equal to 48, 49, and 50 were observed in the F₂ (i.e. inter se among F₁ 50% Murrah - 50% Carabao). Carabaos have larger metacentric chromosomes than the Murrah. The "4/9 Tandem fusion" was evidenet in the 50% Murrah - 50% Carabao. Chromosomal aberrations in the form of gaps and/or breaks, were mostly noted among the crosses. Preliminary results of the ordinary least square analysis showed considerable genetic variability in karyotypic characteristics (i.e. chromosome number, centromeric index, arm ratio, and relative length) within and between breed groups. The practical use of karyotypic characteristics in the local testing and selection of water buffaloes would, however, require analysis of more individual animal performance data to reveal significant correlation with estimated breeding values (EBVs) for particular production and reproduction traits. **(Author's abstract)**

Water buffaloes (*Bubalus bubalis*). Chromosome number. Chromosomal aberrations. Centromeric index. Arm ratio. Relative length. Genetic variability.

- 0160 Viscosities of pure and binary mixtures of methyl laurate, methyl myristate and methyl palmitate at 30, 40, 50, 60, 70, 80, 90 °C. Saquing, Carl D., Arquiza, Apollo C., Azul, Jeff. **Transactions of the National Academy of Science and Technology Philippines**, , :362-363

The viscosity was measured for the pure, binary mixtures for the lauric, myristic and palmitic methyl esters (ME) and mixture for at least five MEs, at

temperatures 30, 40, 50, 60, 70, 80, 90°C and a pressure of 1 atm using a capillary flow method equipped with a Ubbelohde viscometer. The data measured already are many (about 80 data points) and of exceptional quality, having relative standard deviations not exceeding 4.0% representing at least three trials for each data point.

Results showed that viscosity decreased with increasing temperature, but increased with increasing chain length. The measurements were correlated with Fulcher and Andrade equations for pure MEs, and Arrhenius and Nissan-Grunberg equations for binary mixtures. All the equations gave a very satisfactory fit to the viscosity of the pure and liquid mixtures studied. In each case, no percentage difference was greater than 4% between experimental and calculated results.

A generalized equation and a graph relating viscosity to the number of carbon atoms and temperature were developed. Such an equation and graph would be useful in predicting the viscosity of any methyl ester given the number of carbon atoms and temperature. Initial results manifest that very good prediction is achieved at higher temperatures, while more improvements are to be desired at lower temperatures. This may be due to the fact that non-idealities by virtue of stronger molecular interactions are more pronounced at lower temperatures. Further studies are being done to incorporate this in the model. The Grunberg-Nissan interaction energy constants are also reported, along with their analyses.

Finally, the viscosity of the methyl ester mixture produced from coconut oil was found to be closest to the binary mixture of 70% methyl laurate and 30% methyl myristate, hence can be a good approximation to the multicomponent mixture. **(Author's abstract)**

Viscosity. Ubbelohde. Viscometer. Methyl esters. Methyl laurate. Methyl myristate. Methyl palmitate. Mathematical model. Equipment design. Generalized equation. Carbon atom.

- 0161 Volatilization losses of nitrogen from urea and ammonium sulfate from selected soils of Bukidnon. Sarcauga, R., Melodia, F.. **CMU Journal of Science and Technology**, , 3(1):242-253

A study of the volatilization losses of nitrogen from urea and ammonium sulfate was made using four Bukidnon soils namely; Adtuyon clay, Maapag clay, San Manuel Silt loam, and Kidapawan clay loam.

The fertilizers were applied at the rate of 100 kg N/ha by surface application and by mixing them with soil under upland and submerged condition. Lime was applied to both soil conditions.

Results showed that urea was more volatile than ammonium sulfate from all types of soils and under all soils conditions considered in the study.

More $\text{NH}_3\text{-N}$ volatilized from aerated soils taken from submerged soils. Likewise more $\text{HN}_3\text{-N}$ volatilized from the lime than from the unlimed. More $\text{NH}_3\text{-}$ losses were observed from surface application compared with mixing with the soil.

Nitrogen volatilization losses. Urea and ammonium sulfate. Agriculture.

- 0162 Voltammetric determination of lead and mercury using carbon paste electrodes modified with water hyacinth, *Eichhornia crassipes* (MART) SOLMS.. Hernandez, Princess C., Santos, Jose H., Revilleza, Ma. Jamela R., Flavier, Maxima E.. **Transactions of the National Academy of Science and Technology Philippines**, , :367-368

Water hyacinth, *Eichhornia crassipes* (Mart.) Solms., considered as one of the world's worst weeds, can cause reduction of water flow and restrictions in commercial fishing. However, these plants were reported to accumulate metal ions, a property explored in the present research to address monitoring of heavy metals. This study describes the use of a carbon paste electrode modified with the roots of *Eichhornia crassipes* (CPEMEC) for the determination of heavy metals such as lead and mercury by differential pulse anodic stripping voltammetry (DPASV). Water hyacinth obtained from Laguna de Bay was freeze dried to preserve the integrity of the metal-binding sites. The modifier was mixed with carbon powder in a 1:5 ratio and mineral oil added to form a paste. This was packed inside a 2-mm diameter polyethylene tube and a copper rod was inserted to provide electric contact. The CPEMEC was used in the voltammetric measurements of Pb(II) and Hg(II) in aqueous solutions. For lead analysis, the sensitivity and detection limits were found to be $6 \text{ iA}/10^{-6} \text{ M}$ and $3.0 \times 10^{-9} \text{ M}$, respectively. On the other hand, mercury (II) analysis gave a sensitivity of $10 \text{ iA}/10^{-6} \text{ M}$ and a detection limit of $1.2 \times 10^{-8} \text{ M}$. Voltammetric response was optimized with respect to electrode composition, accumulation time, deposition time, pH, and deposition potential. DPASV using the modified electrode was used in the analysis of actual laboratory samples. The result obtained by DPASV was compared with standard AAS method and was found to be 30% lower. The ability of water hyacinth to accumulate metals was attributed to the ion-exchange properties of various functional groups present in the plant material. The ion exchange capacity of *Eichhornia crassipes* roots was also determined and found to be 2.72 G 0.21 meq/g using atomic absorption spectrometry (AAS). **(Author's abstract)**

Anodic stripping. Voltammetry. Carbon paste electrodes. Heavy metal analysis. Chemically-modified electrodes. Ion-exchange voltammetry.

- 0163 Yield response of ubi to different levels of np and k. Bayot, Ariel. **Plant Industry Bulletin**, , 9(2):38-41

The study was conducted for two cropping seasons at different locations (Farmer's Field), to determine the yield response of ubi to different levels of NPK application and to know the best rate of fertilizer application that will give the highest yield in terms of economic return.

The results of two cropping season trial revealed no significant differences on yield and other agronomic characteristics. However, it was observed that ubi plant when fertilized at a moderate amount of complete fertilizers (9-11 bags) per hectare can give a better yield with a viable net return.

Application of 9 bags (450 kgs.) complete fertilizer per hectare yielded 18.23 tons with an ROI of 175.25%, followed by the application of 2 bags (100 kgs.) urea per hectare (control) with a yield of 13.6 tons and gave an ROI of 150.78% and 113.6% respectively.

Agriculture. Ubi. Yield response. NP and K levels.

0164 Zinc fertilization in lowland rice. **Technology!**, 2(9):1-12

Zinc deficiency is a widespread nutritional disorder of lowland rice in the Philippines. About 2 million hectares of flooded rice lands are zinc deficient, a major cause for reduced palay yields in these areas.

Zinc deficiency in the Philippines was first observed in flooded rice fields of Agusan provinces in Mindanao. The entire wetland areas in Agusan are affected.

The malady is steadily increasing nationwide with the intensification of irrigated rice production and use of concentrated fertilizers.

Irrigation waters in the Philippines contain considerable calcium (lime). This lime remains as residue after transpiration and evaporation of irrigation water. Thus, the pH or alkalinity of lowland rice soils is consequently increased. High alkalinity fixes the zinc in the soil in forms not available to the rice plant.

Deficiency occurs in high pH (alkaline) or calcareous soils, very poorly drained mineral and organic soils. The symptoms in the rice plant are reddish brown discoloration of the foliage, stunting and delayed maturity.

The technology to correct zinc deficiency was developed and verified through series of studies conducted by the International Rice Research Institute and the Bureau of Soils since 1968 and through evaluation and extension teaching farm trials by the Bureau of Agricultural Extension since 1977.

The corrective measure for zinc deficiency is simple. Zinc is merely added to the plant or soil. The Masagana 99 National Rice Production Program recommends the broadcasting of 5 kg/ha of zinc sulfate with the use of varieties tolerant to zinc deficiency or 2% to 4% zinc oxide root dip.

Water consideration is the possible basis of recommendation of 10 kg of zinc sulfate per hectare for the moderately tolerant varieties such as the IR 42. Preliminary research results indicate that yields of moderately tolerant varieties can be increased by one ton (23 cavans) per hectare with the use of 10 kg of zinc sulfate.

In 1979, around 200,000 hectares or 11% of the 1.8 million hectares of irrigated rice lands in the country were treated with zinc, mostly with 5 kg zinc sulfate.

Data from Masagana 99 program indicate that the use of zinc increased rice yield by an average of 15 cavans per hectare. This increased the 1979 Philippine national palay production by 3 million cavans (130,000 M.T.) worth approximately P170 million. The total zinc applied costs P 6 million at the farm. This simple technology will surely boost farmers' income in lowland rice areas.

Agriculture. Zinc fertilization. Lowland rice.

BIOLOGY

- 0165 16S mitochondrial ribosomal RNA gene sequences. Monje, Virginia D., Ward, RYK, Olivera, Baldomero M., Cruz, Lourdes J.. **Philippine Journal of Science**, , 128(3):225-237

The sequences of a 16S r RNA gene segment in mitochondrial DNA from seven *Conus* species were determined. The resulting phylogenetic tree indicates that *Conus californicus*, a non-selective predator is most unrelated to the other *Conus* species. Three putative fish hunting species were found to be more closely related to each other, despite different shell morphology and geographical distribution. The results are consistent with several lineages of vermivorous *Conus*: the two worm-hunting species, *C. distans* and *C. rattus* do not appear more closely related to each other than to other *Conus* analyzed. The data provide preliminary evidence consistent with the fish-hunting species being more closely related to the snail-hunting *Conus bandanus* than to any of the worm-hunting species. **(Author's abstract)**

Conus phylogeny. 16S rRNA. Mitochondrial DNA. Molecular evolution. Biology.

- 0166 Atomic absorption spectrometric determination of mineral elements in mammalian bones. Udoh, Anthony P.. **Philippine Journal of Science**, , 129(2):115-123

The phosphorus content of the major bones of male and female selected mammals was determined using the yellow vanadomolybdate colorimetric method. For each animal, the bone with the highest phosphorus content was used as pilot sample. Varying concentrations of strontium were added to solutions of the ashed pilot samples to minimize phosphorus interference in the determination of calcium and magnesium using flame atomic absorption spectrophotometry operated on the air-acetylene mode. At least 6,000 ppm (0.6%) of strontium was required to give optimum results for calcium. The amount of magnesium obtained from the analysis was not affected by the addition of strontium. with the incorporation of strontium in the sample solution, all elements of interest can be determined in the same sample solution. Based on this, a procedure is proposed for the determination of calcium and other elements in bones. Average recoveries of spiked calcium and magnesium were 97.85% and 98.16%, respectively at the 95% confidence level. The coefficients of variation obtained for replicate determinations using one of the samples were 0.00% for calcium, lead and sodium, 2.93% for magnesium, 3.27% for iron and 3.92% for zinc at the concentration levels found in that sample. Results from the proposed procedure compared well with those from classical chemical methods at the 95% confidence level. It is evident that calcium, phosphorus, magnesium and sodium which are the most abundant elements in the bones are distributed in varying amounts both in the different types of bones and different animal species, although the general trend is $Ca > P > Na > Mg$ for each bone considered. The calcium - phosphorus ratio is generally 3:1. The work set out to propose an atomic absorption spectrometric method for the multi-element analysis of mammalian bones with a single sample preparation and to study the distribution pattern of these elements in the bones. **(Author's abstract)**

Phosphorus interference. Bone minerals. Distribution. Calcium-phosphorus ratio. Biology.

- 0167 A botanical study of some underexploited medicinal plants. Roderos, Remedios R., Reyes, Pauline T., Toledo, Dawn P.. **Transactions of the National Academy of Science and Technology Philippines**, , :329-330

Four underexploited species of plants with medicinal value namely, *Centella asiatica* (Linn.) Urban. *Heliotropium indicum* Linn., *Phyllanthus niruri* Linn. and *Stachytarpheta jamaicensis* (Linn.) Vahl were studied. These plants are common weeds found in waste lands.

Ethnobotanical information, particularly from inhabitants of Capiz and Isabela, revealed that these plants are extensively utilized in rural areas for the treatment of numerous skin diseases (*C. asiatica*), respiratory diseases (*H. indicum*), liver diseases (*P. niruri*) and digestive system disorders (*S. jamaicensis*). Morphological and biochemical data deemed valuable in the medical and pharmaceutical fields for scientific study and identification of active components were obtained. Histochemical tests showed that vegetative as well as reproductive parts of all the species were positive for alkaloids, tannins, glucosides and saponins. Protein profiles of the different plant organs and isozyme banding patterns of leaf proteins were generated using polyacrylamide gel electrophoresis (PAGE). **(Author's abstract)**

Polyacrylamide gel electrophoresis. Alkaloids. Tannins. Saponins. Glucosides. Ethnobotanical. Isozyme.

- 0168 Detection of putative tungro resistance genes in rice through mRNA differential display. Romero, Gabriel O., Solis, Renando O., Uera, Raynato B.. **Transactions of the National Academy of Science and Technology Philippines**, , :329

Tungro continues to be the most devastating rice disease, affecting many of the modern varieties including the widely popular IR64. This study aims to identify and clone the genes for resistance against rice tungro virus (RTSV), the primary causal viral agent, to be used in the genetic engineering of tungro resistance (R) in the modern varieties. We have identified potential R-related genes from examining the differentially displayed messages between two near-isogenic lines namely, TN1 (susceptible) and T1-11-8 (resistant). T1-11-8 contains the resistance gene(s) from an Indian landrace ARC11554. At 21 days after sowing, the R and S plants were inoculated with viruliferous green leafhopper for three days under mylar cage. At 20 days after inoculation, the R and S plants were phenotyped by ELISA method. At 21 days after inoculation, RNA was extracted and subsequent cDNA synthesis, PCR amplications and gel electrophoresis were performed. Together with oligo (dT)G, four out of 20 arbitrary primers showed differential PCR products between the T1-11-8 (R) and the TN1 (S) lines on the agarose and polyacrylamide gels. The R-specific bands may represent R-related genes and are now under intensive cloning efforts. **(Author's abstract)**

Rice tungro spherical resistance. PCR. ELISA. ARC11554. TN1.

- 0169 Development of DNA extraction protocols for forensic applications. Paraguison, Rubigilda, Altea, J., Penaranda, M., Miranda, Jasmin Jiji. **Transactions of the National Academy of Science and Technology Philippines**, , :332

Whole blood and body fluids such as saliva and urine are the samples of choice in routine human DNA testing. In forensic casework however, samples may be hard material e.g. bones and teeth, or archival samples e.g. paraffinized or formalin-fixed tissues. This work involved the development and optimization of DNA extraction protocols that may be used when processing these alternative materials. Using simulated casework, a protocol consisting of (1) decalcification in EDTA for bones and teeth or deparaffinization in xylene for embedded materials; (2) proteinase K and lysozyme treatment; (3) organic solvent extraction; and (4) salting-out and isopropanol precipitation, was optimized to give high-quality DNA extracts that are amenable to PCR-based typing and RFLP analysis. Typically, the whole procedure can be completed in 2 days and cost of extraction is estimated at less than P20/sample. This procedure is a feasible and efficient alternative to expensive kit-based extraction methods. **(Author's abstract)**

DNA extraction. Forensic science. Human DNA testing. Molecular genetics.

- 0170 Directions of systematic entomology in the Philippines. Baltazar, Clare R.. **Transactions of the National Academy of Science and Technology Philippines**, , :95-104

A brief history of the development of systematic entomology in the Philippines is presented. Early collections, descriptions and nomenclature of Philippine insects were done by foreigners, mostly from Great Britain, Germany and the United States of America. Japanese workers on Philippine materials came much later starting in the 1960s.

It was only after World War II (1950s) that Filipino taxonomists/systematists began to study groups of economically important insects and mites. Twelve to fifteen systematists in the entire country have their respective specializations but these experts could not study all of the 20,000 or more species of insects and mites existing in the country.

The orders of insects are tabulated together with the number of species and subspecies under each order. Priorities in future studies should be in orders Coleoptera, (beetles and weevils) and Lepidoptera (moths). Other recommendations are enumerated.

The most critical problem is how to attract, train and nurture promising scientists who will be the future insects systematists. **(Author's abstract)**

Biology. Coleoptera. Lepidoptera. Systematic entomology.

- 0171 Discovering the leafminer species of the Cordillera Administrative Region. Baucas, Nicasio S., Scheffer, Sonja J., Joshi, Ravindra C., Verzola, Elizabeth A.. **Transactions of the National Academy of Science and Technology Philippines**, , :287

Since the first outbreak of leafminer on fields planted to 1,000 hectares of potato crop in 1999 at Loo, Buigas, Benguet Province, they have continued to wreck chaos to the vegetable and ornamental crops in the other locations of the Philippines highlands at the Cordillera. We present activities initiated by PLMTF with leafminer specialists around the world. In collaboration with the United States Department of Agriculture (USDA) and leafminer specialist from France, Japan and United Kingdom, four species of leafminers were discovered in Cordillera Administrative Region (CAR), using most modern molecular technique (DNA sequence data) and all known taxonomic (morphological) keys. Leafminers identified were *Liriomyza chinensis* (Kato). However, *L. huidobrensis* was the most abundant, widely distributed, and particularly injurious to many highland vegetables, including cut flowers. Molecular analysis of *L. huidobrensis* specimens from CAR provinces, showed that they were much more similar to the *L. huidobrensis* in South and Central America than they were to *L. huidobrensis* in California and Hawaii. Interestingly, all the four leafminer species are exotic insects pests in CAR.

Currently leafminer management campaign is being strengthened by educating farmers to reduce the misuse and abuse of pesticides, lower cost of cultivation, and minimize exposure to pesticides through networking and other information channels. **(Author's abstract)**

Networking. Genetic Analysis. DNA sequence. Vegetables. Leafminers. Cordillera Administrative Region. Biology.

- 0172 Diversity and foraging behavior of insect pollinators of vegetable crops in selected farms of Nueva Ecija. Castro, Epifania P., Tumibay, Virginia C., Alberto, Annie Melinda P.. **Transactions of the National Academy of Science and Technology Philippines**, , :279

A study on the diversity of insect pollinators of vegetable crops in selected farms in Nueva Ecija was conducted to survey and assess the diversity of insect pollinators and to observe the foraging behavior of pollinators.

The insect pollinators were observed on the flowers of seven species of common vegetable crops such as garlic, red pepper, corn, radish, onion, red bell pepper and string beans in selected farms of Nueva Ecija. Their foraging behavior was observed from 0600H to 1800H for every vegetable crop. Foraging activities of the pollinators were studied according to the direction and duration of pollinators on the individual flower and within and between inflorescence.

Ten (10) species of insect pollinators were identified and classified under three orders, seven families and ten genera. Among these pollinators, *Hymenita recurvalis* recorded the highest value in density, dominance, frequency and importance value followed by *Menochilus sexmaculatus*.

The study found out that all pollinators randomly visited the flowers. Some of them stayed for a longer period of time but some are not. It was also

observed that pollinators continue to forage and visit the flowers even though they were already visited by other pollinators. However, the pollinators preferred to stay in flowers which were not yet pollinated due to the presence of nectar and pollen that serve as good sources of food for them.

Based on the study conducted, few species of pollinators were present in the different selected farm of Nueva Ecija due to the use of insecticides and other pesticides which could harm the pollinators. **(Author's abstract)**

Inflorescence. Vegetable crops. Diversity. Insects. Importance value. Pollinators. Flowers. Foraging behavior. Biology.

- 0173 Diversity of Philippine derby spiders *Neoscona* species (araneidae, aranea). Barrion, Adelina A., Barrion, Aimee Lynn A., Barrion, Alberto T.. **Transactions of the National Academy of Science and Technology Philippines**, , :280

An extremely abundant group of animals constituting a considerable portion of the Philippine fauna are the spiders, the most omnipresent and numerous predators in both agricultural and natural ecosystems. Aside from being predators, *Neoscona* species in particular are popularly utilized as derby spiders or game spiders. Through vial-tapping and net-sweeping, a total of 619 derby spiders, consisting of 80% adults (604) and 20% immature (15), were collected. Majority of the adult derby spiders were females (98%) and these were the ones used for identification. Based on epigyneal characteristics, 11 different species in the genus *Neoscona* were determined, characterized and described namely: *Neoscona nautica* (L. Koch), *Neoscona punctigera* (Doleschall), *Neoscona rumpfi* (Thorell), *Neoscona theisi* (Walchener), *Neoscona vigilans* (Blackwall), *Neoscona aldinei* Barrion f., sp. nov., *Neoscona ampoyae* Barrion f., sp. nov., and *Neoscona facundoi* Barrion f., sp. nov., and *Neoscona lipana* Barrion f., sp. nov., *Neoscona marauoyi* Barrion f., sp. nov., and *Neoscona shereeeae* Barrion f., sp. nov. The most frequently encountered derby spider was *N. punctigera*. **(Author's abstract)**

Vial-tapping. Net-sweeping. f. - filia. Araneidae. Araneae. Epigyneal characteristics. Derby spiders. Predators. *Neoscona*. Biology.

- 0174 The effect of using pelletized media on α -amylase production by solid-state fermentation in an aerated packed-bed bioreactor. Arquiza, Apollo C., Jose, Wilfredo I.. **Transactions of the National Academy of Science and Technology Philippines**, , :360

Biotransformation processes, when compared to their chemical counterparts, offer the advantages of high selectivity, mild operating conditions, and the use of a wide variety of inexpensive raw materials (e.g. agricultural wastes). Most industrial fermentation use the submerged fermentation process (SmF) but another technique, solid state fermentation (SSF), is considered as a promising alternative for some biotransformation processes because of its advantages over SmF.

The study investigated the effect of using palletized media on the

performance of an SSF system, particularly on an aerated packed-bed bioreactor. The SSF utilized *Aspergillus oryzae* grown on a rice bran-cassava starch medium (10:1 mass ratio) to produce α -amylase. The palletized medium had an effective diameter of 5 mm compared to less than 0.833 mm for the unpelletized one. The column bioreactor used had a diameter of 100 mm and a bed height of 165 mm (total bed volume of 1.3 dm³). at an aeration rate of 1.20 vessel volume per minute (vvm) and 84 hours fermentation time, the palletized medium gave a yield of 589 dextrinizing unit (DUN)/(g dry medium) compared to 179 (DUN)/(g dry medium) for the unpelletized medium at the same conditions. Compared to that reported for SSF in static trays, the palletized medium gave 6.52 greater value. At 3.40 vvm aeration rate, the yield (palletized medium) was 611 DUN/ (g dry medium), which was 1.55 times that for the unpelletized medium and 6.76 times that for trays.

The effects of aeration rate and length of fermentation were further investigated for the palletized medium. The results show that the yield of α -amylase did not vary significantly ($\alpha=5\%$) for aeration rates of 1.20, 2.06, 2.81, and 3.40 vvm. A fermentation time of 120 h produced an α -amylase yield that was 60% greater than that for 84 h. **(Author's abstract)**

Solid-state fermentation (SSF). Packed-bed. Bioreactor. Palletized. *Aspergillus oryzae*. Aeration. α -amylase. Enzyme. Heat transfer. Rice bran.

- 0175 Frequency of a mitochondrial DNA 9-bp deletion phenotype in Philippine ethnolinguistic groups. Miranda, Jasmin Jiji, Paraguison, Rubigilda, Datar, Francisco. **Transactions of the National Academy of Science and Technology Philippines**, , :331

The advent of DNA analysis has provided anthropologists, historians, and geneticists an objective method of assessing variation among peoples, superseding many classical anthropological, linguistical, and even biological methods. In human genome diversity research, length changes in human mitochondrial DNA (mtDNA) serve as potentially useful markers for inferring the evolutionary history of populations. A 9-bp mtDNA deletion located in the intergenic region between the COII gene and the lysine Asian populations. Using PCR technology, the presence and frequency of the 9-bp mtDNA deletion phenotype was determined in two major linguistic populations in the Philippines, Tagalog ($f=38\%$) and Cebuano ($f=24\%$), and an Ivatan ethnic community ($f=56\%$). While these data fall within the observed ranges for other Philippine populations, it is interesting to note that these differ from those previously reported for other Asia-Pacific populations. The anthropological implications may therefore be further studied by including ethnolinguistic populations in the Philippines and contributing the data to global genetic matrices. **(Author's abstract)**

Mitochondrial DNA. Philippine ethnolinguistic groups.

- 0176 Hybrids of *Allium cepa* L. x *Allium fistulosum* L. analyzed using random amplified polymorphic DNAs (RAPDs). Duka, Evan Marcelo A., Enriquez, Marileth U., Lu, Chien-an, Engle, Liwayway M.. **Transactions of the National Academy of Science and Technology Philippines**, , :328

Random amplified polymorphic DNA (RAPDS) was used to verify the interspecific hybrids of *Allium cepa* L. and *Allium fistulosum* L. Polymorphic RAPD markers were identified. Forty primers were initially used, from which thirty-one generated scorable bands. Of these, only thirteen primers showed polymorphism among the parents of the five crosses. These were then used to analyze and verify the progenies of each cross.

Hybrids of Cross CF 54 had a total of twenty-six bands, fifteen from the female and nine from the male parent. Two bands did not seem to come from either parent. Results of FC 45 cross had sixty total bands, twenty four from the female and thirty six from the male parent. Hybrids of CF 19 cross had fifty-one total bands, eighteen from the female and twenty eight from the male parent. Five bands did not seem to come from either parent. CF 1 progenies had sixty two bands, twenty four from the female and thirty three from the male parent. Again, five bands did not seem to have come from either parent. Results of CF 16 showed twenty bands, ten from each parent. The details of these crosses are hereby presented.

Results proved that RAPDS is a suitable method in verifying interspecific hybridity between the two *Allium* species. **(Author's abstract)**

RAPDS. *Allium fistulosum*. Polymorphic bands. Interspecific hybrids. *Allium* . Hybrids. Onion.

- 0177 Insects pests of bamboo shoots in the Philippines and their natural enemies. Apricho, Ma. Amabel A., Caasi-lit, Merdelyn T., Lit, Jr., Ireneo L.. **Transactions of the National Academy of Science and Technology Philippines**, , :285-286

Twelve insects were observed to attack the basal shoots (*labong*) of several bamboo species in plantation and natural stands. They were collected from the field further observed in the laboratory and identified. The primary pests include at least two species of bamboo aphids (*Pseudoregma* spp.), the bamboo shoot mealybug (*Palmicultor* sp. aff. *Bambusum* Tang), the bamboo shoot soft scale (*Coccus* sp.), bamboo pit scale [*Bambusaspid* *bambusae* (Boisduval)], an undetermined species of thrips and bamboo planthopper (*Purohita* sp.). Ants that attend to honeydew-producing pests and which cover the emerging shoots with earthen nests or bivouacs are considered secondary pests and include *Dolichoderus* sp., *Solenopsis geminata geminata*, *S. g. rufa*, *Anoplolepis longipes* Jerdon and *Oecophylla smaragdina* Fabricius.

Three species of insects were observed to prey on *Pseudoregma* spp., namely the large ladybird beetle *Synonympha grandis*, lacewing *Chrysopa* sp. and the pyralid *Cryptoblabes aphidivora*. The predatory lycaenid *Spalgis epius* Westwood attacks bamboo shoot mealybugs. An undetermined pathogen infests the bamboo planthopper. **(Author's abstract)**

Biology. Bamboo. Bamboo aphids. *Pseudoregma* spp. *Palmicultor* sp. Bamboo shoot mealybug.

- 0178 Isolation, characterization and determination of bioremediation potential of oil-degrading bacteria from the Manila bay. Lim, Sheila T., Halos, Ponciano S.M.. **Philippine Journal of Biotechnology**, , 6(1):1-12

Isolation of oil-degrading bacteria was done using Natural Sea Water (NSW)-oil media. The chemical composition of the oil, temperature, oxygen and nutrients were correlated with bacterial degradation of the hydrocarbon. Six bacterial isolates possibly from the genera *Pseudomonas*, *Alcaligenes*, *Bacillus*, *Brevibacterium*, *Corynebacterium*, and *Micrococcus* were characterized based on morphology and biochemical tests. The bioremediation potential of the isolates was determined by measuring the percentage of oil conversion. The bacterial isolates degraded a greater percentage of motor oil as hydrocarbon substrate in the medium as compared with diesel oil. Anova and t-distribution analysis showed that the values obtained for biodegradation potential were highly significant.

Biology. Oil-degrading bacteria. Bioremediation. Bacterial isolates. Manila bay.

- 0179 Isolation, enumeration and identification of oil-degrading fungi in Pasig river. Yap, Richard A., Halos, Ponciano S.M.. **Philippine Journal of Biotechnology**, , 6(1):29-40

Water and soil samples were collected along the Pasig River-EDSA and analyzed for the presence of oil-utilizing fungi. A total of 16 fungi were isolated from Pasig River by plating technique using modified Czapek Dox agar medium with the diesel oil incorporated as the only carbon source. Of the 16 isolates, 14 utilized the hydrocarbon. The development of visible turbidity by the yeasts and mycelial growth and dry weights of the mold isolates in the amended basal salts medium correlated positively with hydrocarbon utilization. Of the 14 isolates, 12 were molds and 2 were yeasts. Except for the two yeast isolates, the rest belong to the Fungi Imperfecti. Three belong to the genus *Aspergillus*, two were *Botrytis cinerea*, while the rest belong to the genera *Trichodarma*, *Aureobasidium*, *Botryotrichum*, *Goidanichiella*, *Humicola* and *Phialophora*. One fungal and two yeast isolates were not identified. The two isolates that were not able to utilize the diesel oil in the liquid medium belonged to the genus *Aspergillus*. Enumeration of population of the oil-degrading fungi showed that areas fairly exposed to hydrocarbon contamination contained a higher number of oil-degrading fungi than stations which were relatively free from oil contamination. Statistical analysis using Pearson product moment correlation showed that the prevalent pH had little effect on the population of oil-degrading fungi in Pasig River whereas temperature did not have any effect at all. However, variation in the number of colony-forming units (CFUs) is possible depending upon the prevalent weather conditions.

Biology. Oil-degrading fungi. Isolation, enumeration and identification. Pasig River.

- 0180 Membrane pores. Pasternak, Charles A.. **Transactions of the National Academy of Science and Technology Philippines**, , :187-192

Every cell in the body is surrounded by a narrow membrane that consists of lipids and proteins. The lipids provide insulation from the external environment, the proteins play an opposite role: they sense the environment and transmit information to the interior of the cell. In many cases the signals are transmitted through narrow pores across the membrane: the propagation of impulses in nerves and the contraction of muscles are examples. Different types of protein make different kinds of pore: some for the passage of specific inorganic ions like K^+ , Na^+ and Ca^{2+} , others for the passage of organic nutrients, like glucose and amino acids.

Membrane pores across the cell membrane are also induced by a variety of toxic agents. In this case the pores are non-specific and the outcome is detrimental to the life of the cell, since essential ions and molecules leak out. Agents as diverse as viruses, bacterial and animal toxins, low concentrations of detergents and other molecules cause such pores to be formed. We have found that these types of pore have certain properties in common. One is that pores are closed by divalent cations: the action of zinc in this regard may play a role in fighting off infections caused by some viruses and bacteria. Another property is that if a voltage difference is applied across the pore, current does not flow continuously, but oscillates between high and low conductance states. Such fluctuations of current are typical also of the endogenous ion channels for K^+ , for Na^+ and for Ca^{2+} , mentioned above.

In order to better understand the nature of these effects, we have studied pores created across synthetic membranes made of organic polymers like polyethylene-terephthalate (PETP). Surprisingly, these too show fluctuations of current and inhibition by divalent cations. Such results provide new insights into the mechanisms underlying the flow of ions and molecules through biological membrane pores. They also open up the possibility of using synthetic membranes in various novel situations. **(Author's abstract)**

Biology. Membrane pores. Lipids. Polyethylene-terephthalate.

- 0181 Metabolizable energy of mannanase-treated copra meal (MTCM) and growth performance of broilers fed with MTCM. Zamora, A.F., Sapin, A.B., Luis, E.S.. **Philippine Journal of Biotechnology**, , 7(1):15-24

Streptomyces sp.no.7 which produces mannanase was used to hydrolyze copra meal through solid substrate fermentation (SSF). Four liters of culture broth were inoculated to 1 kg of copra meal in a fabricated bioreactor. Analysis of mannanase-treated copra meal (MTCM) showed significant reduction in crude fiber and a significant increase in energy value. Apparent metabolizable energy, determined by forced-feeding of 8-week old male broilers, increased by more than 100% in MTCM. Feeding trial in broilers was also conducted to evaluate the performance of MTCM as feed ingredient as compared to untreated copra meal (UCM). Highly encouraging results were obtained when crude fiber reduction of copra meal was more than 25%. Feed consumption was lower in broilers fed with MTCM diets, but on the average, they had consistently greater weekly body weight gain. Expectedly, broilers fed with MTCM diets had consistently better feed efficiency compared to those fed with UCM diets.

Biology. Metabolizable energy. Copra meal. Mannanase. Streptomyces sp..

- 0182 Microsporogenesis and microgametogenesis in *Pittosporum resiniferum* Hemsl. (Petroleum nut plant). Tolentino, Vivian S., Zamora, Prescillano M.. **Transactions of the National Academy of Science and Technology Philippines**, , :330-331

This study aimed to trace the series of events that takes place during male sporogenesis and gametogenesis and to classify the type of development in *Pittosporum resiniferum*. The differentiation of the male reproductive structure was also studied. For the process of microsporogenesis and microgametogenesis, smears of pollen from the anther was used and prepared. The modified paraffin technique was followed in the study of the development of the microsporangium.

Results showed that the young anther had a homogenous mass of meristematic cells bounded by an epidermis. As the anther primordium became four-lobed, a 3 cell wide hypodermal archesporium became differentiated in each of the four lobes and the cells showed dense cytoplasm and conspicuous nuclei. The archesporial cells divided periclinally forming a parietal layer of cells towards the outside and the primary sporogenous layer of cells towards the inside. The primary parietal cells divided periclinally and anticlinally giving rise to the endothecium, middle layer and tapetum. The primary sporogenous cells underwent a few mitotic divisions, enlarged and differentiated to form the microspore mother cells. The microspore mother cells underwent meiosis to form the microspore tetrads, which were tetrahedral in arrangement. Cytokinesis is by furrowing and is of the simultaneous type. Each of the microspore tetrads separated, enlarged, and finally differentiated. Each microspore underwent nuclear divisions. The first nuclear division gave rise to a large vegetative cell and a small generative cell. The second division, which involves only the generative cell, gave rise to two sperm cells. The pollen grain was shed in a three-nucleate stage. The pollen grains are tricolpate with smooth exine and on inner intine. Abnormal pollen grains, which were shriveled in shape, were also observed.

Results from the study can be used as a tool in determining sterility/fertility in pollen grains, which can be used as baseline data in genetic engineering methods. It can also provide baseline data for use in research on pollen gene expression in the isolation and characterization of genes involved in pollen development. **(Author's abstract)**

Archesporial cells. Endothecium. Exine. Gametogenesis. Generative cell. Intine. Microspores. Sporogenesis. Tapetum. Tricolpate. Vegetative cell.

- 0183 Multiple bromotryptophan and γ -carboxyglutamate residues in a *Conus* Peptide. Lirazan, Marcelina B., Grey Craig, A., Shetty, Reshma, Walker, Craig S., Olivera, Baldomero M., Cruz, Lourdes J.. **Philippine Journal of Science**, , 128(3):239-246

A novel peptide was purified from *Conus textile* venom which caused

hyperactivity in mice. The 31-amino acid peptide has six residues with unusual post-translational modifications: four γ -carboxyglutamates and two brominated tryptophan residues. This peptide, which we have designated the dibromorunning peptide, is the first known gene product with multiple bromotryptophan residues. We discuss the apparent non-random association of γ -carboxyglutamate and bromotryptophan in *Conus* peptides. **(Author's abstract)**

Conotoxin. Bromotryptophan. γ -carboxyglutamate. Hyperactivity. *Conus* textile. Post-translational modification. Biology.

- 0184 The natural enemies of captive bred and range butterflies. Bayot, Rolando G., Padilla, Carlos L., Cayabyab, Bonifacio F., Adorada, Jessamyn R.. **Transactions of the National Academy of Science and Technology Philippines**, , :283

Range butterflies live freely in their respective habitats i.e., plain meadow, forest and orchard while captive bred butterflies are grown inside enclosures or in butterfly houses. Both group of butterflies are attacked by natural enemies.

Field observations on natural enemies of range butterflies was done in Tarlac, Marinduque, and Laguna. Larvae and pupae of various butterflies were collected and natural enemies were monitored. Captive bred larvae and pupae were likewise monitored. This study was conducted at UP Los Baños from 1998-2000.

The natural enemies of range butterflies are birds, hymenoptera and diptera parasitoids, nuclear polyhedrosis, virus, bacteria, fungi, hemiptera and spider predators. On the other hand, the natural enemies of captive bred butterflies are viruses, bacteria and fungi. Red and black ants are most serious insect natural enemies. The rest of the above mentioned natural enemies cannot attack captive butterflies due to the net that serves as a protective sanctuary.

Experimental data on plain tiger butterfly, *Danaus chryssipus* showed that larvae and pupae of range or free flying butterflies are vulnerable to nuclear polyhedrosis virus, dipteran parasitoids and hemipteran predator. Captive bred larvae and pupae of *D. chryssipus* succumbed occasionally to nuclear polyhedrosis viruses and to ants.

The above results are invaluable to butterfly breeders particularly in producing quality livestock for trading and other purposes. **(Author's abstract)**

Ants. *Danaus chryssipus*. Captive bred. Butterflies. Natural enemies. Range butterflies. Biology.

- 0185 Optimization of growth conditions of the wild-type and mutant strains of the pleuromutilin-producing *clitopilus passeckerianus* (pilat) sing. nr1 3100. Vicente, Mark A., Raymundo, Asuncion K., Quimio, Tricita H.. **Research Journal**, , :20-27

The most suitable substrates for the growth of *C. passeckerianus* wild-type and mutant strain HP76 were found to be similar for both strains based on the extent of mycelial growth. Mycological agar (MA) was selected as a suitable agar medium while wheat bran was determined to be a suitable supplement for mycelial growth. Vegetative growth was also most vigorous on sawdust compared to the other solid substrates tested. The optimum physical conditions, in terms of temperature and lighting condition, were also similar for both strains when grown on wheat bran-supplemented sorghum grains. Air-conditioned temperature (24C) was found to support better growth in both strains compared to room temperature (29-30C). Lighting condition did not affect mycelial growth. Hyphal strands were the only structures noted in the growth of the wild type and HP76 when microscopically observed for five weeks. Oidia formation was observed on two other mutant strains, LP1 and LP2, grown using previously selected substrates and conditions.

Biology. Pleuromutilin. *Clitopilus passeckerianus*. Mutant strains. Growth conditions.

- 0186 Philippine frogs of the *Genus Platymanthis* (Amphibia:Ranidae). Alcala, Angel C., Brown, Walter C.. **Philippine Journal of Science**, , 128(4):281-287

Philippine platymantine frogs, as currently understood, belong to the genus *Platymanthis*. The Philippine species are subdivided into three groups: the *hazela*, the *guentheri* and the *dorsalis* Groups. With the exception of *Platymanthis dorsalis*, the other 25 species thus far recognized are endemic. The local distribution of the three groups varies, with the *hazela* Group exhibiting the most restricted distribution and the *dorsalis* Group the widest. No *Platymanthis* species has been recorded from the Palawan and Sulu island groups. The distribution and taxonomic data support the hypothesis that the Philippine platymantine frogs are Papuan in origin. **(Author's abstract)**

Platymanthis. *Hazela* group. *Guentheri* group. *Dorsalis* group. Murid rodents. Biology.

- 0187 Polymerase chain reaction-based technique for detection and monitoring of movement of mobile elements in *Ralstonia solanacearum*.. Bagsic-Opulencia, Rina D., Fegan, Mark, Raymundo, Asuncion K.. **Transactions of the National Academy of Science and Technology Philippines**, , :288

Ralstonia solanacearum is the causal agent of bacterial wilt, the devastating plant disease of many important crops such as banana, tomato, potato, tobacco, eggplant, ginger and peanut throughout the world. A repetitive element previously cloned from the bugtok strain of *R. solanacearum* distinguished Philippine banana strains from the vegetables strains by DNA hybridization and by Polymerase chain reaction (PCR). These primers were based on the flanking regions of this elements and were previously shown to specifically detect Philippine banana strains. In the present study, these primers were shown to also detect a peanut strain from Indonesia, *Heliconia* strain from Costa Rica and banana strains from Honduras, Costa Rica and Panama (RFLP 24), all phylogenetically related to Philippine banana strains.

Likewise in this study, the repetitive element was sequenced to determine its significance in the organism and to design primers for a more robust and rapid PCR. Analysis of the sequence revealed the presence of an insertion sequence (IS) with terminal direct and inverted repeats. Iss are mobile genetic elements which can insert multiple sites in a target molecule and cause mutation. They are sometimes associated with pathogenicity and virulence functions in plant pathogens.

Primers based on the internal region of the IS amplified a 217 bp product after 2 hr PCR compared to 8 hr using the other set of primers. The new primer set detected not only the Philippine banana strains and members of RFLP 24 but also *Heliconia* strain from Columbia, *Pothos* strains from Hawaii, anthurium strains, and banana strains from Columbia and Peru (RFLP 25). A distantly related potato strain from Peru was also detected indicating that the Iss are more widely distributed than previously revealed. The PCR primers are useful in monitoring movement of the ISs within population of *R. solanacearum* to gain better understanding of the world-wide epidemiology of this organism.
(Author's abstract)

Primers. *Ralstonia solanacearum*. Bacterial wilt. PCR. Insertion elements. Biology.

- 0188 Population dynamics of bradyrhizobium japonicum (kirchner) jordan in rice-soybean rotation. Sison, Ma. Lourdes Q., Paterno, Erlinda S.. **Philippine Journal of Biotechnology**, , 6(1):13-27

Field experiments were conducted to study the populations of indigenous and introduced strains of bradyrhizobia in soil and rhizosphere in a rice-soybean cropping sequence. Antibiotic resistant mutants of *B. japonicum* strain USDA 110 were used to inoculate the two soybean crops. Indigenous bradyrhizobia population in the soil increased 100-fold from planting to harvest of the first soybean crop while the introduced inoculant, USDA 110 SpcRif, recovered from the soil was 100 times lower. Counts of bradyrhizobia in the rhizospheres were 200 times higher than in the soil for both indigenous and introduced strains. Bradyrhizobia number in the flooded soil declined during rice growth but remained higher in the rice rhizosphere. During the growth of the second soybean crop, the first crop inoculant fluctuated from 100-10,000 cells/g dry soil in the presence or absence of the second crop inoculant (USDA 110 StrRif) whose number equilibrated around 1,000 cells/g dry soil. In the rhizosphere both inoculants maintained a population of 10 cells/g dry root in the presence or absence of competition. The first crop inoculant formed 54% of the nodules of the initial soybean crop and 28% of the nodules of the second soybean crop. With reinoculation, the first crop inoculant occupied only 17% of the nodules while the second crop inoculant dominated nodule occupancy by 43%. Results show that bradyrhizobia introduced for the first time abundantly colonized soybean roots and significantly increased nodulation, nitrogen uptake and soybean yield. The inoculum strain survived flooding of soil and persisted up to the next soybean crop after rice but failed to dominate nodule occupancy. Inoculation of every soybean crop after rice is therefore necessary to ensure successful nodule occupancy.

Biology. *Bradyrhizobium japonicum*. Population dynamics. Rice-soybean rotation.

- 0189 Population of rhizobia and mungbean response to frequency of inoculation in a rice-based cropping system. Paterno, E.S., Sison, M.L.Q., Garcia, E.S., Torres, F.G., Sutare, A.I.. **Philippine Journal of Biotechnology**, 6(1):41-53

A long term field experiment to study the response of mungbean to inoculation and persistence of rhizobia in a rice-based cropping system was conducted at UPLB from 1985 to 1990. Treatments consisted of two inoculation frequencies. In the first treatment, the inoculum was introduced only at the initial planting of mungbean. In the second treatment, the inoculum was introduced everytime mungbean was planted after rice. Mungbean cultivars Pag-asa 1 and Pag-asa 3 and *Bradyrhizobium* sp. strains M5 and M6 were used. The second and third crops of mungbean were planted after two successive rice crops. For the fourth mungbean crop, uninoculated seeds were planted in all plots after two successive rice crops. Nodulation, dry matter production, nitrogen uptake and grain yield were determined for each mungbean crop. Soil samples were collected periodically in between plants during the mungbean and rice crops. The population of rhizobia was determined by the plant infection method in a composite of five samples collected from each plot. Seeds of *Macroptilium atropurpureum* were aseptically grown in pouches and kept in a growth chamber. One week old seedlings were inoculated with 1 mL of ten-fold soil dilutions. Nodule occupancy of the inoculum strains was determined in each mungbean crop by agglutination. Inoculum strain and frequency of inoculation had no significant effect on nodulation, dry matter production, nitrogen uptake and grain yield of the first three mungbean crops planted after rice. Nodule occupancy by the inoculum strains decreased until the fourth cropping indicating decreased competitiveness. Regardless of the frequency of inoculation, the proportion of nodules formed by the inoculum decreased from 71 to 16% for M5 and from 78 to 26% for M6. The initial population of cowpea rhizobia in the soil decreased from ___ cells/g soil before planting the first mungbean crop to ___ cells/g at harvest. Flooding the field for the rice crop slightly increased rhizobial number but prolonged flooding drastically reduced their number. Population of rhizobia rose again when the soil was drained for rice harvest and the next mungbean crop.

Biology. Rhizobia. Mungbean. Population. Inoculation. Rice-based cropping system.

- 0190 Probe for differentiation of *Xanthomonas oryzae* pv. *oryzicola* and *X. oryzae* pv. *oryzae*. Raymundo, A.K., Perez, M.T.M., Leach, J.E.. **Philippine Journal of Biotechnology**, 7(1):49-52

A previously cloned amplification product generated from *Xanthomonas oryzae* pv. *oryzicola* by primers based on the upstream region of the promoter for the *hrpXoo* (hypersensitivity and pathogenicity) gene was used as probe to compare the genomes of *X. oryzae* pv. *oryzicola* and *X. oryzae* pv. *oryzae*. The clone designated as pHrp256, hybridized to a 9.4 kb BamHI fragment in different isolates of the bacterial leaf streak pathogen, *X. oryzae* pv. *oryzicola*. Likewise, a 5.4 kb BamHI fragment was detected in isolates of the closely-related rice pathogen, *X. oryzae* pv. *oryzae*. Therefore, DNA from the two microorganisms contain a size polymorphism in the BamHI fragment containing a region of the

hrpXoo promoter. The size polymorphism can be used to differentiate the two microorganisms.

Biology. *Xanthomonas oryzae*. Probe. Bacterial leaf streak.

- 0191 Purification and partial characterization of alkaline protease from *Bacillus subtilis* NRRL B-3749 (BIOTECH 1679). Centeno, R.M., Espino, T.M., Mercado, M.A.. **Philippine Journal of Biotechnology**, , 7(1):25-34

An alkaline protease was isolated from the culture supernatant of *Bacillus subtilis* NRRL B-3749 (BIOTECH 1679). Purification of the crude enzyme filtrate involved ammonium sulfate precipitation, desalting by dialysis and ion-exchange chromatography using carboxy methyl cellulose (CMC). The purified alkaline protease fraction showed a single protein band after polyacrylamide gel electrophoresis (PAGE). Enzyme assay of the single protein band showed alkaline protease activity. The purified enzyme had a molecular weight of 31,000 daltons using sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE). Chemical characterization of the purified alkaline protease showed optimum proteolytic activity at 55

Biology. Alkaline protease. *Bacillus subtilis*. Enzyme. Gel chromatography.

- 0192 Spiders. Barrion, Alberto T.. **Transactions of the National Academy of Science and Technology Philippines**, , :121-130

Spiders are economically significant arthropod predators, their most important use is in agriculture and forestry where they serve as natural biological control agents against insect pests. Of the 35,000 described species all over the world, the checklist of Philippine spiders is just 1.47%, consisting of 517 species, 225 genera belonging to 38 families grouped into two infraorders (Mygalomorphae and Araneomorphae) of suborder Opisthothelae. In Philippine rice fields, the seemingly rich spider fauna consists of 337 species under 28 families while the surrounding habitats have 70 species in 50 genera under 19 families. The Philippine spider record is the highest in the entire Asian tropical rice fields.

An ecological study of Philippine irrigated rice field reveals that 3,098 spiders belonging to 42 species are largely grouped into two functional guilds, namely, the web builders and the hunters. Among the web builders, the most diverse are the comb-footed spiders (Theridiidae); long-jawed spiders (Tetragnathidae); garden spiders (Araneidae) and the dwarf spiders (Linyphiidae).

The diverse hunters, on the other hand, are the jumping spiders (Salticidae); crab spiders (Thomisidae) and the wolf spiders (Lycosidae). In irrigated rice fields, spiders are visible on the rice canopy and above water environments during or immediately after transplanting in both wet and dry seasons. Wide array of insect preys of spiders include collembolans, dipterans, moths and butterflies, rice bugs, leafhoppers and planthoppers. Entire prey spectrum consisted of 198 species belonging to 91 families in 14

orders of Class Insecta. Predation rates of spiders are known only in 14 taxa comprising of four hunters and 10 web builders. The hunters are Lycosidae (3 species, 2 genera) and Oxyopidae (one species), while the web builders are Araneidae (2 species), Linyphiidae (1 species), Theridiidae (1 species) and Tetragnathidae (6 species). A community assemblage of these 14 taxa at anyone time consumes 65 leafhoppers, 72 planthoppers, 26 rice stem borer and leaffolder moths, 51 rice whorl maggot flies and 146 collembolans in a day. In turn, spiders serve as hosts of 15 hymenopteran parasites, two pathogens, a nematode as well as prey to bull frogs, toads, birds, ants, and wasps. Natural enemies of spiders limit their effective and efficient use in the natural biological control of rice insects pests.

To conserve spiders and optimize their innate potentials in the regulation of rice insect pests, the following provisions are recommended: (1) maintain refuge areas with diverse plants and landscapes, (2) maintain files of rice straw around rice fields, (3) avoid burning habitats surrounding rice fields, (4) avoid overgrazing rice bunds and surrounding grassy habitats, (5) avoid using herbicides on grasses around rice fields and (6) use judiciously selective insecticides against rice insect pests. **(Author's abstract)**

Biology. Spiders. Arthropod predator. Opisthothelae.

0193 SSADM system data modeler. Magboo, Ma. Shiela A.. **Transactions of the National Academy of Science and Technology Philippines**, , :265-257

Data models help ensure a good database design. However, most data modeling tools are either pure data modeling tools or have some sort of integration but is too costly for most people. To solve this problem, the author created SSADM System Data Modeler, a computer-aided software engineering (CASE) tool that supports both top-level and bottom-level approach to data modeling. The tool conforms to the nations used in Structured Systems Analysis and Design Method (SSADM) Version 4+, a technique popular in the United Kingdom that supports the analysis and design phases of information systems development [Goodland, 1995].

The objective of this study is to identify the basic data modeling features that data designers look for and to show that SSADM System Data Modeler satisfies most of these basic features.

The author enumerated the list of data modeling features of SSADM System Data Medeler and tested each to verify that the tool is indeed capable of performing the indicated features. These features include tha ability to (a) create data representation using Logical Data Models (LDM) consistent with the syntactical rules of specific method, in this case SSADM; (b) edit description about entities, relationships and attributes which further illustrate the objects, their properties and interrelationships with other objects; (c) perform normalization up to Third Norma Form; (d) integrate the results of top-level and bottom-up approach to data analysis; (e) provide consistent environment to prevent the user from performing invalid actions; (f) create the database structure of the corresponding diagram in MS Access; (g) automatically update the diagram and corresponding database whenever an operation such as create, edit or delete of entitie, relationships or attributes is

performed; (h) generate error messages in case of diagram inconsistencies; (i) help facilitate to describe how to use the software; (j) print the diagram as well as other documents supporting the diagram.

SSADM System Data Modeler satisfies most of the expectations, however, it falls short on the following aspects: (a) database platform it creates; (b) its inability to convert a legacy database to another platform; (c) the notation it supports; and (d) the number of users it accommodates. Although it has a capability to create a database structure from the resulting diagram, the resulting database platform is limited to Microsoft Access. It has no reengineering features to convert a legacy database into another platform. It supports only one notation, the SSADM notation, which is not as widely used as the other notations. It does not support the Unified Modeling Language (UML) notation which is the de facto standard for object-oriented analysis and design. It is also stand-alone, not multi-user like what most data designers want. However, despite all these limitations, SSADM System Data Modeler is still able to accomplish most of the features of a basic stand-alone data modeling tool. The resulting software can then be refined later to address most, if not all the identified limitations. **(Author's abstract)**

Data modeling. Computer-aided software engineering (CASE). Logical data structure (LDS). Logical data model (LDM). Entity relationship diagram (ERD). Structured systems analysis and design method (SSADM).

- 0194 Studies on azospirillum as bio-fertilizer for potted sweet potato in volcanic ash-laden soil. Lopez, P.J.S., Santos, T.S., Rasco, Jr., E.T.. **Philippine Journal of Biotechnology**, , 7(1):35-48

Studies on the various factors that can affect sweet potato response to Azospirillum inoculation show the following trends: Isolates. BSs 202 and Sp7 are better than BSs 8 and isolate XII. BSs 202 may be useful in less fertile soils such as in volcanic ash while Sp7 is probably suited to a wider range of soil conditions. Variety. Sweet potato varieties can be classified into three categories based on their response to the effective isolate BSs 202: strongly responsive, weakly responsive and unresponsive. Characteristics associated with each response are described and varieties falling under each category enumerated. UPLSP 1 and 88WS623 are classified as highly responsive. Method of inoculation. Both dipping of cutting in Azospirillum-carrier water suspension before planting and direct application of the Azospirillum-carrier to the soil are effective depending on the desired response and variety. Responses documented are interpreted as dosage effects with implications on modes of action of Azospirillum.

Biology. Azospirillum. Bio-fertilizer. Potted sweet potato. Volcanic ash-laden soil. Inoculation.

- 0195 A study of lung flukes from the Philippines. Hui-Lan, Zhong, Cabrera, Benjamin D., Lian-Yin, He, Zhi-Biao, Xu, Bao-Lian, Lu, Wei-Ji, Cao, Pei-Zhi, Gao. **Acta Medica Philippina**, , 17(1):16-23

The lung flukes from Sorsogon in Luzon, Philippines have the following features:

1. The cyst wall of the metacercariae are thinner than those of *Paragonimus westermani* seen in China.

2. Successful animal feeding experiments on 4 dogs and 5 cats resulted in full development of the flukes to adult stage producing ova. However, only 1 out of 10 white rats fed with the same kind of metacercariae came down with infection which, however, was very light and without passage of ova in stools.

3. A few of the adult worms show the following features which are different from those of *Paragonimus westermani* seen in China.

The ovary is 6-lobed with 1 lobe separating widely apart from the other 5 lobes.

4. The chromosome karyotyping of flukes from Sorsogon, Philippines, appear to belong to the diploid pattern.

5. The biological significance of the metacercariae with long or short excretory bladder requires further study.

6. From our preliminary studies, we are inclined to agree with the observations published by the scientists in the Philippines and Japan. But since the situation is rather complicated, further researches are necessary, particularly by means of combined investigative methods to study not only the genetics and morphology of the parasite but also the clinical epidemiology immunology and clinical characterization of the victims involved. **(Author's summary)**

Biology. Parasitology.

0196 The use of sargassum SPP. as a substrate for growing mushrooms. Corteza, Dante, Sarmiento, Chona Q.. **Research Journal**, , 10(1):2-7

Seaweeds, particularly the *Sargassum* spp., were tested as a substrate or growing medium for mushrooms. The mushroom species used was the *Volvariella volvacea*.

Three wire-boxes A, B, and C were prepared. The wire-boxes A and B had seaweed substrates that were treated differently. Wire-box C had banana leaves for comparative purpose. The set-ups were subjected under temperature control using improvised incubator.

Results of the study showed *Volvariella volvacea* basidiocarps development in wire-box B were morphologically similar with wire-box C. In wire-box A, the mycelium had established in the seaweed substrate but failed to develop into fruiting bodies.

Biology. Mushrooms. *Sargassum* spp.. *Volvariella volvacea*.

- 0197 The use of Tn 4001 mutagenesis to study cytodherence in mycoplasma pneumoniae. Hedreyda, C.T., Krause, D.C.. **Philippine Journal of Biotechnology**, , 7(1):1-14

In order to develop additional techniques for the study and genetic manipulation of *Mycoplasma pneumoniae*, the *Staphylococcus aureus* transposon Tn4001 was transformed into this mycoplasma by electroporation. A transformation frequency of 10^{-3} to 10^{-5} /colony-forming unit was observed and DNA hybridization analyses confirmed chromosomal insertion of the transposon by a transpositional mechanism in several sites. Transposon mutagenesis was also used to analyze *M. pneumoniae* cytodherence. Gentamicin-resistant transformants were screened for hemadsorption (HA) as an indicator of cytodherence. Six HA⁺ colonies from independent transformations were isolated, filter purified, and characterized in more detail with the original goal of identifying insertions within the locus that includes the genes for cytodherence-accessory proteins HMW1 and HMW3. Southern hybridization analysis revealed that all six transposon insertions mapped to the same 6.2-kbp EcoRI fragment. This site is distinct from the locus containing the genes for HMW1 and HMW3, yet these proteins were absent from the protein profiles of all six transformants. These observations suggest a potential regulatory locus that may be important in the expression of the HMW cytodherence-accessory proteins. Restriction profile analysis, PCR, and DNA sequence analysis revealed that the insertions mapped to the second of four ORFs within the P65 operon. Western immunoblotting data using antisera to fusion proteins containing part of the proteins expressed from the four ORFs revealed that second ORF where the insertions were localized is the gene for the cytodherence accessory protein HMW2, a protein that is also missing from the mutant profile. Furthermore, polar effects of the transposon on the expression of both upstream and downstream genes were observed.

Biology. Gamma irradiation. Tylosin yield. *Streptomyces fradiae* no. 93.

- 0198 USP grade lambda-like carrageenan from *Halymenia durvillaei* bory de sainte vincent (short communication). Briones, Annabelle V., Ambal, Wilhelmina O., Monroyo, Evangeline C., Villanueva, Merle A., Estrella, Romulo R., Lanto, Eduardo A.. **Philippine Journal of Science**, , 129(1):15-17

A *lambda*-like carrageenan was produced from *Halymenia durvillaei*, a red seaweed that grows widely in almost all parts of the Philippines. The extraction procedure was optimized at a seaweed to hot water ratio of 1:40 (W/V). An average yield of 29.10% was obtained using two (2) extractions followed by precipitation of the carrageenan with isopropyl alcohol. The physicochemical properties of the product conform with the standard *lambda carrageenan* obtained from Sigma Chemical Company and the USP specifications for carrageenan. **(Author's abstract)**

Lambda carrageenan. *Halymenia durvillaei*. Isopropyl alcohol. Biology.

BOTANY

- 0199 Arbuscular mycorrhizal fungi associated with some economically important spices and aromatic plants. Venkateshwar Rao, G., Manoharachary, C., Kunwar, I.K., Rajeshwar Rao, B.R.. **Philippine Journal of Science**, , 129(1):51-55

Economically important spice crops viz. cinnamon, coriander, curry leaf, fenugreek, onion and aromatic crops viz. citronella, cornmint, east Indian jamrosa, lemon grass, lemon scented gum, palmarosa, rose scented geranium and vetiver were screened for arbuscular mycorrhizal (AM) fungal association. 18 AM fungal species represented by eight species of *Acaulospora*, four of *Glomus*, three of *Gigaspora*, two of *Scutellospora* and one of *Sclerocystis* were found associated with the rhizosphere soils of these plants. Among all the fungal species, *Glomus fasciculatum* was the most predominant species found associated with 11 crops. This is the first report on the occurrence of these many genera and species of AM fungi in these crops. The number of AM fungal propagules ranged from 40-120 / 10g soil. The AM fungal colonization percentage in the roots ranged from 0-59%. Maximum colonization was observed in the roots of rose scented geranium (59%) followed by cornmint (46%) and vetiver (42%). **(Author's abstract)**

Root colonization. Propagule number. Phosphorus. Soil. Botany.

- 0200 A collection of bryophytes from Ambangeg, Bokod, Benguet and noteworthy species found in the construction of bird's nests. del Rosario, Romualdo M., Lu, Juan L., Penecilla, Gerard L.. **Journal of Graduate Research**, , 9(2):72-78

Fifty eight species of mosses, six species of liverworts and one specie of hornwort are reported from Ambangeg, Bokod, Benguet. Eight species of bryophytes; six species of mosses and two species of liverworts were discovered as being used in the construction of bird's nests.

Ambangeg is a small barrio of Bokod in the province of Benguet located (16°31'N and 120°50'E) Northeast of Baguio City near the foot of Mt. Pulog, the second highest peak in the country. It is a rugged highland area with an elevation of 1370 m. The place, about three hours ride by bus from Baguio City is almost surrounded by mountains. It is inhabited by a tribe known as the Ibaloi or Ibinaloi. Agriculture is the main source of food and occupation. Rice and vegetables are harvested from the terraces. The vegetation is of secondary forest type with small patches of pine trees and grassland. While the terrain does not permit the development of fishponds, some fresh water fishes are caught from nearby rivers and streams. The manmade lakes of Binga and Ambuklao supply fingerling stocks of *Cyprinus carpio* Vinnæus [carps], *Chanos chanos* Forskal [bangos], *Tilapia mozambica* Peter [tilapia], *Glossogobius celebius* (Cuvier and Valenciennes) [goby] *Huro floridana* (Le Sueur) [black bass], and *Ophicephalus striatus* Block [mudfish].

The first collecting trip to Ambangeg was made in January 1978 by the third author and Mr. Severino Reyse, NRCP 1.E-34 Scientific illustrator. The trip yielded forty nine specimens. In May 1979 a team composed of the second and third authors together with National Museum Technician Mr. Francisco R. dela Cruz re-explored the area and collected 50 specimens including a bird's nest made of bryophytes. The set of bryophyte collection

from the area is deposited at the Philippine National Herbarium, National Museum.

The specimens were identified and are listed below in phylogenetic order together with the citation of collection and field number and notes on their ecological habitats.

Bird's nests. Ambangeg, Bokod, Benguet. Botany. Bryophytes.

- 0201 Embryo and ovule culture of three woody fruit species. Magdalita, Pablito M., Valencia, Lolita D.. **Transactions of the National Academy of Science and Technology Philippines**, , :299

Embryo and ovule culture of avocado, lanzones and rambutan was done to preserve the important genotypes identified in a mass selection breeding programme. Immature or mature embryos of these woody fruit species were excised from fruits of avocado, lanzones and rambutan and cultured on either Murashige and Skoog\of avocado and lanzones embryos was obtained using half-strength MS supplemented with 2.2 uM benzyladenine (BA). Ovules and embryos of lanzones and rambutan, respectively, germinated on either MS or DF supplemented with 0.5 uM BA and 0.5 uM naphthalene acetic acid (NAA). Germinated embryos were allowed to grow into full plants onto the same germination medium. **(Author's abstract)**

Embryo. Ovule. Avocado. Rambutan. Lanzones. Murashige and skoog. De fossard. Breeding. Benzyladenine. Naphthalene acetic acid. Botany.

- 0202 Molecular characterization of antherculture derived indica rice (*Oryza sativa*) variants.. Chico, Martha V., Macabale, Sharon S., Desamero, Nenita V.. **Transactions of the National Academy of Science and Technology Philippines**, , :290-291

Stable breeding lines were generated from anther culture (AC)-derived variants of indica rice variety Wagwag and IR64. Differences in some agronomic traits were established for some variants. Other variants, however, are morphologically and agronomically similar. To genetically differentiate these variants, we DNA fingerprinted them using RAPD (randomly amplified polymorphic DNA) and SSR (simple sequence repeats) markers. A total of 21 and 30 RAPD primers and 20 and 27 SSR primers were assayed for Wagwag and IR64 variants, respectively. With wagwag, 16 (76.2%) and 19 (95%) RAPD and SSR primers, respectively, are polymorphic. Likewise, 23 (76.7%) and 11 (40.7%) RAPD and SSR primers, respectively, are polymorphic for IR64 variants. Polymorphic bands amplified from polymorphic primers were scored and used in the cluster analysis. A total of 50 (average of 3 per primer) and 140 (average of 6 per primer) bands were generated from polymorphic RAPD primers for Wagwag and IR64, respectively, of which, 49 (98%) and 70 (50%), respectively, are polymorphic bands. While for SSR, 70 (average of 4 per primer) and 22 (average of 2 per primer) loci were amplified from the polymorphic primers for Wagwag and IR64, respectively. The RAPD and SSR markers effectively detected molecular genetic variation among the variants. The AC-derived variants were genetically differentiated as well from the seed-derived progenitors. The efficiency of genetic differentiation depends on

the population. With Wagwag variants, clustering was more discrete with SSR markers, while for IR64, RAPD markers genetically separated the variants better than with SSR markers. **(Author's abstract)**

Variants. Indica rice. Anther culture. SSR. RAPD. Botany.

- 0203 The morphology and identity of two species of balanophora in Bukidnon, Philippines. Amoroso, Victor B., Semitara, Andrade C.. **Philippine Journal of Science**, , 128(4):319-330

Morphological studies of Balanophora revealed the presence of two distinct species: *B. papuana* Schltr. and *B. fungosa* ssp. *fungosa* J.R. and S. Forster. Although previously reported in Luzon and Palawan, *B. fungosa* is a new record in Mindanao. Morphological comparisons revealed that *B. papuana* is dioecious, has pale yellow to reddish brown and scabrous tuber, opposite-decussate phyllotaxy and red leaves. On the other hand, *B. fungosa* ssp. *fungosa* is monoecious, has pale yellow to yellow-brown and granulated tuber, spiral or rarely subopposite phyllotaxy and pale yellow leaves. **(Author's abstract)**

Balanophora papuana. Balanophora fungosa ssp. fungosa. Holoparasitic plant. Root parasite. Botany.

- 0204 Potency of rhizobial strains from different environments to increase economic productivity in some legumes. Ghouse Basha, M., Vivekanandan, M.. **Philippine Journal of Science**, , 129(2):131-134

Rhizobial strains from different environments were isolated and characterized through root nodule-trap method. The isolates were employed as biofertilizer to three tropical legumes. Application of these strains as bio-inoculants increased economic productivity such as number of pods, total dry weight of pods, dry weight of seeds, dry weight of pod wall and dry weight of 100 seeds in *Vigna mungo* (L.) Hepper, *V. radiata* (L.) Wilczek and *V. unguiculata* (L.) Walpers. Among, the different rhizobial strains isolated virgin soil isolate performed well compared to others regarding economic productivity. The virgin soil rhizobia also belong to 'cowpea miscellany group' and they are more virulent and vigorous compared to other strains. **(Author's abstract)**

Vigna mungo. Vigna radiata. Vigna unguiculata. Root nodule-trap method. Bio-inoculants. Biofertilizer. Extreme environments. Botany.

CHEMISTRY

- 0205 Acrolein content of the exhaust gases from alcogas and cocodiesel fueled engines. Ochotorena, Zenaida Legaspi. **The Technician**, , 3(1):1-20

Acrolein present in the exhaust of alcogas and cocodiesel fueled engines was determined by colorimetric method. The acrolein emitted in the exhaust of alcogas fueled engines was about 2.1 mg/min whereas premium gasoline was about 5.6 mg/min; diesel fueled engines emitted about 10.4 mg/min and cocodiesel about 23.8 mg/min. The acrolein emitted by any of these fuels increased with the increase in fuel intake and engine rpm. A change likewise in engine operation such as idling to first gear also increased the amount of acrolein in the exhaust. The acrolein was sampled by bubbling the exhaust into ice water producing aqueous acrolein solutions which reacted with M-aminophenol and hydroxylamine hydrochloride in HC1 medium to form 7-hydroxyquinoline whose maximum absorbance is at 345 nm. The reaction is specific for acrolein and substituted acrolein compounds. Concentrations of acrolein in aqueous solutions of about 0.03 umole per ml was determined by this simple and fast procedure.

Alcogas and cocodiesel fueled engines. Acrolein. Exhaust gases. Chemistry.

- 0206 Animal manure and mycorrhiza applied singly and in combination for the control of the rice root-knot nematode (*Meloidogyne graminicola* Golden and Birchfield) in green onion (*Allium fistulosum* L.). Diongzon, Maria Lima D., Gapasin, Ruben M.. **Transactions of the National Academy of Science and Technology Philippines**, , :304

The studies conducted in pot experiments aimed to: (1) evaluate the effects of different animal manure on the growth of green onion and *Meloidogyne graminicola* population and development and to identify the most effective rates against this nematode (2) determine the suppressive effects of combining vesicular-arbuscular mycorrhiza (VAM) and animal mature against the nematode and (3) determine the effects of time of application of mycorrhiza-animal manure combination on onion growth and nematode development and population.

The different animal manure (cow, chicken, goat, sheep and pig) improved the growth of green onion. However, the chicken and cow manure at 5 and 10 tons/ha significantly reduced the number of galls, egg masses and nematode population in roots and in soil compared to the lower rate of 2 tons/ha. Vesicular arbuscular mycorrhiza (VAM) combined with the animal manure increased the number of spores and mycorrhizal infection that resulted in a lower number of galls, egg masses and nematode population in roots and in soil. VAM-chicken manure gave the highest reduction of these parameters that ranged from 69 to 92%. When VAM and the animal manure were applied 2 and 4 weeks before the nematode, the number of VAM spores and percent VAM infection were higher which resulted to 84-89% reduction in galls and egg masses. Likewise, nematode population in roots and in soil was also reduced in these treatments. Top and root weights were higher in plants pre-inoculated with VAM and animal manure. **(Author's abstract)**

Manure. VAM. Root-knot nematode. *Meloidogyne graminicola*. Green onion. *Allium fistulosum*.

- 0207 Assessment of selected mangrove sites in hook bay, Polillo Island for the establishment of an effective community-based resource management program. David, Ma. Agnes B., Esguerra, James Paul H., Esteban, Janalezza Morvenna A., Sering, Gheleene O., Sibugan, Rachel Anne T.. **Transactions of the National Academy of Science and Technology Philippines**, , :313-314

Mangrove swamps play a significant role in ecological stability and in providing a source of livelihood to coastal communities. In coordination with the Community-Based Coastal Resource Management Program of the Institute of Social Order, a baseline ecological study was conducted in selected mangrove sites in Hook Bay, Polillo Island towards developing resource management program. Four mangrove sites in the said area were selected for assessment based on the following criteria: occurrence of reforestation, proximity to human settlement and possible effects of upland agricultural runoff from nearby tributaries. Three 10 m x 10 m plots were established in each site, and the following activities were conducted from August to November 2000: (a) mangrove inventory (i.e., species identification, saplings and seedlings count, and girth at breast height (GBH) and height measurements); (b) soil sampling and analysis (i.e., particle size, pH, salinity, total nitrogen, available phosphorus, potassium, total cation exchange capacity (CEC), and exchangeable bases such as calcium and magnesium); and (c) water quality monitoring (i.e., salinity, temperature, pH, conductivity, turbidity, and dissolved oxygen (DO)). Eighteen mangrove species and their associates were identified, with the most dominant species being *Rhizophora apiculata*, *Sonneratia caseolaris*, and *Ceriops tagal*. Initial laboratory results show high soil phosphorus levels (at 42 to 74.5 ppm) and average soil salinity (27.3 to 39.7 ppt). The pH of the water is moderately basic (pH = 8.09 to 8.52), and salinity generally decreased between September to November (13.5 to 21.6 pp). The results of both field and laboratory investigation will be integrated with the demographic and socio-economic data as basis for a management plan that the community can serve as a tool for sustainable utilization of the mangrove resources in their area. (Author's abstract)

Mangrove. Bay. Physico-chemical analysis. Soil analysis. Water analysis. Species inventory. Environmental management. Sustainability. Polillo Island.

- 0208 Bioefficacy of *Metarrhizium anisopliae* (Metsch.) Sorokin against the migratory locust, *Locusta migratoria manilensis* Meyen, on sugarcane. Recuenco, Julieta D.. **Transactions of the National Academy of Science and Technology Philippines**, , :305

The outbreak of the migratory locust in Central Luzon and other parts of Southern Luzon prompted the need to develop control strategies to effectively reduce the insect's population. One of these methods is the application of environment friendly biotic agents like the entomopathogenic fungus, *Metarrhizium anisopliae* (Metsch.). Sorokin commonly known as green muscardine fungus. This was tested against the locust using different inoculum densities and sources. Spraying locust nymphs of varying ages with the fungus at 10^8 conidia/ml, gave 100% infection and mortality. The older hoppers had faster and more infection with higher percent mortality. The older hoppers had faster and more infection with higher percent mortality than the younger ones. Infection of hoppers and adults was significantly greater at higher inoculum

density (10^8 conidia/ml) than at lower inoculum density (10^4 conidia/ml). *M. anissopliae* – infected males at different male to female ratios resulted in higher percent mortality on 1:1 male to female ratio (87.5) than those inoculated with 1:5 male to female ratio (68.75). Comparing *M.* – infected males and *M.* – infected rice hull, *M.* – infected males afforded faster infection than *M.* – infected rice hull. The result indicate that *M. anissopliae* is an effective and promising biological control agent against the destructive migratory locust, *Locusta migratoria manilensis* Meyen, that damages sugarcane. **(Author's abstract)**

Metarrhizium anisopliae. Locusta migratoria manilensis. Inoculum density. Inoculum sources. Bio-control.

- 0209 Combinatorial chemistry. Rodriguez, Evelyn B.. **Transactions of the National Academy of Science and Technology Philippines**, , :215-238

Combinatorial chemistry started with Merrifield's Nobel Prize winning invention the solid-phase synthesis of peptides. By mid 1980s, solid phase techniques have been greatly refined so that it was possible to make huge numbers of peptides simultaneously in the same reaction vessel, using a few steps. Later, strategies and techniques of solution phase combinatorial synthesis have been developed as well. While solid phase synthesis makes it easier to conduct multi-step reactions and to drive reactions to completion, solution phase synthesis allows a much wider range of organic reactions. In its earliest form, the primary objective of combinatorial chemistry was to generate large "libraries" of molecules en masse – instead of synthesizing compounds one by one, as how synthetic organic chemistry has been practiced for the last 100 years- and how to find the most promising "lead" pharmaceutical compounds by high throughput screening of the libraries. Although combinatorial chemistry and combinatorial technology have been mostly applied to drug and agrochemical discovery, they can be powerful tools in the diagnostic, down- stream processing, catalysis and new materials sector. **(Author's abstract)**

Chemistry. Combinatorial chemistry. Solid-phase synthesis. Peptides.

- 0210 Comparative colorimetric and colorfastness evaluation of textiles dyed with indigo (indigofera tinctoria) powder produced from Aurora, Aklan, and Negros Occidental, Philippines. Cabansag, Jeannie Lynn J., Fenoy, Rudy C.. **Samay**, , :26-35

Indigo dye extracted from indigo (indigofera tinctoria) plants grown in Aurora, Aklan and Negros Occidental were applied to abaca (*Musa textilis*), cotton (*Gossypium hirsutum*), pineapple (ananas comosus), and pineapple-silk (*A. comosus-Bombyx mori*) fabrics and silk yarns. The dyed fabrics and yarns were analyzed colorimetrically to compare the color difference in terms of lightness and color saturation of adsorbed dye. Color strength of adsorbed indigo dye in terms of Kubelka-Munk's K/S values was derived from the reflectance value of 650 nm, the wavelength of maximum absorption of indigo, and compared with the indigo found in the said localities. Colorfastness (CF) to laundering and perspiration were determined and expressed as color change

and staining on different standard fibers. Colorimetric data of dyed textile materials showed prominent darkness and greatest blue saturation for Aurora indigo, while comparative lightness and blue saturation almost nearing bluish-green coordinates were observed for indigo from Aklan and Negros Occidental. Dyed textiles from the three localities have similar features of the spectral reflectance curves but textile materials dyed with indigo from Aurora exhibited the highest (K/S) intensity of adsorbed dye. Textiles dyed with indigo from Aklan and Negros Occidental showed satisfactory CF to laundering and perspiration, with minimal changes in color and staining, while Aurora indigo-dyed textiles showed most prominent fading and staining.

Chemistry. Textile. Indigo dyed textiles. Colorimetric. Colorfastness.

- 0211 Dyeability, color, and performance of naturally dyed jute (*corchorus olitorius*) fabrics. Carino, Argentina T.. **Samay**, , :43-53

The increasing demand for jute-based products prompted the study on its dyeability and colorfastness (CF) properties when using natural dyes. Ten dye sources were used in this study annatto (*Bixa orellana*), guava (*Psidium guajava*), young coconut (*Cocos nucifera*), duhat (*Syzygium cumini*), indigo (*Indigofera tinctoria*), cogon (*Imperata cylindrica*), mahogany (*Swietenia macrophylla*), mayana (*Coleus blumei*), talisay (*Terminalia catappa*), and yellow ginger (*Curcuma longa*). Various mordanting conditions were considered to determine their effect on color and dye affinity for jute fabrics. Generally, low ratings were obtained for the CF to laundering test while CF to rubbing test showed acceptable ratings except for annatto and talisay. Reflectance measurements also revealed the effectiveness of CuSO over alum as mordant. The established PTRI technologies on dye extraction and application were found suitable for jute dyeing indicating the potential of natural dyes for the dyeing of jute fabric. Moreover, this study supports the latest innovations using jute as a substitute to existing natural and synthetic fibers for natural dyeing.

Chemistry. Textile. Dyeing. Colorfastness. Jute fabrics.

- 0212 Effects of temperature and moisture content on tensile strain at fracture in the tangential direction of Northern red oak and aspen
 . Bello, Emmanuel D.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :6-13

The tensile strains at fracture in the tangential direction of northern red oak were about 3/10 to 7/10 of that of aspen. Within the moisture content range from 6 to 18% and temperature range from 80° to 170°F, the fracture strain of aspen increased linearly with either increasing temperature or moisture content. In the case of northern red oak, the relationship of this property with either of the two factors followed a quadratic curve. For both, a significant interaction between moisture content, within the hygroscopic range, and temperature was also present, denoting that the effect of temperature was intensified as moisture content increased below the fiber saturation point.

The two relationships of fracture strain with moisture content over the entire hygroscopic range at a constant temperature followed complex sigmoid curves. **(Author's abstract)**

- 0213 Essential oil and phytochemical analysis of pandan-mabango. Tarro, Juanita A., Astillero, Nhilda. **Research Journal**, , 6(2):2-9

This study was designed to serve as a confirmatory test for the presence of essential oil in the leaves of pandan and chemical constituents present in the roots.

With the process of steam distillation and solvent extraction using di-ethyl ether as the solvent, extraction of oil was unsuccessful.

However, the phytochemical analysis of the root parts showed the presence of condensed tannins. Negative results were obtained in the analysis of alkaloid, flavonoid and anthraquinone.

Chemistry. Essential oil extraction. Phytochemical analysis of pandan.

- 0214 Extraction and analysis of oil from Marang seeds (Artocarpus Odorotissima Blanco). Molina, Isidore Ma. M., Astillero, Nhilda. **Research Journal**, , 6(2):10-18

This research aimed to extract and analyze oil from marang seeds. The percentage yield of the oil was determined. The different analyses conducted gave information about the physical and chemical properties of the oil which in turn led to the possibility of using the oil for food preparation or for any soap making.

The average percentage yield of the oil by solvent extraction method using diethyl ether as solvent is 22.979. This oil was used to make soap.

The soap formed was not as hard as those of other commercial soaps in the market. Its color was yellow-brown. The soap was however of inferior quality due to the unrefined extracted oil. However, the extracted oil could be used for industrial purposes since it is of high glyceride content and soaps are glycerides or esters of long chain fatty acid.

Chemistry. Extraction and analysis. Marang seeds (Artocarpus Odorotissima Blanco).

- 0215 Extraction of wax from okra leaves. Barbaso, Delilah Caneda. **Research Journal**, , 4(1):36-46

This study deals with the extraction of wax from okra leaves using methods and procedures simple enough to be adopted by the rural folks. The age of okra leaves which gives the greatest yield of wax, the method of extracting the wax that is economical and high yielding and some of the physical

characteristics of the extracted wax were determined.

Maximum percentage yield of wax by solvent extraction using acetone was 16.55% with the mature leaves giving the greatest yield of wax.

Wax extraction. Okra (*abelmoschus esculents*). Chemistry.

- 0216 Fuel bricks from sawdust and styrofoam. Fernandez, Pilar Nieman. **Research Journal**, , 5(1):47-59

This project is concerned with the utilization of agricultural and industrial waste, sawdust and styrofoam as fuel bricks.

The right proportion of sawdust to styrofoam adhesive for the preparation of sawdust fuel bricks was determined. The bricks were tested for porosity, tensile strength and durability.

The right proportion of styrofoam to gasoline was also investigated so that the right adhesive was prepared. Tests were also conducted to determine the time required for the adhesive to bind. The amount of adhesive to be applied to the different materials being bound and the right viscosity of the adhesive needed to bind different materials effectively were determined.

Physical tests indicated that better bricks from sawdust were obtained when the adhesive used was not too sticky nor too fluid, however, sticky adhesive was effective in binding different kinds of materials while too fluid adhesive were only good for light materials.

Styrofoam is partially soluble in acetone. The acetone-styrofoam mixture can be used in sealing holes. Acetone was also found to be a good remover of the adhesive.

Chemistry. Fuel bricks. Sawdust. Styrofoam.

- 0217 An integral-momentum analysis of the laminar boundary layer along a rectangular corner. Liongson, Leonardo Q.. **Philippine Engineering Journal**, , 5(2):120-131

An integral-momentum analysis is applied to the problem of the laminar boundary layer along a rectangular corner. It involves an assumed self-similar velocity profile defined by functions with prescribed properties. Two case examples are provided. Reasonably good agreement is obtained between the results of the present study and the available numerical solution of previous workers on the problem. **(Author's abstract)**

- 0218 Interaction of *Anthocephalus chinensis* (Lank) rich. ex. Walp and *Albizia falcataria* (L.) Fosb. . Zabala, Neptale Q.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :1-5

Kaatoan bangkal, *Anthocephalus chinensis* (Lank.) Rich & Walp., and

Moluccan sau, *Albizia falcataria* (L.) Fosb, trees were planted in pure and mixed stands to determine differences between mixed and pure stands of the same species in terms of growth and damage by destructive agencies.

Results showed that mixing the two species had no advantage over pure stands of the same species in terms of both volume growth and survival. Insect infestation was very light, and no difference was observed between species or between pure and mixed stands. More Moluccan sau trees were broken and wind-thrown than Kaatoan bangkal trees. **(Author's abstract)**

Kaatoan bangkal. Moluccan sau.

- 0219 Management of the golden apple snail menace through environment-friendly approaches. Dela Cruz, Mario S., Joshi, Ravindra C.. **Transactions of the National Academy of Science and Technology Philippines**, , :305-306

The golden apple snail is an alien species of freshwater mollusks scientifically known as *Pomacea canaliculata* (Lamarck). Locally, it is referred to as "Golden Kuhol". It was introduced in the Philippines for commercial purposes from South America in the 1980s. Bred and promoted as a potential alternative source of food protein of low-income Filipino farmers for years, it has become a plague in rice farms all over the country including the Ifugao Rice Terraces.

We present new alternatives to reduce the misuse and abuse of synthetic commercial molluscicides. These are prior to planting select Philippine seed board rice varieties which exhibit less golden apple snail damage, and apply basal application of inorganic fertilizers as soil incorporation at the recommended rates. Botanical attractants should be used prior to crop establishment to facilitate easy and swift collection of golden apple snails. A new recipe "Chicharon Kuhol" (Snail crackers) for human consumption was formulated to promote its utilization. Additional information on the right-use technology of commercial synthetic molluscicides by proper timing, application techniques, and lowering the recommended dosage to lower the mortality of native snails (non-destructive snail species), but without reducing the mortality of the golden apple snail is highlighted. **(Author's abstract)**

Golden snail. *Pomacea canaliculata*. Management.

- 0220 Mechanism of resistance of peanut, *Arachis hypogaea* L. against peanut leafhopper *Empoasca ricei* dworakowska and pawar. Sison, Maria Luz J., Adalla, Candida B.. **Transactions of the National Academy of Science and Technology Philippines**, , :303

Five peanut entries, namely NC Ac 343, Myra (PC), UPL Pn4, UPL Pn6, and IPB Pn83-68-140 were tested to determine the mechanism of resistance to the peanut leafhopper, *Empoasca ricei* Dworakowska and Pawar. These were selected based on different levels of resistance to *E. ricei*. NC Ac 343 was the most resistant entry, which showed both antibiosis and antixenosis

effects. This entry had the lowest number of adults that settled on the test plants and had twice the number of trichomes per microscopic field than those of the susceptible cultivars IPB Pn83-68-140 and UPL Pn6. Nymphal development was longer while adult longevity was comparatively shorter on the resistant cultivars NC Ac343 and Myra (PC). A significant negative correlation was found between various morphological characters and number of adult leafhoppers. **(Author's abstract)**

Peanut. *Arachis hypogaea*. Peanut leafhopper. *Empoasca ricei*. Antibiosis. Antixenosis.

- 0221 Medicinal plants commonly used by Yakan tribes in Bato-Bato, Lamitan and Tumahubong, Basilan Province. Fermo, Hanagrace F., Dimaguila, L.S.. **Research Journal**, , 8(1):4-12

This study aimed to determine the medicinal plants that are commonly used among Yakan tribes of Bato-Bato (Lamitan) and Tumahubong, Basilan Province.

The information obtained from interviews with the herbolarios includes the common name, parts used, preparation and prescriptive use of the plants.

Twenty-one of these plants were collected for their taxonomic classification and identification.

The active constituents of one promising plant, Kapok (*Ceiba pentandra*), were determined phytochemically and microbiologically. The extraction was carried on with ethyl alcohol as solvent.

Results show the presence of saponins, tannins, and flavonoids.

Results for the microbiological test show that the active principles in Kapok are not capable of killing microorganisms, particularly, *Escherichia coli* and *Candida albican*, the test of organisms used.

Chemistry. Medicinal plants.

- 0222 Medicinal plants in common use among the Subanon of Malongon, Malangas, Zamboanga del Sur. Sanchez, Nilda S., Dimaguila, L.S.. **Research Journal**, , 8(1):13-19

This study endeavors to have knowledge about the Philippine medicinal plants being used by the Subanon herbolario in the barrio of Malongon, a distance away from the poblacion of Malangas, Zamboanga del Sur. Through this, the common name of plants, part or parts used, preparations and prescriptive uses were obtained.

One of the plants which promises to be a good medicinal plant is hagonoi (*Wedelia biflora*). This was analyzed phytochemically and microbiologically. A test for saponin using froth test yielded positive result. With the use of Ferric chloride test a positive result was obtained which indicated the presence of tannin. Test for alkaloids using Wagner's and Mayer's reagent yielded positive results and were confirmed in the Confirmatory test. Microbial action on *Escherichia coli* and *Candida Albican* gave a negative result indicating that there was no inhibitory action on the growth of test organisms.

Further studies on the phytochemical and microbiological testing of the active constituents of this plant is recommended to really confirm the kind of constituents present.

Chemistry. Medicinal plants.

- 0223 Outdoor test facility for solar flat-plate collectors. Ramos, Henry J., Reyes, Edgardo S.. **Philippine Engineering Journal**, , 5(2):33-47

An outdoor test facility based on the open-loop design has been developed for determining the efficiency of solar flat-plate collectors. The applicability and adoption of the various published standards on collector testing like the ASHRAE, AFNOR, DIN/BSE, EIR and CSIRO under actual Philippine climatological conditions are discussed. Features of the developed test facility are described and results obtained using one of the published standards are presented. **(Author's abstract)**

- 0224 Photochemical reactions involving nitrosylpentacyanoferrate (II) – bromide system using cadmium sulphide as semiconductor. Singh Chouhan, Mahaveer, Singh, Sadhana, Khandelwal, Ramesh Chand. **Philippine Journal of Science**, , 135(2):121-129

Sodium nitroprusside contains cyanide ligands that are not easily replaced chemically. An effort has been to substitute this ligand by another anionic ligand like bromide. The rate of this photochemical reaction has been observed spectrophotometrically in the presence of cadmium sulphide as a semiconductor. The effect of different parameters like pH, intensity of light, concentration of sodium nitroprusside and bromide ion on the rate of this substitution reaction has been studied. The product was isolated and characterized by different analytical methods. A tentative mechanism for this photochemical substitution has been proposed. **(Author's abstract)**

Ligand exchange. Photochemical. Semiconductor. Chemistry.

- 0225 Strength Evaluation of flexible securing systems for ship's deck-stowed containers. Veal, Reynaldo B.. **Philippine Engineering Journal**, , 5(2):48-65

The seaway forces acting on ship's on-deck containers, the elements of strength of containers and their securing gear and the equations characterizing the behavior of flexible securing systems are discussed. An algorithm that generates points for a container stack weight diagram, for use by ship deck officers, is presented. **(Author's abstract)**

- 0226 Studies of Zamboanga City clay samples for ceramics and brick making. Dimaguila,

Clay samples from two barrios of Zamboanga City, namely, Tumaga and Boalan, were subjected to physical and chemical tests to determine their suitability for ceramics or brick making. Results of the tests were compared with acceptable standards reported by Atienza (1976) and Erfe (1964).

Results of the tests show that Tumaga clay, with just a little modification in body composition, is a potential raw material in ceramic making. Likewise, tests indicate that Boalan clay, mixed with palay ash, in the proportion of 60% clay and 40% palay ash, produces a suitable material for either ceramics or structural bricks.

Ceramics and brick making. Chemistry.

- 0227 Sulfonation of clean and contaminated polystyrene (styrofoam). Manalac, S., Senador, Jr., A., Escoto, A.. **Philippine Engineering Journal**, , 29(2):79-92

This study investigates the efficiency of the direct method of sulfonation or the addition of sulfuric acid to clean and contaminated polystyrene or Styrofoam and the comparison of the ion exchange capacity of clean and contaminated polystyrene.

The sulfonation process was divided into four sets of experiments. The first part was to determine the correlation between the time of sulfonation and ion exchange capacity (IEC) of sulfonated polystyrene (SPS using clean polystyrene; the second part was to test the replicability of the sulfonation process using clean polystyrene; third part was to verify the calculated IEC and sulfonation degree by performing the regeneration process and the last part was the sulfonation of the contaminated polystyrene.

Experimental results from the sulfonation process yielded an average IEC value of $10.3 \pm 5.05 \times 10^{-4}$ mol for clean SPS as compared to $15.0 \pm 7.61 \times 10^{-4}$ mol for contaminated gSPS

g

SPS

SPS, and the degree of sulfonation, calculated as percent sulfonation has an average value of $11.98 \pm 6.53\%$ for clean SPS as compared to $18.41 \pm 11.44\%$ for contaminated SPS.

These values indicate that the method of sulfonation employed was able to introduce sulfonate groups both for the clean and contaminated polystyrene with apparent greater effectivity for the contaminated polystyrene. (Author's abstract)

Chemistry. Sulfonation. Ion exchange capacity. Polystyrene. Styrofoam.

- 0228 Wash fastness of cotton fabrics dyed with annatto (bixa orellana) powder and treated with dimethyloldihydroxyethyleneurea (DMDHEU). Yutoc, Ryan C., Carillo, Elbert C., Divinagracia, Ma. Christine A., Leano, Jr., Julius L., Enerva, Lorna T.. **Samay**, , :20-25

Greige woven cotton fabrics were scoured, bleached, mordanted and dyed with annatto (*Bixa orellana*) dye powder at different conditions of dyeing temperature, liquor ratio, and concentrations. The dyed cotton fabrics were treated with a crosslinking agent, dimethyloldihydroxyethyleneurea (DMDHEU), to evaluate the effect of the crosslinker on the color and colorfastness performance of annatto-dyed cotton fabrics. The results revealed the enhanced colorfastness to laundering performance of cotton fabrics dyed with annatto powder under different dyeing conditions subsequently treated with DMDHEU. The crosslinked fabrics resistance to fading when exposed to direct sunlight gave improved fastness properties compared with the untreated annatto-dyed cotton.

Chemistry. Textile. Dimethyloldihydroxyethyleneurea (DMDHEU). *Bixa orellana*. Natural dyes. Crosslink. Cotton.

COMPUTER SCIENCE

- 0229 On computing the input to a discretized linear system. San Juan, Christian B.. **Philippine Engineering Journal**, , 4(2):73-80

In some applications, there is the need to compute for the input signals of a linear system knowing the form of the output signal. This is normally true in physiological and mechanical systems, especially in the field of robotics. A simple way to do this is by discretizing the state equation. The resulting equations are not only easy to manipulate but also amenable to computer solutions.

Computer science. State equation. State variable. Matrix.

- 0230 Value-based utility broker for jitter management of voice on IP networks. Pedrasa, Jhoanna Rhodette I., Festin, Cedric Angelo M.. **Philippine Engineering Journal**, , 26(2):57-74

A variety of scheduling algorithms and management frameworks have been proposed to provide more than just best-effort service offered by the Internet Protocol. A new framework, Value-Based Utility (VBU), uses the perceived knowledge of the state and degree of user satisfaction in managing router resources and functions. VBU has been shown to effectively manage packet loss and delay in times of high demand and low resource availability. This paper applies VBU to jitter management by enhancing on two existing scheduling algorithms, namely Stop-and-Go and Jitter-EDD. Our results show that Stop-and-Go with Utility can achieve a tighter jitter bound of T , where T is the frame length, which is half of the original bound of $2T$ offered by Stop-and-Go alone. VBU has limited application however to Jitter-EDD, where the rigid environment restricts the re-allocation of resources according to demand.

Value-based utility (VBU). Jitter management. IP networks. Computer science.

- 0231 Wave model for coastal structures. Gregorio, Enrico G.. **Philippine Engineering Journal**, , 4(2):91-98

Wave models as a planning and design tool are used to predict the influence of environmental conditions on a proposed harbour layout. These models have to satisfy similarity criteria as described herein. Factors such as wave climate, scale selection, hydrographic surveys, instrumentation and documentation influencing the design of the wave models are discussed. The use of wave disturbance test and stability test in arriving at the optimum port layout and breakwater cross-section, respectively is also explained.

Wave climate. Scale selection. Hydrographic surveys. Instrumentation and documentation.

ECOLOGY

- 0232 Chaos in the activated sludge process. Quano, Ely Anthony R.. **Transactions of the National Academy of Science and Technology Philippines**, , :193-213

The activated sludge process is used to remove biodegradable organic impurities in wastewater using bacteria and other microorganism to decompose the organic impurities into water, carbon dioxide, and additional microbial cells. One of the main problems in the operation of the activated sludge process is the occurrence of sudden and often unexplained process instability or upsets. A number of hypothesis have been developed to explain the nature and cause of process instability. The process kinetics involved a number of non-linear and linear differential equations to define the preypredator relationship among various microbial species, the dominance and predominance of specific species to the presence of poisons, biochemical catalysts, and type of substrate. The kinetic models of the activated sludge process is very complex.

Using the basic kinetic model for the completely mixed activated sludge process, the chaotic behavior of the system was studied. The study also identify the process and design variables creating chaos and estimate the ranges of those design and operating variables within which chaos takes place. The study confirmed that the activated sludge process is unstable when operated under (i) a very short detention time less than 2 hours; (ii) very stringent effluent quality, i.e. less than 2 mg/l, and (iii) very high influent COD concentration with detention time set at 4 hours or less. Increasing the detention time increases the system stability. **(Author's abstract)**

Ecology. Sludge. Wastewater. Water impurities.

- 0233 Some facets o upland development in the Philippines. Sajise, Percy E., Baguinon, Nestor

T.. **Scientia Filipinas**, , 2(1):3-17

In the Philippines, the upland problem is real. Home to about five million Filipinos who live below the poverty level, the upland areas which comprise 31% or roughly one out of every three hectares in the country are fast succumbing to rapidly encroaching human settlements with survival practices incompatible with the fragile upland environ. Development, the authors stress, is not exploitation. In the uplands, it means not only a productive and protective crop cover nor merely a feasible system of land use, but one that is also socially acceptable-one that enhances human development. Dissecting the upland phenomenon, the authors advance a strategy for upland development that is strictly Filipino, emphasizing that any effort to upgrade the uplands must encompass not only the upliftment of the man-land systems but must also stabilize the man-and-man relationships.

Ecology. Upland development.

- 0234 An inventory of the butterfly species (lepidoptera, rhopalocera) of the upper Imbang-Caliban watershed, north Negros forest reserve, Philippines. Slade, Eleanor M., Turner, Craig S. **Silliman Journal**, , 44(2):158-183

Coral Cay Conservation (CCC) recently completed an inventory survey of the butterfly fauna of the Upper Imbang-Caliban watershed area of the North Negros Forest Reserve (NNFR), Negros Occidental, Philippines. The NNFR is one of the last significant areas of moist tropical forest in the Negros-Panay Faunal Region of the Philippines and therefore is considered to be vital for the conservation of a high number of forest-dependent and endemic species. The inventory results revealed that 45% of all species and 84% of sub-species recorded were Philippine endemics, with 21% of sub-species recorded occurring only on Negros. This is the first published account of the butterfly species in the NNFR and highlights the relative importance of the NNFR for the conservation of endemic and restricted-range butterfly species and the need for long-term conservation management of the remaining forest area. Suggestions for conservation and sustainable management of the butterfly fauna of the NNFR are discussed.

Ecology. Butterfly species. Lepidoptera. Rhopalocera. Imbang-Caliban watershed. North Negros forest reserve.

- 0235 Negros avifauna:. Turner, Craig, Tamblyn, Alexia, Dray, Robert, Ledesma, Jose-Maria, Maunder, Louisa, Raines, Peter **Silliman Journal**, , 44(2):136-157

The avifaunal species richness and levels of endemism in the Philippines are of global importance, yet the country has the highest number of threatened restricted range bird species in the world. Despite this, few studies have attempted to assess areas for conservation. Coral Cay Conservation (CCC) has recently completed an inventory survey of the birds of the North Negros Forest Reserve (NNFR), Negros Occidental, Philippines. The Mackinnon list surveys completed across six habitat types during 2002 identified 96 species

from 35 families, of which 68 (69%) were endemic to the Philippines. The species records include several IUCN Red Listed species and the results of the survey are used to give a preliminary assessment of the conservation importance of the different habitats of the NNFR for threatened, near-threatened, restricted range and endemic bird species. These results further stress the need for long-term conservation management of this remaining forest area.

Ecology. Community composition. Habitat types. North negros forest reserve.

0236 PASIG:. Zafaralla, Macrina T.. **Scientia Filipinas**, , 2(1):36-44

Monitoring is not enough in dealing with the major causes of pollution in the Pasig River. The monitored parameters must be related to the socio-economic conditions which pollution directly or indirectly affects. Since pollution is an offshoot of several causes, it can be solved through a vigorous and sustained interdisciplinary approach. The conduct of the study (one of the subjects of a doctoral dissertation) was, by and large, a singular effort without, of course, precluding expert advice particularly on its scope. Despite the relatively short time frame within which sampling and analyses were conducted, certain biophysical phenomena were identified. These phenomena were in relation to fluctuations in the economic life of various occupational groups that depend on the river for their livelihood. The purely scientific imperatives of the study were linked with pragmatic, down-to-earth issues to present a panoramic view of pollution and to open areas of mutual responsibility and, hopefully, collaborative effort among scientists in the natural and social sciences, on one hand, and the policymakers, on the other.

Ecology. Pasig River. Deterioration. Despoilation.

0237 Protected areas for biodiversity conservation and environment education in the Philippines. Bagarinao, Teodora. **Philippine Journal of Science**, , 128(3):191-209

The Philippines holds the distinction of having enormous biodiversity with the highest density of endemic species but has the problems of very fast decline in old-growth forests and the highest number of endangered mammal and bird faunas in the world. Among the recorded 53,577 species in the country are 512 unique species of land birds, mammals, reptiles and amphibians with 43-73% endemism. This biodiversity is seriously threatened by habitat destruction due to the expansion of human populations and activities. Loss of biodiversity impairs ecosystem functions and results in floods, drought, erosion, pests and diseases, low productivity, and food shortages, with serious socioeconomic consequences. To arrest the loss of biodiversity, *in situ* conservation is imperative and the remaining natural habitats and biodiversity must be protected. But the 73 million Filipinos in 1997 demand more land, water, biological resources, and income. Most Filipinos are unaware about the country's biodiversity and the imperative for conservation. Environment education for the general public is essential, and nature recreation and ecotourism can be effective means toward "greening" the minds of

citizens. The National Integrated Protected Areas System includes 290 sites occupying about four million hectares (about 13% of the country's total land area), mostly in the remaining forests, but increasingly more in marine ecosystems in the country. This paper provides information about the biodiversity in the protected areas have been exploited for products and energy, only some provide for ecotourism, and only a few are actually protected. Some accessible areas should be funded and managed more effectively for ecotourism and public education, but others must be left alone and actively protected. Encounters with nature engender pride in the national heritage, generates responsible citizen action, and helps ensure biodiversity conservation. **(Author's abstract)**

Sierra Madre. Isarog. Panay-Negros. Apo. Tubbataha. Ecology.

0238 Rotavirus and afebrile seizure. Caro, Glovelyn S.. **Philippine Scientific Journal**, , 43(1):21-24

Objective: To raise awareness on the neurologic manifestations of a common gastrointestinal pathogen.

Design: Case Report

Setting: Department of Pediatrics

Case Summary: This is a case of a 2-year old girl admitted due to upward rolling of the eyeballs and stiffing of extremities. Four days prior to admission, she had four episodes of non-projectile vomiting of previously ingested milk. There was no other associated sign or symptom. Three days prior to admission, she was no longer vomiting but had 4 episodes of yellowish to greenish, non-mucoid and non-blood streaked watery-based stools. She was brought to a private physician and was advise oral rehydration solution which she tolerated. The diarrhea persisted, prompting another consult one day prior to admission. She had normal urinalysis and was told to continue the ORS as needed. A few hours prior to admission, she had upward rolling of eyeballs and stiffening of all extremities lasting for 2 minutes. She was to the ER and was subsequently admitted. She had 2 previous admissions for seizures: benign febrile convulsion secondary to acute gastroenteritis. She was seen by a neurologist and was worked up. However, her EEG blood count, stool examination, urinalysis and electrolytes were all normal. This 2-year old girl had a history of recurrent seizures associated with diarrhea. She had no neurological deficit after each occurrence.

Above case presented with afebrile seizures during episodes of diarrhea. Patient did not have significant electrolyte disturbance and the stool was positive for rotavirus antigen.

The first report of central nervous system involvement after rotavirus infection was made in 1978. Since then, this association has been described by several authors. Studies have reported various frequencies of CNS involvement in children with acute rotavirus gastroenteritis.

Conclusion: This case was reported with recurrent seizures associated with diarrhea on a 2 year old girl. The physical and neurologic examinations

were normal. The stool exam was positive for rotavirus antigen. In the evaluation of afebrile seizures, we must be aware of common pathogens with rare manifestations. **(Author's abstract)**

- 0239 Thyrotoxic periodic paralysis (TPP). Samoy, Elmer P., Mainimtim, Eva Marie T., Adlao, Julius, Bartolome, Vincent, Pabilonia, Teresa **Philippine Scientific Journal**, , :25-31

Objectives: To determine the prevalence of Periodic Paralysis among Filipino patients diagnosed with thyrotoxicosis at MCU-FDTMF Hospital. To determine the epidemiologic characteristics, seasonal occurrence, characteristics of paralytic attacks, and the precipitating factors associated with the disease.

Research Design: Descriptive.

Setting: Department of Internal Medicine, MCU-FDT Medical Foundation and Hospital.

Sample Population and Methodology: A review of the medical records of 72 patients admitted at MCU-FDTMF Hospital with a final diagnosis of Periodic Paralysis, Hypokalemic Periodic Paralysis, Familial Periodic Paralysis or Thyrotoxic Periodic Paralysis was done from January 1997 to October 2002. The medical history, physical and neurological exam findings, and laboratory work-ups (serum K⁺ and thyroid function test) were tabulated and analyzed. Sixty-seven records were available for review, and 16 cases had an unequivocal biochemical evidence of thyrotoxicosis. Of the 16 records, 12 had the final diagnosis of TPP.

Result: The mean age of the patients was 32 years old, with a 15:1 male to female ratio. The initial attacks were common in the early morning (68.75%) and during the warmer months of the year, February to May (56.25%). The mean duration of the paralytic attack was 28.19 hours. All patients had bilateral lower extremity involvement, and 56.25% had concomitant bilateral upper extremity involvement with lesser intensity. Majority (75%) had moderate muscle weakness with motor grade of 2-3/5. The precipitating factors were strenuous activity, eating salty foods and cold exposure. Cardiac rhythm disturbances noted were atrial fibrillation, non-specific ST-T wave changes and incomplete right bundle branch block. All patients had hypokalemia upon admission and had normokalemia upon recovery of motor function. Majority (50%) received potassium replacement only. Others received a combination of β -blocker with potassium replacement and or an anti-thyroid drug. **(Author's abstract)**

EDUCATION

- 0240 Capitalizing on organizational knowledge: Bacongus, Rowena. **Silliman Journal**, , 48(1):63-74

Agricultural extension services have been organized to provide producers scientific farming technologies and knowledge to give them competitive edge in making farming decisions. Such an edge would have the effect of transforming the agriculture sector into a modern and profitable industry where the rural poor graduate from poverty into the middle class. However, because such is not the case in many countries like the Philippines, extension systems worldwide have been under scrutiny for falling short of their objectives. The current study looked into a decentralized municipal agricultural extension system in a layer and swine based municipality-San Jose, Batangas, Philippines. Secondary data from 1993 (or two years after the enactment of the Decentralization Law) were complemented by interviews and focused group discussions. It was found that the municipality has active private extension for its swine and layer industry, the major source of agriculture income, but the government agricultural extension system needs to re-evaluate its traditional role from a monolithic producer of traditional services to that of an enabler where it catalyzes the effective involvement of public and private agencies or organizations to build the intellectual capital of the locality to make superior business decisions. Such a shift in perspective by the municipality requires a shared vision among the key stakeholders in the community. It is argued that extension systems, whose function is primarily to develop human capacities in agriculture, need to maximize strategies to create knowledge that addresses the multi-functional nature of agricultural development. Knowledge creation strategies should be prioritized as these could significantly improve extension's contribution to facilitating a learning community adept at addressing complex problems at the municipality level.

Education. Organizational knowledge. Decentralized agricultural extension systems. Imperatives.

- 0241 A comparison of pupil achievement in elementary mathematics using individualized instruction utilizing self-directed instructional materials and the teacher-directed mastery-based method. Mangubat, Emmanuel. **Research Journal**, , 4(1):3-29

Trends, practices, and methodology of instruction from the context of today's rapidly changing world need to be reexamined, innovated, and improved to make them relevant to the changing needs and demands of the times. Innovations in educational practices, teaching strategies, and methodology of instruction to help solve existing and future problems of all dimensions should be encouraged and explored.

In mathematics alone, several teaching methods and strategies can be explored not only to improve instruction but help solve the problem of school accommodation resulting from population explosion as well.

This experimental study utilizing Self-Directed Instructional Materials (SDIM) in individualizing instruction in the elementary grades is premised on this proposition. It attempted to answer the following questions:

1. Is there a significant difference in the achievement in elementary mathematics between grade six pupils given individualized instruction using self-directed instructional materials with those taught using linear instruction utilizing the mastery learning strategy?
2. Is there a significant difference between the achievement in

mathematical skills of grade six pupils given individualized instruction utilizing self-directed instructional materials and those taught the linear instruction utilizing the mastery learning strategy based on four mathematical skills or criteria?

This experimental study presents the use of self-directed instructional materials in individualizing mathematics instruction in grade six at the Western Mindanao State University laboratory School.

Twenty-five Exercise Sets were prepared by the researcher on the units on Ratio, Proportion, and Percent and Geometry. In this study the experimental procedure utilizing randomized control group pretest-posttest design was employed.

The control group used linear instruction utilizing the mastery learning strategy. The teacher taught the class as a whole teaching only one subject matter or one Exercise Set, while the experimental group teacher gave each pupil one Exercise set with little or no assistance from him. The fast learners were allowed to go on to the next Exercise Set provided mastery was achieved.

The subjects of this study were randomly assigned by lottery. Validity and reliability of the research instruments were determined using the Pearson Product Moment of correlation. The performance of the two study groups in this experimental study were quantified and analyzed using the Analysis of Variance.

In general the findings of this study revealed that there was no significant difference in the performance of the subjects on the two treatment groups on Ratio, Proportion, and Percent and Geometry except on only one criterion - demonstrates increased skill in using processes and procedures in solving problems where the null hypothesis was rejected.

Since no significant difference existed between the two treatment groups on the whole test and the three mathematical skills or criteria, the self-directed instructional materials could also be used hand in hand with other teaching strategies in the teaching of elementary mathematics.

The researcher suggested that his study be replicated using a large population before a conclusive statement could be made with regards to its effectivity as a teaching strategy in the teaching of elementary mathematics.

Education. Self-directed instructional materials (SDIM).

- 0242 An economic review on the productivity and profitability of the two Philippine coconut tall varieties. Magat, S.S., Canja, L.H.. **The Philippine Journal of Coconut Studies**, , 32(1-2):23-39

Two known tall varieties of coconut in the country were considered in this analytic work to generate indicative information and knowledge on the productivity and production economics in growing tall coconut varieties. These are Laguna Tall (LAGT) and Baybay Tall (BAYT) grown at the genetic blocks of Zamboanga City, which is a coastal-flat area of Western Mindanao and an intermediate growing zone of coconut. The data from establishment, maintenance and yield for the first 15 yr from field-planting (FP) were used in this simple production economic analysis, a practical tool for decision-making in coconut farming.

Between the two coconut tall varieties evaluated, Baybay Tall has

consistently demonstrated its high yields and its highly desirable attributes than the traditional Laguna Tall variety. BAYT had an earlier initial harvest of 6 yr compared to 7 yr of LAGT. It is also generated higher gross return, net returns, benefit-cost ratio (BCR) of 1.66-4.12 vs 1.05-3.30 for LAGT, and earliest break-even year (BEY) of 9 yr vs. 14 yr at a copra price of P14/kg. Based on the results, BAYT deserves more attention in terms of profitability; suggesting more planting materials should be grown in coconut farm locations similar to conditions of intermediate growing zone of coconut. Implications in coconut planting/replanting, palm productivity and profitability as influenced by the different planting materials are discussed with respect to policies in coconut industry development. (PhP 49 = 1 US\$) **(Author's abstract)**

Coconut production. Coconut palms. Tall variety. Replanting. Coconut productivity. Economic profitability. Nuts. Copra yield.

- 0243 Two lectins from the leaves of mahogany, *Swietenia macrophylla* KING. Rodelas, Abigail Joy D., Lacsamana, Marivic S., Merca, Florina E.. **Transactions of the National Academy of Science and Technology Philippines**, , :379-380

Lectins are carbohydrate-binding proteins or glycoproteins of non-immune origin that can agglutinate cells and/or precipitate glycoconjugates. This study reports the presence of lectins in some Meliaceae species and the purification and partial characterization of two lectins from the leaves of *Swietenia macrophylla* King (large-leafed mahogany).

Crude leaf extracts of twelve Meliaceae species were screened for lectin activity using the hemagglutination assay. Eight of these species namely, *Azadirachta indica* (neem), *Dysoxylum cumingianum* (tara-tara), *Melia azedarach* (chinaberry/paraiso), *Melia dubia* (bagalunga), *Sandoricum koetjape* (santol), *Swietenia macrophylla* King (large-leafed mahogany), *Swietenia mahogany* (small-leafed mahogany) and *Toona calantas* (kalantas) gave positive results. The strongest lectin activity was observed in the crude leaf extract of *Swietenia macrophylla* King.

The lectins in the mature leaves of *Swietenia macrophylla* King were isolated by extraction with 0.02 M phosphate buffer containing 0.15 M NaCl, pH 7.2, and purified by sequential ammonium sulfate fractionation and gel permeation chromatography on Sephadex G-150.

The two purified lectins from the mature leaves of *Swietenia macrophylla* King namely, Lectin 1 and Lectin 2, were both non-blood type specific because they agglutinated all human blood types (A,B,O and AB) However, only Lectin 1 was able to agglutinate the calf, swine and carabao erythrocytes used in the study. Hapten inhibition assay using all four human blood types showed that the sugar specificity of Lectin 1 was directed towards several sugars such as L-(+)-arabinose, D-(+)-mannose, D-(+)-galactose, α-L-rhamnose, methyl-α-D-mannopyranose, D-(+)-glucosamine, sucrose and α-D-(-)-fructose while the agglutination reaction of Lectin 2 was not inhibited by any of the sugars tested. Both lectins were found to be glycoproteins containing 0.50% and 1.57% carbohydrate, respectively.

SDS-PAGE gave two protein bands for Lectin 1 with estimated molecular

weights of 210 and 200 kD. For Lectin 2, only one protein band was observed with a molecular weight of approximately. **(Author's abstract)**

- 0244 Reactions of married tausog women toward birth control methods and their implications to population education. Bernardino, Emilia T.. **Research Journal**, , 4(1):47-52

This study aimed to identify the reactions of married Tausog women of San Raymundo, Jolo, Sulu and their implications to population education. Specifically, it sought to answer the following questions:

1. What are the reactions of married Tausog women of San Raymundo toward the different methods of birth control?
2. What are the birth control methods married Tausog women accept and use?
3. What factors affect their birth control practices?
4. How may the findings of this study be used in the community?

The hypotheses tested were:

1. Married Tausog women of San Raymundo, Jolo, Sulu, have negative reactions toward birth control practices.
2. The commonly accepted and used birth control methods are: the herbs, prolonged breastfeeding, and the pills.
3. Factors that affect their birth control practices are: lack of knowledge, husband's attitudes, financial status, and fear of side effects.

The respondents involved in this study were 200 married Tausog women of San Raymundo, Jolo, Sulu. The instrument used was a checklist-questionnaire patterned after a questionnaire being used by the Family Planning Clinic of World Neighbors, Zamboanga City. The checklist-questionnaire consists of two parts. The first part deals with birth control methods. To supplement this questionnaire, personal interviews were conducted to insure validity and reliability of this study.

Population education. Birth control methods. Tausog women. Education.

- 0245 Science and culture and education for change part II. Bernido, Christopher C., Carpio-Bernido, M. Victoria. **Transactions of the National Academy of Science and Technology Philippines**, , 26(2):268-276

Barriers hindering the widespread development of scientific manpower in the Philippines are examined. Specific measures aimed at breaking these barriers are proposed. These involve concerted effort of the government and private sectors. A small privately run research center in the island province of Bohol, which has gotten support from the Department of Science and Technology and foreign agencies on a project-by-project basis, is cited as an initiative with modest but real contributions. **(Author's abstract)**

Science culture. Scientific manpower. Science education. Education.

- 0246 Science culture and education for change part I. Carpio-Bernido, M. Victoria, Bernido, Christopher C.. **Transactions of the National Academy of Science and Technology Philippines**, , 26(2):243-267

The current situation of Philippine education presents problems and challenges of staggering proportions. With old paradigms deemed insufficient, we present investigations of new structures that could boost effectiveness of the Philippine educational system. These apply the key observation that, Money is not the problem. Culture is the problem. In particular, we address the questions: What programs can foster the highest levels of learning, creativity, and productivity while overcoming severe constraints of poverty, low standards of living, substandard learning conditions, and formidable cultural barriers? What programs can generate higher levels of human development for a country by the cultivation of a healthy, cultured, and socially responsible citizenship?

We present an innovative, differentiated, and target-oriented program for high impact multi-disciplinary learning in the High School. Essential features include (1) Parallel Learning Groups (Modified Jigsaw Strategy), (2) Activity-based Multi-domain Learning, (3) In-school Comprehensive Student Portfolio, and (4) Strategic Study and Rest Periods. The program, implemented since school year 2002-2003 in a rural private high school in Bohol, proves to be a robust workable scheme even in its initial stages. It is student-teacher-administrator friendly and can easily be modified and adapted to different levels of affluence (or poverty) of public and private high schools. Although implemented with the 2002 Basic Education Curriculum (BEC), the program is compatible with other curricula. The program has resulted in the progressive enhancement of cognitive and affective learning of students, with each year's graduates, on the average, exceeding performance levels of the previous year. This is shown by external checks of performance such as the number of students who pass the University of the Philippines College Admission Test (UPCAT). **(Author's abstract)**

Multidisciplinary learning. Innovative strategies. Secondary education. Education.

ENGINEERING

- 0247 Acetylcholinergic receptors in the CA1 region of the rat. Salunga, Thycudides L., Kawashima, Takashi, Akaike, Tadashi, Sugai, Tokio, Onoda, Norihiko, Matsunami, Ken'ichi. **Transactions of the National Academy of Science and Technology Philippines**, , :339

Optical responses were recorded from the rat hippocampal slices (450 μm), stained with a voltage sensitive dye, RH 482 (0.01%), using a real-time optical recording system to study the cholinergic influence on hippocampal activity. The recording system consists of a camera head with a 128 x 128-photodiode array with a high time resolution of 0.6 ms. Electrical stimulation was applied through a bipolar electrode placed in the fornix to

stimulate the cholinergic pathway.

Electrical stimulus evoked a response that propagated both to the dentate gyrus and CA1 region. Latencies of response varied among slices with a median value of 13 ms. In the presence of acetylcholine (Ach) or carbachol (CCh) the optical response was diminished specially in the CA1 region. This effect was nearly abolished by atropine. Furthermore, GABA at low concentration also attenuated the response and with the addition of Ach/CCh further inhibition was seen. Application of Ach and CCh had little effect on optical signals around the stimulating electrode where direct activation of nearby cells or non-synaptic response is mostly responsible for the recorded optical responses.

We conclude that the inhibitory effect of acetylcholine and its agonist can be brought by activating the muscarinic receptors in the GABAergic inhibitory interneurons. This activation increases the excitability of the interneurons and that synaptically released. Ach increases interneural activity. The partial effect of muscarinic antagonist atropine suggests that only muscarinic but also nicotinic receptors are activated as demonstrated by the effect of d-tubocurarine. **(Author's abstract)**

- 0248 Analysis of defect structures in silicon solar cell materials. Mena, Manolo G.. **Philippine Engineering Journal**, , 6(1):66-73

Three (3) solar cells fabricated from EFG ribbons were subjected to quantitative defect analysis on several surface planes. The internal planes were observed by removing surface layers of silicon atoms by chemical dissolution. The results show that the average dislocation pit density varies from one surface plane to another. The procedures for chemical polishing and etching, as well as the process of quantitative defect analysis are also discussed.

Engineering. Metallurgical engineering. Silicon solar cell. Quantitative defect analysis.

- 0249 Analytical generation of stress-strain properties of coir fiber reinforced composites in axial compression. Jorillo Jr., Pablo A., Verdejo, Benjamin D., Lopez Jr., Romeo G., Baarde, Reynaldo O. . **Philippine Engineering Journal**, , 16(1):27-48

This paper examines the compressive stress-strain properties of concrete and mortar matrix reinforced with a natural cellulosic fiber i.e., coconut (coir) fiber. An extensive experimental program was carried out to investigate the inter-relationship of fiber reinforcing parameters such as fiber volume fraction, length or aspect ratio in combination with different grades of concrete or mortar matrices and the resulting stress and strain properties of the fiber-cement composite materials in axial compression. In order to characterize the stress-strain curve of a fiber concrete/mortar, a fractional second degree polynomial model developed by Sargin (1971) and modified by Wang et al. (1978) was used in this study. Findings showed that the analytical model can

satisfactorily generate the complete stress-strain properties of a fiber composite material based solely on the knowledge of material properties of the composite constituents.

Engineering. Coir fiber reinforced composites.

- 0250 Analyzing impacts of transportation infrastructure and policies on traffic flow in Metro Manila using advanced tools and techniques. Regidor, Jose Regin F.. **Philippine Engineering Journal**, , 25(1):1-14

Various transportation infrastructure and policies have been implemented in the Philippines in order to ease traffic congestion and other transportation and traffic problems. Many of these are in Metro Manila, comprising a long list that includes grade separation devices, traffic control facilities, and vehicle restraint measures. These have been generally perceived to have positive impacts and have led to the construction of more infrastructures or the continued implementation of traffic schemes. Nevertheless, there are sectors that have not taken advantage of available impact assessment techniques and tools to systematically and properly evaluate the effects of infrastructure and policies on transportation and traffic. This paper presents the most popular methods and some tools for appraising effectiveness of infrastructure and policies. Several examples are discussed and results are used in formulating recommendations regarding best practices in impact assessment.

Engineering. Impact analysis. Transportation infrastructure. Policies. Traffic flow.

- 0251 Applications of machine vision in agriculture. Paita, Bernabe L.. **Philippine Engineering Journal**, , 19(1):35-54

Machine vision is an emerging field of technology that is expected to create a pervasive impact in the future. A simple definition of machine vision is

Engineering. Machine vision applications. Agricultural engineering.

- 0252 An approximate design technique for microstrip parallel-coupled band-pass microwave filter. Ambrosio, Raymond Gerard O.. **Philippine Engineering Journal**, , 17(1):1-12

An approximate design technique is presented for parallel coupled bandpass filter in microstrip form. Both computational and graphical forms together with simulation software are used to optimize the design. Due to the use of several graphs and approximations, an average of 3% deviation from the computed to the final simulated design was noticed.

Engineering. Microstrip parallel-coupled band-pass microwave filter.

- 0253 An assessment of the hypoglycemic property of *Syzygium cumini* LINN. and *Musa paradisiaca* LINN.. Santiago-Mendoza, Jasmine S., Ysrael, Mafel C.. **Transactions of the National Academy of Science and Technology Philippines**, , :341

Syzygium cumini L. and *Musa paradisiaca* L. are used in traditional medicine in lowering blood glucose levels. Although these plants have been reported to have hypoglycemic properties, their effects on blood glucose levels should be studied in detail to be able to use them judiciously even at crude state.

The juice from the ripe fruits of *S. cumini* L. was freeze-dried while the unripe fruits of *M. paradisiaca* L. was extracted using ethanol as solvent. Each crude fruit extract dissolved in water was given orally at a dose of 1.25g/kg BW to nondiabetic and diabetic Swiss mice at different prandial states: fasting and postprandial. Blood was collected at different time intervals through the ocular vein. Concentration of glucose in the blood was determined by glucose-oxidase method. The hypoglycemic activity was expressed in terms of % reduction in the blood glucose level.

Results showed that in nondiabetic mice, *S. cumini* L. and *M. paradisiaca* L. had significant effect in fasting state ($p < 0.02$) and in postprandial state when each extract was fed simultaneously with glucose solution ($p < 7 \times 10^{-5}$). In diabetic mice, none of the two extracts showed any effect in the fasting state. However, *S. cumini* L. opposed the rise in postprandial blood glucose level when extract was given thirty minutes before glucose load (percentage reduction of blood glucose level: -117 ± 35 in the control vs. -10 ± 2 , $p < 0.002$) *M. paradisiaca* L. showed a tendency to raise (-337 ± 56) the postprandial blood glucose levels 30 minutes after it was administered orally together with glucose solution. Reduction of -56 ± 20 followed at 75 minutes. The results indicated that these two fruits have interesting possibilities as source of oral hypoglycemia agents. **(Author's abstract)**

Syzygium cumini. *Musa paradisiaca*. Hypoglycemia. Diabetes mellitus.

- 0254 An assessment of the morphological system of classification of Philippine *Acanthamoeba* isolates by riboprinting. Pilar, Anna Victoria C., Enriquez, Gloria L., Matias, Ronald R.. **Transactions of the National Academy of Science and Technology Philippines**, , :337

Acanthamoeba spp. is a group of free-living, ubiquitous amoebae that are the causative agents of keratitis and granulomatous amebic encephalitis. Due to problems encountered in the identification of *Acanthamoeba* isolates based on the current morphological system of classification, other methods have been employed in determining the correct species designations of *Acanthamoeba* isolates. Riboprinting (PCR/RFLP) is one of the most recent methods which involves restriction digestion of PCR products after amplification of the mitochondrial and nuclear small subunit (SSU) r RNA gene. Eight *Acanthamoeba* environmental isolates were obtained from Baguio (Bag), Mt. Arayat (MA), Tanauan Batangas (MB), Misamis Oriental (MO), Puerto Princesa (PP), Sierra Madre (SM), Tuguegarao (TS) and Novaliches (W4). These were studied based on morphological characteristics, isoenzyme

analysis, and Riboprinting. These were also identified through PCR using genus- and species-specific primers. All isolates exhibited the characteristics of morphological Group II (polygonal cysts). Data from isoenzyme analysis and Riboprinting were analyzed using cluster analysis. Grouping based on cyst morphology correlated well with isoenzyme analysis and Riboprinting. MA, MB, MO, and PP could belong to a different species based on morphology, 18S Riboprinting, isoenzyme analysis, and PCR identification using species specific primers. W4 was found to be very similar to the reference strains *A. castellani* (Ma) and *A. polyphaga* (Jones). SM could belong to another species that is related to the Castellani group on morphology, isoenzyme analysis, and PCR identification using species-specific primers. However, further studies would have to be done on Bag and TS for species identification.

In determining the correct species designation of asexually reproducing organism such as *Acanthamoeba*, both morphological and molecular data should be incorporated. A classification scheme based on these data would be provide information regarding the diversity of various *Acanthamoeba isolates*.
(Author's abstract)

Acanthamoeba. Keratitis. Riboprinting. RFLP. Small subunit (SSU) rRNA gene. Isoenzyme analysis. Cluster analysis. Cyst morphology.

- 0255 Assessment of traffic inputs to pavement design and rehabilitation. Regidor, Jose Regin F., Damaso II, Romeo A., Bilugan, April Rose V.. **Philippine Engineering Journal**, , 26(2):1-12

Traffic and the consequent loads that vehicles transfer to the roads are major factors considered in pavement design. Heavy vehicles, particularly trucks that carry the largest loads cause the most damage to pavements. In the design process, axle loads attributed to heavy vehicles are derived and the total equivalent standard loads are estimated over a design period. The total loads are then utilized in coming up with the appropriate design that takes into account pavement type and thickness, among others. This paper analyzes the traffic inputs to pavement design through assessment of actual highway sections along the Pan-Philippine Highway also known as the Doa Remedios Trinidad Highway. Original design loads due to previous projections of traffic is compared to present loads and new projections of future traffic loads. As such, pavement performance level could be gauged and the adequacy of current pavement types and thickness can be determined. Recommendations are formulated and proposed in relation to the importance of accurate traffic inputs in pavement design, especially the development of heavy vehicle factors that allow for a more accurate estimation of equivalent axle loads as well as implications to economic design of pavements.

Civil engineering. Traffic inputs. Pavement design and rehabilitation. Engineering.

- 0256 A background on system identification in structural engineering using kalman filter. Oreta, Andres W.C.. **Philippine Engineering Journal**, , 12(2):11-28

System identification is an important step towards the aim of evaluating the existing condition, assessing the degree of damage and deterioration and predicting the response of structures. In this regard, this paper aims to provide the structural engineer a background on the application of system identification in the field of structural engineering using Kalman filter techniques. The basic concepts in system identification and parameter estimation are described and the linear discrete Kalman filter algorithm used to carry out the system identification is summarized. To illustrate the system identification by Kalman filter, a single degree-of-freedom system was analyzed. A survey of researches related to this field is also presented.

Engineering. Structural engineering. System identification. Kalman filter.

0257 Beams. Pacheco, Edgardo S.. **Philippine Engineering Journal**, , 14(2):71-74

An interactive computer program was developed for the universal solution of the differential equation of the elastic curve which was derived by the author in an earlier paper. This program determines the reactions at the supports and constructs the shear and bending moment diagrams of statically determinate as well as statically indeterminate beams. It computes the maximum bending and transverse shear stresses for eight beam cross-sections. It also makes a sketch of the elastic curve and determines the deflection at selected points as well as the maximum deflection. The beam supports may be at the same or at different levels.

Engineering. Beams.

0258 Bilinear henstock-stieltjes integral. Jamil, Ferdinand P., Canoy, Jr., Sergio R.. **Transactions of the National Academy of Science and Technology Philippines**, , :353-354

Both the bilinear Riemann-Stieltjes and Moore-Pollard-Stieltjes integrals have certain difficulties and shortcomings in the case where the functions under the integral sign share a common discontinuity. To overcome some of the deficiencies of these integrals, a new integration process must be developed. In 1995, the second author introduced the bilinear Henstock-Stieltjes integral for Banach-valued functions and proved the existence of the integral in the case where the function is continuous and the integrator is of bounded variation or bounded semi-variation. Recently, these authors proved the existence of the same integral in the case where the function is regulated and the integrator is of bounded variation. Indeed, as seen and proved, the Henstock-Stieltjes integral is far better and has greater advantage than the former aforementioned integrals. In fact, as an example will show, the conditions that the integral. Furthermore, this paper offers two main results, namely, the existence of the bilinear Henstock-Stieltjes integral in the case where the functions are both regulated and a better integration by parts formula. **(Author's abstract)**

- 0259 Boiler performance of emulsified fuel. Manegdeg, Ferdinand G.. **Philippine Engineering Journal**, , 19(1):67-82

This research aims to show the performance of using emulsified fuel in a boiler. Bunker and three (3) fuel mixtures consisting of different proportions of bunker, water and catalyst were tested using three (3) nozzle sizes. Samples of the fuels tested including coal were subjected to fuel characteristic tests. A batch mixer was designed and fabricated to blend the fuel mixtures. The fuel mixtures were blended at the experimental sites using the formulated catalyst of the World Energy Extender Corporation. The process of emulsification done and the performance tests conducted area discussed in this study. Fuel characteristic tests were performed based on the codes o the American Society for Testing Materials and he International Organization for Standardization. Boiler performance tests were conducted based on the power test codes of the American Society of Mechanical Engineers. A water tube boiler in conformity with Japanese Industrial Standard code was used. It was observed that the thermal efficiency was lower when firing the boiler with fuel mixtures of bunker, water and catalyst than when only bunker was used. This research only proves that these fuel mixtures can be used as alternative fuels. It is recommended that further study should be conducted to improve and realize the full potential of emulsified fuels.

Engineering. Emulsified fuel. Boiler performance.

- 0260 On cayley algebras of dimension 2^r , $r \geq 4$. Cawagas, Raoul E.. **Transactions of the National Academy of Science and Technology Philippines**, , :354-355

The existence of Cayley Algebras of Dimension $n = 2^r$ is established by construction using a new procedure called the *ZSM Process*. These algebras form a class of flexible real algebras that includes the *Cayley-Dickson algebras* as a subclass. If $r \geq 4$, one of the smallest algebras of this type is the *sedonions* S ($n = 2^4$) which contains as subalgebras the *real numbers* R ($n = 2^0$), *complex numbers* C ($n = 2^1$) quaternions H ($n = 2^2$), all of which are associative, and the *Cayley numbers* (*octonions*) O ($n = 2^3$) which is nonassociative. This paper shows that these real algebras have a common structural base (the *Klein group* of order $n = 2^r$), and they all belong to a single family composed of classes of Cayley algebras of dimension 2^r . **(Author's abstract)**

Cayley-Dickson algebras ZSM process. Sedenions. Octonions. Quaternions.

- 0261 New challenges in building fire safety. Roque, Rolando G.. **Philippine Engineering Journal**, , 12(2):39-45

As building grow higher and their uses become more complex, and as plastic-based combustible loadings increase, building fires become a complex

problem. Dramatic progress has been made in fire protection engineering. Unfortunately, our local building and fire codes have lagged behind the current technology. Direct code application may not be the best and most economical solution. Alternative solutions must be equal to or better than the code requirements. Building fire safety is not accomplished only by installing a sprinkler system, but must also include an egress system that affords an acceptable level of life safety, an alarm and detection system that is reliable, an effective smoke control system, an economical fire protection covering for structural members, and a strategy for maximizing the capabilities and resources of the fire department. Integration of the various fire protection features is the new challenge in building fire safety.

Engineering. Fire protection engineering. Direct code application. Egress system. Fire suppression. Smoke control. Structural fire resistance.

- 0262 Channel utilization of a half-duplex ARQ protocol for packet radio channels. Abaya, Efren F.. **Philippine Engineering Journal**, , 12(2):1-10

ARQ is a common error control method for terrestrial data transmission. The different types of ARQ are reviewed, and channel utilization characteristics are summarized. A half-duplex go-back-N ARQ method is presented as a model for the AX.25 ARQ protocol used in packet radio, and an equation for channel utilization is derived and analyzed.

Engineering. Electrical engineering. Half-duplex ARQ protocol. Channel utilization. Packet radio channels.

- 0263 Characterization of rifampicin resistance in Philippine isolate of mycobacterium tuberculosis utilizing the RNA polymerase B gene. Montoya, Jaime C., Maglonzo-De Jesus, M.S., Reclusado, G., Sombrero, I., Ang, C.F.. **Transactions of the National Academy of Science and Technology Philippines**, , :345

Rifampicin resistant isolates of *Mycobacterium tuberculosis* in the Philippines were characterized using the rpoB gene (RNA polymerase gene). A total of 47 isolates were analysed using polymerase chain reaction and DNA sequencing. Majority of the Rifampicin resistant isolates of *Mycobacterium tuberculosis* in the Philippines showed point mutations in the rpoB gene (RNA Polymerase B. gene). Majority of the point mutations were in positions 526 (39.5%) and 531 (34.9%) and the most of these involved single nucleotide substitutions. Most of the point mutations associated with Rifampicin resistance were seen in the isolates from the National Capital Region (NCR) whereas majority of the Rifampicin resistant isolates without point mutations were seen in Laguna or areas outside of the NCR. This information may be used in subsequent studies for determining patterns of drug resistance as well as monitoring changing virulence and drug susceptibility of *Mycobacterium tuberculosis* that may impact on health policies related to tuberculosis control.
(Author's abstract)

Mycobacterium tuberculosis. RNA polymerase gene. Point mutation. Nucleotide substitution.

- 0264 Characterizing the spatial pattern changes of urban heat islands in Metro Manila using remote sensing techniques. Pereira, Rosalyn A., Lopez, Epifanio D.. **Philippine Engineering Journal**, , 25(1):15-34

This study characterizes the spatial pattern of urban heat island (UHI) phenomenon when in situ measurements are not available. Images obtained from remote sensors operating in the thermal infrared wavelength of Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper (ETM+) were used to derive the surface temperature of Metro Manila from 1989 to 2002; thereon, the formation of urban surface heat islands became apparent. The impact of urbanization to surface urban temperature is noticeable-the average annual rate of urban growth is found to be 1.33 percent while the rise of UHI has an annual growth rate of 0.8 degrees Celsius. Likewise, increase in land surface temperature is related to the decrease in leaf biomass. These were evident from changes in land cover parameters such as fractional vegetation cover and surface moisture availability. These parameters were derived by computing the normalized differences vegetation index (NDVI) from the images.

Engineering. Spatial pattern changes. Urban heat islands (UHI). Remote sensing techniques. Landsat thematic mapper (TM). Enhanced thematic mapper (ETM+).

- 0265 Cloning and sequencing of the LYS3 gene encoding homoaconitase in *Penicillium chrysogenum*. Teves, Franco G., Casqueiro, Javier B., Raymundo, Asuncion K., Martin, Juan F.. **Transactions of the National Academy of Science and Technology Philippines**, , :338

Two completely different biosynthetic pathways for L-lysine exist in nature. The diaminopimelic acid pathway is observed in green plants, bacteria and some phycmycetes. Yeasts and filamentous fungi synthesize L-lysine through the α -aminoadipic acid (α -AAA) pathway. While much has been known about the latter pathway in yeasts, so little is known about it in filamentous fungi in terms of the genes involved and its regulation. In *Penicillium*, only two genes in the pathway have been cloned so far. It is therefore imperative that more studies on the molecular genetics of the α -AAA pathway be undertaken for a clearer picture of this unique biosynthetic pathway. We have cloned the *lys3* gene from *Penicillium chrysogenum* by complementation of a lysine-requiring strain of *P. chrysogenum* called the L2 mutant with a clone from a genomic library. This clone carries a 4.3 kilobase pairs (kbp) of DNA fragment constructed on the plasmid vector pAMPF9L. Complementation was confirmed by plasmid rescue and re-transformation of the L2 mutant. A restriction map of the complementing fragment was prepared and sub-clones were constructed using pBluescript KS+/SK+ in two orientations for sequencing. Computer-aided assembly of contigs generated a 3.412 kbp sequence with an open reading frame (ORF) size of 2.406 kbp. Comparison with homologues in DNA databases world-wide revealed that the cloned *lys3* gene encodes for homoaconitase, the enzyme that functions in the second and third steps in the α -AAA pathway. The gene contains one intron and several putative regulatory sequences. Results are highly significant not only because the *lys3* gene

encoding homoaconitase is the first to be cloned in *Penicillium* but also because of the existence of putative functional domains in the gene based on sequence analysis. **(Author's abstract)**

L-lysine. Alpha-amino adipic acid. *Penicillium chrysogenum*. lys3 gene. Cloning. Complementation. Genomic library. Homoaconitase. Restriction map. Domains.

- 0266 Coding telephone numbers to avoid "wrong numbers". Abaya, Efren F.. **Philippine Engineering Journal**, , 17(2):1-28

"Wrong numbers" are an annoyance for owners of telephones. These incidents are due to several causes, of which the following two may be the most common: (a) pressing the wrong button on a telephone keypad, or (b) misreading a printed or handwritten telephone number.

This paper presents two methods for developing numbering plans that will reduce the incidence of accidental wrong numbers when using push-button telephone sets by utilizing an error-detecting code on telephone numbers. It is demonstrated that small telephone numbering plans for 2 digits to 4 digits can be quickly generated by using a weighted code or by exhaustive search. Rotary dial phones are not considered in the paper.

Engineering. Electrical & Electronics Engineering.

- 0267 Combining local and global features for offline handwriting recognition. Cajote, Rhandley D., Guevara, Rowena Cristina L.. **Philippine Engineering Journal**, , 26(1):21-32

HMM. Engineering. MLP. PRG. Offline handwriting recognition.

- 0268 Comparing diesel fuels at various T90 distillation temperatures. Denoga, Gerald Jo C., Quiros, Edwin N. . **Philippine Engineering Journal**, , 25(2):23-34

The performance of a Diesel engine was evaluated using fuels with varying T90 distillation temperatures. The T90 distillation temperature is an indicator of the yield of Diesel fuel extracted from crude oil. A higher T90 can translate to better utilization of raw petroleum resources. This experiment verified if high distillation temperatures have any effects on torque, power, specific fuel consumption and emissions. Engine vibrations were also measured and analyzed using accelerometers. Tests were done on a light truck engine connected to a chassis dynamometer.

Engineering. Diesel fuels. T90 distillation temperatures. Engine

performance. Vibration. Emissions.

- 0269 Computation of block error rates with randomly varying block sizes. Abaya, Efren F.. **Philippine Engineering Journal**, , 6(2):35-43

The block error rate (BLER) is a basic parameter of data communication channels which is usually computed on the assumption of independent and identically distributed bit errors and fixed block sizes. This paper presents a method of computing block error rates when the block sizes are allowed to vary according to a known probability distribution. It is shown that under some simple conditions the block error rate is relatively insensitive to the actual distribution or to the variance of the block length, and that it depends largely on the average block length. Some analytic and numerical computations are presented to illustrate the method.

Block error rates (BLER). Engineering. Block sizes. Analytic and numerical computations.

- 0270 A computer program to determine the lateral critical speeds of flexible rotors. Paran, Alexander P., Si, Willie C.. **Philippine Engineering Journal**, , 6(1):30-45

This program determines by numerical methods the lateral critical speeds of a rotating shaft of circular cross section and of uniform density. The core of this program uses the method developed independently by Prohl and Myklestad as adapted by J.W. Lund. There is no limit to the number of critical speeds that the program can find, the only requirement being that the shaft in consideration be divided into a sufficient number of sections. The program can handle either English units or the SI and the operator has a choice of entering some values in units of weight or units of mass. Another feature of the program is the ability to plot the mode shapes of the rotor at the different critical speeds.

Engineering. Mechanical engineering. Flexible rotors. Lateral critical speeds. Computer program.

- 0271 Conical grate rice husk combustor for grain drying. Hien, Phan Hieu, Quick, Graeme R., Cruz, Ibarra E.. **Philippine Engineering Journal**, , 14(2):21-44

An experimental conical grate rice husk furnace was designed, fabricated, and tested in Los Banos at the Agricultural Engineering Division of the International Rice Research Institute. Experiments were performed with the furnace under suction from an axial-flow fan. Drying air efficiency of the furnace was found to lie in the range 60-80 %. At a rice husk burning rate of 32-38 kg/hr, the furnace was compatible with a flat-bed dryer demand of 4-6 tons/batch for 6-8 hr continuous operation. The furnace has a simple cable-type transmission which provides synchronized fuel feeding and ash discharge, and is lightweight relative to its heat load. The charred ash from the furnace contained from 6 to 15 % unburnt carbon and was amorphous, as examined by the X-ray diffraction method. Problems in continuous operation of the gasifier-combustor were identified, the major constraint being rice husk feeding flow at high

temperature. A rice husk gasification equilibrium (RHGE) model was developed to predict gasifier performance. The model used a reactivity factor R_f to account for biomass reactivity relative to that of graphite, and took account of the ash content and the %Unburnt carbon of rice husk in the mass and heat balance equation. Comparison between RHGE model-generated data and published experimental data showed that the model adequately predicted gasifier performance.

Engineering. Rice husk. Combustion. Grain drying.

- 0272 Continuous beams on elastic supports. Pacheco, Edgardo S.. **Philippine Engineering Journal**, , 16(1):119-134

The integrated equation of the elastic curve of an elastically supported continuous beam that is acted on by any number of concentrated forces, concentrated couples, and uniformly varying loads is obtained by using the Laplace transformation. The support may consist of a Winkler foundation, and/or simple supports and/or cantilever supports which may be linearly elastic or rigid.

Engineering. Laplace transformation. Winkler foundation.

- 0273 Corrosion behavior of steel bar in chloride contaminated mortars with fly ash. Madlangbayan, Marish, Otsuki, Nobuaki, Nishida, Takahiro, Baccay, Melito. **Philippine Engineering Journal**, , 26(2):13-24

In this study, the corrosion behavior of steel in mortars with fly ash was investigated. Electrochemical measurements including the half-cell potential, current density, anodic polarization and cathodic polarization were performed. The test results showed that corrosion current densities in chloride contaminated fly ash mortars with longer curing are within the passivity limit. Also, from the anodic polarization curves, the passivity grades in chloride contaminated fly ash mortars with longer curing were the same as Ordinary Portland Cement (OPC) mortars which indicates that mortars with this binder can provide passivity to steel bars as effective as OPC mortars. Moreover, by cathodic polarization test, fly ash mortars exhibited the ability to reduce oxygen availability which leads to enhancement in corrosion performance.

Engineering. Steel bar. Corrosion behavior. Electrochemical measurements. Fly ash mortars.

- 0274 Corrosion of grinding media. del Rosario, Jr., Antonio F., Mena, Manolo G.. **Philippine Engineering Journal**, , 6(2):54-69

An experimental technique in resolving wet grinding media wear into its mechanical and corrosive wear component is presented. The results of the tests indicated that wet grinding media wear is approximately 46 percent

mechanical wear and 54 percent corrosive wear.

Grinding media. Engineering. Mechanical and corrosive wear component.

- 0275 Current status/role of biophysical studies in integrated coastal management sustainability in selected sites in Negros Oriental and Sogod Bay, Leyte Philippines. De Leon, Roy Olsen D. **Silliman Journal**, , 44(1):265-284

Biophysical studies have become an integral part of the Integrated Coastal Management (ICM) process. Such studies in most cases take a significant portion of the ICM budget costing about 14 percent of the year 1 budget per kilometer of costline. Yet, a review of different Coastal Resources Management (CRM) resources profiles and plans, legislation developed in aid of CRM, and augmented by interviews of 30 key informants in selected sites reveals that the biophysical data generated are underutilized. A trace of the flow of information in the ICM process cycle further reveals that in most cases, the information stop in the planning stage. The low utilization of information can be attributed to problems in accessing the information, lack of perceived need for the information, or lack of technical know how in utilizing the information as well as updating the information. **(Author's abstract)**

- 0276 Cytogenetic effects of sambong (*Blumea balsamifera* L.) tablets on human leukocytes cultured *In vitro*. Rabe, Rannie R., Lapitan, Delinia G., Azote, Candy B., Eusebio, Artemus F., Mendioro, Merlyn S., Villamael, Luisa N., Tandang, Rosalina N.. **Transactions of the National Academy of Science and Technology Philippines**, , :342

Cytogenetic effects of sambong (*Blumea balsamifera* L.) tablets, a diuretic medicinal drug were determined on human leukocytes cultured in vitro. Four concentrations (%) (0, 0.5, 1.0, and 1.5) were tested on 20 year-old male blood donors while concentrations (%) 0, 2.0, 3.0, and 5.0 were tested on 40 years old and above donors. The concentrations tested on young donors did not significantly affect mitotic index (0.140, 0.125, 0.111, and 0.104 for control, 0.5, 1.0 and 1.5, respectively). Mean frequency of cells with chromosomal breaks, gaps, loose sister chromatids and condensed chromosomes was low. Mean frequency of cells with gap was 0.019 for 0.5% and 0.039 for 1.5% with break was 0.005 for control and 0.039 for 1.5% and with loose sister chromatids was 0.034 for control while 0.074 or 1.5%. Concentrations tested on older donors significantly decreased the mitotic index; 0.122, 0.079, 0.072 and 0.041 for control, 2, 3, and 5%, respectively. No significant differences on mean frequency of cells with chromosomal aberrations were noted. Mean frequency of cells with gap was 0.019 for control and 0.021 for 5%. The number of cells with break remained low (0.014 for control and 0.019 for 5%). The same observation was noted for cells with condensed chromosomes (0.089 for control and 0.116 for 5%). Results indicate that *B. balsamifera* is not a mutagen since it exhibited no chromosome-damaging effect on human leukocytes. **(Author's abstract)**

Cytogenetics. Mitotic index. Chromosomal aberrations. Sambong. Blumea balsamifera. Loose sister chromatids. Breaks. Gaps. Condensed chromosomes. Mutagen.

- 0277 DC current measurement using magnetic flux in an electronic null balancing arrangement. Escoto, Jr., Miguel T.. **Philippine Engineering Journal**, , 26(1):33-44

DC current measurement using magnetic flux balancing with an automatic controller is presented. A ferromagnetic, toroidal core is used both as a flux detector and magneto motive force summer element. A symmetrical, AC triangular current sent through an excitation coil builds up flux in the core. The DC current to be measured is sent through a another coil, which sets up a bias magneto motive force or mmf. The bias mmf causes the core to reach saturation earlier on one side of the flux build up than on the other side. As core saturation is reached, a voltage pulse transition is detected in a separate winding by a Schmitt trigger. Its duty cycle varies with the amount of flux imbalance affecting an automatic control feedback which strives for zero flux, by sending an opposing current, through a fourth coil, producing a canceling flux. An electronic null balancing circuit was wired to verify the technique.

Keywords: Coercion point, flux, magneto motive force, Opamp, proportional-integral, residual flux, remanence, saturation, Schmitt trigger

Remanence. Proportional-integral. Engineering. Coercion point. Flux. Magneto motive force. Opamp. Residual flux. Saturation. Schmitt trigger.

- 0278 Delamination in plastic packages. Mena, Manolo G.. **Philippine Engineering Journal**, , 18(1):67-78

Delamination or the disbonding of the plastic moulding compound from various surfaces and interfaces in a packaged integrated circuit is a major cause of reliability failures. This paper reviews the causes of the said disbonding, the types of reliability failures that may be induced as well as various solutions available to prevent delamination.

Engineering. Metallurgical engineering. Plastic moulding delamination.

- 0279 Design and development of a two post rotary-percussion drilling rig. Borlagdan, Paterno C.. **Philippine Engineering Journal**, , 16(1):103-118

A two-post Rotary Percussion drilling rig (AMDP Model 2 Drilling Rig) for shallow tubewell irrigation development was successfully developed at the Agricultural Mechanization Development Program, University of the Philippines at Los Banos.

Consisting of a 5 horsepower horizontal shaft gasoline engine as the prime mover for rotary drilling, 4 horsepower direct coupled water pump for jetting, overhead platform mounted on two post system, a reduction gear box, hoist and cable system sub-assembly, sliding engine mount sub-assembly and basic strut supports; it is capable of drilling into various soil formations up to

100 feet and even deeper.

This paper presents the design features and especial capabilities of said drilling rig.

Engineering. Two post rotary-percussion drilling rig. Design and development.

- 0280 A design methodology for implementing RF CMOS low-noise amplifiers in a 0.25 μm CMOS process. de Leon, Maria Theresa Gusad, Alarcon, Louis Poblete. **Philippine Engineering Journal**, , 29(2):1-16

In this paper, a methodology in designing CMOS Low-Noise Amplifiers (LNAs) in a 0.25- μm CMOS process is proposed. Three power-matching techniques are considered in the design of the LNA. These are: (1) matching for maximum available gain, (2) matching for a constant gain, and (3) matching for stability. Twenty-two LNA circuits employing the common-source topology with cascode configuration are designed, implemented, fabricated, and tested. These circuits differ from each other in terms of the transistor dimensions, inductor and capacitor implementations, and bias voltages used. The performance of LNA circuits designed using the three different techniques are characterized. Simulation and actual measurement results are also compared and analyzed to determine the capability of the simulator to predict the LNA's overall performance at radio frequencies.

Engineering. Electrical and electronics engineering. Design methodology. RF CMOS low-noise amplifiers. 0.25 μm CMOS process.

- 0281 Design-storm unit-hydrograph computer program. Templo, Jr., Pedro T.. **Philippine Engineering Journal**, , 12(2):47-66

The estimate of the design flood is one of the governing inputs for the selection and sizing of many infrastructures. While the design storm unit hydrograph approach is one of the most reliable method for the estimate of flood magnitude, its computation if done manually, is too tedious. A computer program should make the method usable to a number of practicing hydrologists.

Engineering. Design storm unit hydrograph. Computer program.

- 0282 Detection of influential observations in canonical factor analysis. Mateo, Zenaida F.. **Transactions of the National Academy of Science and Technology Philippines**, , :357-358

Sensitivity analysis procedures have been previously studied by Tanaka and Odaka for detecting influential observations. Some of these analysis/procedures are the principal factor analysis, maximum likelihood factor and least squares factor analysis.

In the present study, it was shown that a similar method can also be developed in canonical factor analysis (CFA). The main objective here is to investigate the influence of a small change of data on the result of the analysis. One of the influence measures utilized to detect/assess influence observation is called Euclidean norm of $t \ddot{A}(1)t$. It is note mentioning that some techniques such as the usage of the Cholesky decomposition and its derivative are used to formulate the sensitivity analysis. First, the theoretical influence functions $s(X; \ddot{A})$ and $s(x; LL.)$ for the unique variance matrix \ddot{A} and the common variance matrix $LL.$, were derived and utilized in the formulation of theory.

The present method was applied to the Open/Closed book data (Mardia, Kent, Bibby, 1979). The data cover 88 students who took examinations in the five area subjects namely mechanics, vector, algebra, analysis, and statistics. The examinations of the five subjects were administered using a closed book and an open book method. A two-factor model is assumed and the canonical factor analysis was applied based on the correlation matrix.

The results showed that the two individuals No. 82 and 75 are the most influential among the 88 observations. It was observed that omission of these two observations is not small and influence appears mainly in the loading and communalities of the two subjects, that is in variable 1 (mechanics) and variable 2 (vector).

Considering the whole data set, the study revealed that there are two factors extracted namely: "Closed book test: and "Open book test". Omission of these two observations resulted to a vague structure, which suggest that the two individuals play important role in the analysis. **(Author's abstract)**

Influential observations. Canonical factor analysis. Euclidean norm. Cholesky decomposition. Unique variance matrix. Common variance matrix.

0283 Determination of all elementary nafil loops of order 7. Layno, Renilda S.. **Transactions of the National Academy of Science and Technology Philippines**, , :355

The study of NAFILs (*non-associative finite invertible loops*) is a new frontier in the theory of loops and quasigroups. This is a class of loops that includes the familiar IP, Moufang, and Bol loops which are involved in such diverse fields as finite geometries, combinatorics, and theoretical physics. Not much is known about other interesting loops in this class like the *elementary* NAFILs (loops with no non-trivial subsystem).

This paper deals with the study of elementary NAFIL loops of small order. In particular it presents studies on the determination of all elementary NAFIL loops of order $n = 7$ using the software FINITAS. This software was developed as a tool for the analysis and construction of finite algebraic structures.

The results shoe that there are exactly 2,333 NAFIL loops of order $n = 7$ out of which 16 are abelian and 2,317 are non-abelian. Out of the 16 abelian NAFILs, 8 are elementary. Of the 2,317 non-abelian elementary NAFILs, exactly 681 have one self-inverse element. To date we have determined about 176 non-abelian elementary NAFILs of order 7. Most of these elementary NAFILs have Cayley table that are full permutations. Moreover, many of these

have no known loop properties like IP (inverse property), AP (alternative property), CIP (cross inverse property), etc. The search for other elementary NAFILs of order 7 is still continuing. **(Author's abstract)**

Loop. Non-associative. Invertible. NAFIL. Elementary. FINITAS.

- 0284 Development of a car ownership model in Metro Manila. Rubite, Caesar P., Tiglao, Noriel Christopher C. . **Philippine Engineering Journal**, , 25(1):35-50

The Metro Manila region has been continuously growing swiftly over the past years. This rapid urbanization in the city center has spilled over its periphery, the adjoining municipalities. Accessibility between the outer periphery and the city center becomes very critical especially when people seek employment within the city center. With the lack of efficient transit system on one hand, and improved socioeconomic characteristics of the household on the other, the demand for private cars is expected to increase also. However, the limited supply of road space cannot keep pace with increasing demand. Therefore, it is necessary to manage the growth of car ownership in metropolitan areas. A basic understanding of individual and household attitudes towards car ownership would enable the formulation of effective policies and plans for managing car ownership. Knowledge of car ownership paves the way for a better understanding of the people's behavior which will greatly affect policy formulation and analysis in the future. The research is concerned with determining the various household characteristics which influence the household's decision to own a car. This decision is modeled as a binary choice incorporating the different household and individual characteristics as explanatory variables. The study used data taken from the Metro Manila Urban Transportation Integration Study Home-Interview Survey (HIS) database. The research revealed that the major factors affecting household decision to own a car are household income and number of working adults.

Engineering. Transportation engineering. Car ownership development.

- 0285 Development of a cellular automata modeling tool on a cluster computer. Saldaña, Rafael D., Yu, William Emmanuel S.. **Transactions of the National Academy of Science and Technology Philippines**, , :358

A cellular automaton (CA) is defined as a discrete dynamical system, where space, time, and the states of the system are discrete and have the following properties:

- (1) Space is represented by a regular lattice in one, two, or three dimensions.
- (2) Each site, or cell, in the CA lattice can be in one of a finite number of states.

Using the C programming language and the Local Area Multicomputer Message Passing Interface (LAM-MPI) parallel computing environment, we

developed a CA modeling and simulation tool on a cluster computer consisting of eight compute nodes.

The toolkit integrates four standard CA algorithms, namely (1) Game of Life, (2) Greenburg-Hastings, (3) Cyclic-Space, and (4) Hodgepodge Machine.

The developed modeling and simulation tool can be used to demonstrate the following complex phenomenal artificial life forms, neuron excitation, spread of diseases, and wave propagation in excitable media. **(Author's abstract)**

Cellular automata. Cluster computer. Parallel computing. Excitable media. Modeling and simulation.

- 0286 Development of a centrifuge for high-speed centrifugal extraction of moisture from macerated water hyacinth. Calilung, Edwin J.. **Philippine Engineering Journal**, , 19(2):13-42

Rapid mechanical dewatering of fibrous vegetative materials like water hyacinth requires separation of the process into two steps of maceration (cell breakage) and moisture extraction, to allow individual optimization for speed and efficiency. To fulfill the second step, centrifugal moisture extraction was explored. Centrifugal moisture extraction characteristics were determined using a fabricated batch loading centrifuge to determine its potential for rapid moisture extraction. A continuous-loading conical centrifuge was designed, fabricated and tested for continuous high-capacity moisture extraction from macerated water hyacinth. Batch centrifuge tests were conducted to establish the performance parameters for centrifugal moisture expression from macerated water hyacinth. The tests showed the following basic trends: - Percent moisture extraction, weight reduction, and vegetable matter loss significantly increased with increasing degree of maceration. - Percent moisture extraction, weight reduction, and vegetable matter loss increased as centrifugal acceleration was increased. - Percent moisture extraction, weight reduction, and vegetable matter loss increased with increasing spin duration. Moisture and weight reduction were observed to exponential functions of spin duration and a critical spin duration of 5 seconds was determined for all treatments. Moisture and weight reduction were also found to be a linear function of centrifugal acceleration. Little change, however, resulted from increasing levels of centrifugal acceleration. Greater moisture and weight reduction resulted from increasing degree of maceration (though extrusion in a die ring with small hole diameter or several maceration passes). The target moisture reduction was attained at a centrifugal acceleration of 1341-g, 5 seconds spin duration and with the hyacinth macerated in a 6.35 mm die ring or twice macerated in a 12.70 mm die ring. To achieve higher throughput and better efficiency, a cone type continuous-loading centrifuge was designed, constructed and tested. The prototype, however, did not function properly due to the inherent difficulty of controlling the flow of fibrous macerated material up the conical screen surface. The material tended to form a mat that was difficult to break and which remained fixed on the cone surface. A system for controlled and positive displacement of the material along the conical screen surface should solve the problem, but will complicate the design, require high fabrication tolerances and increase machine costs considerably.

Engineering. Centrifugal moisture extraction. Macerated water hyacinth.

- 0287 Development of data, models and techniques to determine optimal reliability level of electric power supply for the Philippines. Viray, Francisco L., del Mundo, Rowaldo R., de la Cruz, Donato S., Ojeda, Ma. Concepcion O., Pangilinan, Ma. Lourdes D.. **Philippine Engineering Journal**, , 12(3):69-92

This study develops models and techniques to determine optimal reliability level of electric power supply for the Philippines using data from NPC Luzon grid. A survey of outage cost incurred by industrial firms in Metro Manila and suburbs from January to June 1990 was used to develop the outage cost model. The cost of increasing reliability and the cost of having an unreliable one, from the point of view of the national economy are combined to determine the optimal level which is the point where the total cost is minimum.

Engineering. Electric power supply. Data, models and techniques. Optimal reliability level.

- 0288 The development of multiple objective programming methods for forest land management planning. Bruce Bare, B., Mendoza, Guillermo. **Philippine Engineering Journal**, , 4(1):92-110

Multiple objective programming (MOP) has undergone a rapid period of development in the 1970's. Concurrently, increased land-use pressures have stimulated forest land management analysts to develop and utilize more sophisticated planning aids to address complex multiple use issues involving multiple objectives and decision-makers. In this paper, a selected set of MOP methodologies are reviewed and evaluated in terms of their utility and applicability as land management planning tools. The STEP method is selected as an appropriate technique and is applied to a forest land management problem. Two objective function weighting procedures are illustrated. Although no MOP technique by itself can resolve land management conflicts, the STEP method offers promise as a rational-systematic means of exploring alternative feasible solutions to the multiple objective forest land management problem.

Multiple Objective Programming (MOP) or Multi-Criteria Decision Making (MCDM) is concerned with planning problems in which several conflicting objectives are to be optimized simultaneously. Multiple use forest planning exemplifies this situation because most forest land use planning problems involve a consideration of multiple conflicting goals and objectives such as: increased net revenue from timber resources, improved water quality, protection of wildlife, preservation of natural beauty, and increased recreational opportunities.

Engineering. Forestry. Forest land planning and development management.

- 0289 Digital signal conditioning of bioelectric signals:. Rodriguez, S.V., Guevara, R.C.L.. **Philippine Engineering Journal**, , 20(2):6-17

This paper presents possible ways of implementing digital Finite Impulse Response (FIR) filters in microprocessors to perform signal conditioning on biomedical electropotential signals, specifically electromyogram (EMG) and electrocardiogram (ECG). Digital filters are useful for these applications because of the flexibility offered by these filters as compared to their analog counterparts. This study focuses on the FIR type of digital filters because of their potential to minimize the distortion introduced to a signal. Different FIR filter design implementations are presented in order to come up with a comparative performance of the different implementations. The filters will be compared based on performance, accuracy, cost and complexity. Requirements and recommendations will be made describing various alternatives in digital filter implementation.

Engineering. Digital filter implementation. Digital signal conditioning. Bioelectric signals.

- 0290 Diversion requirement estimation for paddy rice irrigation systems. De Vera, Maximo R.. **Philippine Engineering Journal**, , 12(1):1-14

A methodology for estimating the diversion requirement of lowland rice is presented using a cropping pattern based on rainfall distribution and dependable streamflow in the Bicol River basin. The case study involves some 8,000 hectares to be irrigated. Results of the study showed decadal irrigation diversion requirement varying from 0.07 to 1.76 liters/second/ha depending upon effective rainfall and crop growth stage. These figures are useful for system design and operation including water management.

Engineering. Water resources engineering. Irrigation systems. Diversion requirement. Lowland rice.

- 0291 A DSP-based solution to the early identification of hearing impairment. Valentus, Vincent Peter C.. **Philippine Engineering Journal**, , 17(1):63-70

This paper describes the development of a low cost DSP solution for the early identification of bearing impairment. The desire is to develop a cost-effective, highly sensitive, and easily administered screening system for the evaluation of human hearing acuity.

The proposed system is called EARTEST. EARTEST is basically a DSP-based screening audiometer capable of performing pure tone air conduction testing.

Engineering. EARTEST.

- 0292 EEE student mortality-performance analysis. Denoga, Gay Marie C.. **Philippine Engineering Journal**, , 20(1):1-8

This is a study of students performance/mortality in the EEE curriculum for the UP EEE Classes of 1990 to 1996 based on student grades in the DEEERS database incurred within the time frame from 1991-1997 using Digital Signal Processing techniques, for the purpose of obtaining a measure of, and predicting a student's course completion capability.

Engineering. EEE student. Mortality-performance analysis.

- 0293 Effect of percentage alumina on the growth kinetics of copper and hardness of Cu-Al₂O₃ composite. Velasco, Angelito A., Digsay, Charmaine Florabel A., Balajediong, Jennifer M.. **Philippine Engineering Journal**, , 25(1):51-60

In this paper, the effect of the amount of alumina reinforcement on the growth kinetics of copper grains during the early stages of sintering and hardness of the composite was investigated. Samples were obtained by mixing the powders of copper and alumina of different compositions (5% and 10%wt alumina) and compacting at 3,000 psi. Sintering is done using a tube furnace in a nitrogen atmosphere for varying times (10, 20, 40, 80, 160 minutes) and temperatures (750C, 850C, 950C). Afterwards, the samples were prepared for metallographic examination and the average grain size of copper was measured. Photomicrographs showed an increase in copper grain size and decrease in porosity with increasing temperatures. From the kinetic study, the following grain growth equations for 5% alumina and 10% alumina copper-matrix composite were obtained. Hardness measurements were performed using the Vickers Hardness Tester. Higher hardness of the composite was attained at increased temperatures and % alumina.

Engineering. Cu-Al₂O₃ composite. Alumina. Copper. Growth kinetics.

- 0294 Effects of light quality and duration on the germination of *anthocephalus chinensis* rich. ex walp. seeds. Quintos, M.M., Sandoval, L.D., Dela Cruz, R.E.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :44-46

The effects of different light quality and exposure time on the germination of Kaatoan bangkal, *Anthocephalus chinensis* Rich. ex. Walp., seeds were studied. Seeds were exposed to four light-quality treatments: white, red, yellow, and blue lights. Seeds exposed to white and red lights gave significantly higher germinations (78% and 73%, respectively) compared with those exposed to yellow (59%) or blue (0%) light. Blue light significantly inhibited germination. Transferring the seeds exposed to blue light to 12-hour white light significantly reversed the inhibition process giving 53% germination. Other seeds were exposed to continuous white light, 12-hour white light and 12-hour dark periods, and continuous dark conditions for 20 days. Seeds exposed to 12-hour light and 12-hour dark periods gave higher germination (72%), than those seeds exposed to either continuous light (13%), or continuous dark (1%). Seeds exposed to either continuous light or dark treatments, when transferred to 12-hour light and 12-hour dark periods significantly increased germination to 67% and 55% respectively. (Author's

abstract)

- 0295 Effects of pulsed operations on isothermal reactions in a CSTR. Escoto, Angela D.. **Philippine Engineering Journal**, , 6(2):70-84

This paper shall look into the possible effects of deliberate unsteady state processing brought about by introducing sinusoidal fluctuations to stable plants. This practice is commonly referred to as PULSED operations. Effects of input disturbances such as sinusoidal variations in feed rate and/or feed composition are reflected on the time average value of the system output. It will be shown that the time average performance from periodic reactor operation is sometimes superior to that obtained from steady state processing. The following cases are considered: (1) second order, irreversible reaction in an isothermal CSTR, 2A-B and (2) results of work done by other authors on complex reactions using parallel reactions, 2A-B and A-C, and consecutive reactions nA-B-C.

Engineering. Pulsed operations. Isothermal reactions. CSTR.

- 0296 Efficacy and safety of sucralfate enema in the prevention of radiation proctitis. Atienza, Melflor A.. **Transactions of the National Academy of Science and Technology Philippines**, , :343

Radiotherapy has extended the lives of patients with malignancy. However, this often results in complications including radiation proctitis which may lead to strictures and recurrent bleeding. The study aimed to determine the efficacy and safety of sucralfate enema in preventing radiation proctitis. Twenty-four patients who underwent abdominal radiotherapy at the Philippine General Hospital were randomized to receive either 10% sucralfate enema (Treatment group: n=12) or placebo (Control group: n = 12) during the course of radiotherapy. Patients were followed up every two weeks until two months after the end of therapy then every month for four more months. Proctosigmoidoscopy is done at the end of radiotherapy, one, two, and six months after. Failure of prophylaxis was defined as the development of radiation proctitis based on clinical, endoscopic and histologic criteria. Adverse drug effects were monitored. Two patients in the control group were lost to follow up. Two out of twelve patients in the treatment group and four out of ten patients in the control group developed radiation proctitis. Diarrhea with no other evidence of radiation proctitis was observed in one patient in the treatment group. This study showed trend toward a decrease in the incidence of radiation proctitis with sucralfate enema. **(Author's abstract)**

Radiation. Proctitis. Sucralfate. Randomized controlled trial. Prophylaxis. Proctosigmoidoscopy. Radiotherapy complications. Enema.

- 0297 Elasto-plastic soil-structure analysis by bem-fem substructure method. Zarco, Mark

A., Kuppusamy, Thangavelu. **Philippine Engineering Journal**, , 17(2):53-66

A method for solving soil-structure interaction problems which includes the infinite boundary effects of the far field domain is developed. The method involves coupling boundary elements based on the Melan fundamental solution with finite elements in a manner so as to result in a system of equations which is both symmetric and banded. Analyses of nonlinear soil-structure interaction problems such as bearing capacity, lateral earth pressure and U-frame lock construction problems are performed to investigate the far field domain effect.

Engineering. Engineering sciences. Elasto-plastic soil-structure analysis.

0298 Elimination of assembly-induced package cracks in plastic soic. de Guzman, Jose Cesar, Epistola, Elmer, Mena, Manolo G.. **Philippine Engineering Journal**, , 18(1):37-66

Considerable amount of information and knowledge is available on moisture-induced package cracking, especially on surface mount devices. During IC assembly itself, plastic packages are subject to thermal and mechanical stresses which may lead to package cracking or degrade package strength, thus making the package more susceptible to moisture effects. This study was conducted to characterize and understand assembly-induced package cracking in SOIC's. Probable sources of thermal and mechanical stresses were identified by analyzing each station of the SOIC back-end assembly process. Each package cracking mechanism identified was defined in terms of its associated failure modes and rootcauses. The critical areas identified include mechanical deflashing, dambar removal, lead forming, singulation and IR ink curing. Mathematical models of the cracking mechanisms in these areas were developed and used to understand process input variables that affect the tendency of a package to crack. Evaluations, simulations and failure history reviews were then done to verify and substantiate the models with actual data. Process improvements were then defined based on the assembly input variables verified to be critical to SOIC package cracking tendency. These improvements include tooling modifications which reduces stresses during assembly, prevention and assignable causes through design and system improvements and tool life evaluations which eliminate potential sources of worn out tools. Package robustness measures such as anchor holes, improved tie-bar designs v-grooves and dimples were also analyzed. Process controls, monitors, contingency measures and short-looped reliability tests were likewise developed for early detection and containment package crack occurrences on the line. Results of the study showed that assembly-induced package cracking may be minimized through proper management of mechanical and thermal stresses at back-end assembly. Key areas identified include: - Reduction of mechanical stresses through process and tooling design improvements; - Elimination of process deviations and/or problems by using effective process controls and early detection monitors; and - Package robustness enhancement schemes.

Engineering. Assembly-induced package cracking. SOIC.

- 0299 Emulsified fuel performance on compression ignition engine. Manegdeg, Ferdinand G.. **Philippine Engineering Journal**, , 20(2):18-31

The research aims to show the performance of using emulsified fuel in a compression ignition engine. Diesel and four (4) fuel mixtures consisting of different proportions of diesel, bunker, water and catalyst were tested at various storage durations and engine parameters. A batch mixer was designed and fabricated to blend the fuel mixtures. It was observed that the thermal efficiency was lower when firing the engine with fuel mixtures of diesel, bunker, water and catalyst than when firing the engine with straight diesel. The research however, proves that the fuel mixtures can be used as alternative fuels without engine modifications. There is no substantial difference on the engine performance for all the tested fuels at various storage durations.

Engineering. Emulsified fuel. Compression ignition engine.

- 0300 An energy-saving idea for airconditioning systems in phased construction projects. Santos, Arturo Martin B.. **Philippine Engineering Journal**, , 12(3):107-110

In multiple-building projects wherein the buildings are constructed one by one, the number of standby chillers for the whole complex will be more than necessary if each buildings air conditioning systems is exclusive to itself. However, if the refrigeration plants of these buildings are interconnected, the number of standby units will be reduced compared to the conventional method of designing refrigeration plants for airconditioning in phased construction projects. This paper discusses the design concept undertaken by the DCCD Engineering Corporation for the Ayala Center in Makati.

Engineering. Airconditioning systems. Energy-saving method. Phased construction projects.

- 0301 The engineering innovation center:. Abis, Leopoldo V.. **Philippine Engineering Journal**, , 19(2):1-12

Commercialization of technologies through licensing and patenting has been practiced worldwide. University-based licensing offices that bring university research and development outputs to the industry have become a major source of income for continued support for R&D activities. Industries involved in the transfer of technologies have benefited well with their collaboration. The Engineering Innovation Center is the unanimous response of the University of the Philippines College of Engineering, the National Engineering Center, the University of Philippines Alumni Engineers, and the U.P. College of Engineering Research and Development Foundation, Inc. in promoting commercially the R&D outputs of the U.P. College of Engineering and the National Engineering Center. This paper presents the goals and strategy of Innovation Center as well as its present involvement and future plans.

Engineering. Engineering innovation center. Goals and strategy. Industry and academe

collaboration.

- 0302 Engineering manpower and training needs of the various industries vis-a-vis curricular/training programs in selected engineering schools. Viray, Francisco L., de la Cruz, Donato S., Chan, Ma. Rosario L., Doma, Jr., Bonifacio T., Chan, Ma. Concepcion L., Ojeda, Lourdes O.. **Philippine Engineering Journal**, , 14(2):85-94

The study is based on the result of a survey conducted among establishments in mining and quarrying, manufacturing, electricity, gas and water; construction; transport, storage and communications and banking located in Regions 4,7,10, 11 and NCR. The study shows that: (a) engineering graduates are mostly employed either in management/administrative or are doing low level technologies\ work and only a small fraction of them are employed in work that requires engineering skills such as design and research and development; (b) engineering education is perceived to be either adequate or inadequate depending on whether the operation of the company is specialized or not; (c) most companies provide for the training needs of their newly-hired engineering graduate especially in management or in specialized technical skills, through on-the-job or in-house trainings; and, (d) companies still deem that the following must be effected to uplift engineering education: more time for on-the-job trainings, improve facilities, improve curriculum and improve teaching faculty.

Engineering. Engineering manpower. Curricular/training programs. Engineering schools/industries.

- 0303 Expert systems in production. Ong, Victoria D., Raneses, Nestor O.. **Philippine Engineering Journal**, , 15(1):9-16

The paper concerns itself with the applications of a branch of artificial intelligence called "expert systems". It describes some of expert systems\ industrial engineering applications according to category, model or prototype name, developer, problem domain, decision output, development tools, and methodology or assessment. The study focuses on the wide-ranging applications of expert systems in production especially in the areas of materials handling, process specification and planning, production planning and scheduling, simulation and data analysis, operations analysis, facility and workplace design, database management, equipment diagnosis, robotic, and quality assurance. A survey of 100 expert systems production applications reveals its main uses as follows: planning (23%), diagnosis (17%), design (14%), and control (14%). The paper finally ends with the prospects and projection of research and development on expert systems in the field of industrial engineering in the Philippines.

Engineering. Artificial intelligence. Expert systems.

- 0304 Expressions dynamics of genes implicated in limb development. Mangahas, Paulo Miguel F., Sajise, Sheila C., Palmes-Saloma, Cynthia. **Transactions of the National Academy of**

The vertebrate limb is an outgrowth of the embryonic body wall, consisting of the mesenchyme derived from the somites and the somatic portion of the lateral plate mesoderm, surrounded by an ectodermal jacket. The formation of the limb is controlled by a complex set of molecules such as those belonging to the Transforming Growth factor ² (TGF²) superfamily, Fibroblast Growth Factors (FGFs), Homeobox (Hox), retinoic acid and Chondromodulin-1 (Chm-1), that interactively promote axis formation, stimulate growth, and pattern the individual skeletal elements. In order to study the expression dynamics of some of these genes, we performed wholemount ribonucleic acid (RNA) *in situ* hybridization analyses on different stages of mouse embryos and excised limb buds. The procedure consists of cloning the complementary DNAs (cDNAs) of the genes encoding for bone morphogenetic protein⁴ (*BMP4*), *Wnt*, *Shh* (Sonic hedgehog), *N-myc* and *Chm-1* into a plasmid vector with flanking T3 and T7 RNA Polymerase binding sites and utilizing these sites to transcribe *in vitro* digoxigenin-labeled sense and antisense RNA probes for hybridization to target messenger RNAs (mRNAs). Our results show that these various genes exhibit a spatio-temporal pattern of expression in the developing mouse limb bud. For instance, *N-myc* expression is detected early in the limb bud mesenchyme in an increasing proximodistal gradient with peak expression levels at embryonic days 9.5-10 after which its expression is rapidly down-regulated. On the other hand, *Wnt* mRNA expression is confined to the ectoderm while that *BMP-4* is found in the anterior and posterior regions of the limb bud encompassing the antero-posterior organizer center, the zone of polarizing activity or ZPA. *Chm-1* is the latest gene to be expressed and its mRNA is confined mainly to regions of presumptive digits where cartilage condensations are confined. The expressions dynamics of these genes have been correlated with their roles in either promoting chondrogenesis or in controlling the fates of various cell types in the vertebrate limb. **(Author's abstract)**

Vertebrate limb development. mRNA *in situ* hybridization. Bone morphogenetic protein. Chondromodulin. Transforming growth factor b. Sonic hedgehog.

- 0305 Fabrication of organic bulk heterojunction solar cells by screenprinting. Mercado, Candy C., Amorsolo, Jr., Alberto V.. **Philippine Engineering Journal**, , 26(1):45-54

An organic solar cell composed of Poly(2-methoxy-5-(2'-ethyl-hexyloxy)-1,4-phenylene vinylene)(MEH-PPV) and (6,6)-phenyl C61-butyric acid methyl ester(PCBM) was fabricated by screenprinting. This study is part of a research to drive the cost of PV production down and enable widespread use of the sun's energy. MEH-PPV, a conjugated polymer, becomes semiconducting upon photodoping and when in contact with PCBM, a fullerene derivative, a continuous photocurrent is obtained. Screenprinting was possible because of the ability of both MEH-PPV and PCBM to be processed from a solution of Chlorobenzene. Screenprinting experiments showed that solution has very thin viscosity and requires very high print speeds, 300 to 600 mm/s or more, for best film uniformity. Screenprinting process was also successfully applied to ITO etching and on glass substrates opening the way to the possibility of a fully screenprinted organic solar cell.

Engineering. Organic solar cell. MEH-PPV. PCBM. Screenprinting. ITO etching.

- 0306 Frequency of glucose-6-phosphate dehydrogenase deficiency mutations among Filipino newborns detected by newborn screening. Padilla, Carmencita D., Cutiongco, Eva Maria C., Shirikawa, Taku, Nishiyama, Kaoru, Abaya, Christian Eric S., Matsuo, Masfumi. **Transactions of the National Academy of Science and Technology Philippines**, , :346

A newborn screening pilot study on glucose-6-phosphate dehydrogenase (G6PD) deficiency was conducted among Filipino newborns using the Formazan method on dried blood spots. Results revealed a G6PD deficiency incidence of 3.6% among newborns screened. A red cell based quantitative enzyme assay was used to confirm screen positive cases for G6PD deficiency. Among the confirmed G6PD deficiency cases, multiplex polymerase chain reaction (PCR) using multiple tandem forward primers and a common reverse primer (MPTP) was used to detect for previously reported common mutations in exons 5, 9, 11 and 12 of the G6PD gene. The DNA of 200 Filipino newborns with G6PD deficiency were analyzed and results showed 169 or 84.5% had detectable mutations while in 31 or 15.5% of the samples, no mutations in exons 5, 9, 11 and 12 could be detected. The most common mutations was the G to A transition on nucleotide 871 (Viang Chang) of exon 9 in combination with a silent mutation on exon 11 accounting for 33.7% of the cases. This was followed by the C to T transition on nucleotide 1360 (Union) in 21.3% and silent mutations on nucleotide 1311 in 15.4% of cases both mutations were found on exon 11. Other mutations include 383 T to C (Vanua Lava) in 10%, 100 G to A (Chatam) in present 9.5% and 1376 G to T (Canton) in 3.6% of the newborns. There were combinations of these mutations present in a minority of cases. Results of this study show the molecular heterogeneity underlying G6PD deficiency among Filipino newborns. **(Author's abstract)**

G6PD deficiency. Formazan method. Multiplex PCR. MPTP.

- 0307 Frictional characteristics of non-woven geotextile-sand interface. Gutierrez, Marte, Miyamori, Tateki, Makiuchi, Katsuhiko. **Philippine Engineering Journal**, , 6(2):16-22

The use of geotextiles is a recent innovation in soil stabilization. For soil reinforcement applications, adequate geotextile-soil friction is necessary. A high geotextile-soil friction will restrict displacements of soil around the geotextile and thus increase the strength of the soil itself. This paper presents the results of tests performed to determine the frictional behavior of the interface of sand and different types of non-woven geotextiles using a large direct shear testing machine.

Engineering. Geotextiles. Soil stabilization. Sand interface. Frictional behavior.

- 0308 Fuzzy logic based decision system for the local control of signalized intersections. Ravago, Reuben J.. **Philippine Engineering Journal**, , 17(1):55-62

The objective of this study is to develop a fuzzy logic based system which will effectively control a 4-lane intersection. The controller is based on fuzzy logic and it has two inference engines which determine the actions in the intersection. One fuzzy logic engine decides the phase length for a direction pair while the other decides the phase splits. The system is adaptive in that it makes decisions based on currently available traffic data. Testing of the system against a conventional traffic simulation have shown very favorable results.

Engineering. Computer software. Fuzzy logic based system.

- 0309 The generic network modeling language (GNM). Magtubo, Erville D.. **Philippine Engineering Journal**, , 17(1):19-32

GNM is a language specifically designed to be the base language for the HERMES Project. This language provides network engineers a tool for describing and designing a network topology. With GNM, engineers can design their network in a graphical manner making it easier to be understood by other engineers. This paper discusses the basic rules in using the language.

Engineering. Communications engineering. Generic network modeling language. HERMES.

- 0310 A groundwater database for Metro Manila and Laguna lake basin. Liongson, Leonardo Q.. **Philippine Engineering Journal**, , 12(3):15-48

A groundwater database for Metro Manila and Laguna Lake Basin has been initiated in 1990 together with an on-going three-year research project on the conjunctive management and modeling of surface water and groundwater resources in the region. Through a formally organized multi-agency linkage and cooperation, a substantial collection of all agency-sourced secondary groundwater and other related data (circa: 1950-present) has been achieved after the first year. The regional database so far consists of 201 technical reports and publications, 234 maps of various types, lithology and other well data for 5911 wells, groundwater level data for 57 observation wells, water quality data for 35 sampling stations, streamflow and lake stage data for 29 surface water stations, climatic data for 17 climate stations, and seismic-reflection and georesistivity data for aquifer geometry. Aside from its immediate use in the on-going project, the database has other important long-term applications. The database collection and functions are being continually augmented and enhanced in order to realize their long-term utility and potential as a source of vital groundwater information for the general user, as management tool for water resources planners and technologists and as generator or research information and studies to be conducted by faculty, researchers, students, and practising engineers.

Engineering. Groundwater database. Metro manila. Laguna lake basin.

- 0311 Group technology in systems integration. **Philippine Engineering Journal**, , 15(1):63-84

Systems integration (SI) requires that components must be thoroughly analyzed, simplified, standardized and optimized over its lifespan to achieve true integration. Group technology (GT) provides a rational framework for integrating systems. GT is a disciplined approach of grouping parts, process, equipment, tools, people, information, energy or subsystems based on similarities and optimizing their efficiency and effectiveness over time. It involves attribute identification and family formation, classification and coding, simplification, standardization and optimization. Family formation, classification and coding are the cornerstones of group technology. We have established that GT is a science-based concept which has many potential applications for simplifying, standardizing and optimizing complex systems. Design guidelines on how to effectively carry out GT are given. Specific research and development trajectories are suggested.

Engineering.

- 0312 Household electricity consumption in the Philippines. Dalusung III, Alberto R., Lagman, Anneli S.. **Philippine Engineering Journal**, , 14(2):45-70

Past efforts on energy conservation programs have been directed largely at industrial and commercial establishments, which have traditionally been large energy users. The growing residential power demand, estimated at 6,336 GWh and accounting for 29.7% of 1992 power consumption, also opens prospects for energy conservation. The study assesses the characteristics of household electricity demand in Metro Manila and identifies areas where demand management schemes can have the greatest impact on the power supply base. The study benefitted largely from the 1989 household energy consumption survey conducted by the then Office of Energy Affairs under the World Bank Energy Sector Management Assistance Program. Review of the size and structure of household electricity demand indicates large potential energy savings from the use of more efficient lighting, airconditioning and refrigeration. The cost of conserved energy from the use of efficient energy-using devices is far less than the cost of installing additional power capacity. An intensified and sustained nationwide energy conservation program can significantly required capital investments for power development. Energy conservation also addresses the growing environmental issue while lowering energy imports and thus improving the country's balance of payments position. The study emphasizes that the gains achieved from earlier efforts can only be sustained and advanced with the synchronization of various efforts from both the legislative and executive branches of government. The support of the private sector, covering the power utilities, media, non-government organizations, and consumers, is also imperative. Among various recommendations, the restructuring of power tariffs is deemed to be the single most effective factor in prompting energy conservation. By providing the right pricing signals, consumers will be compelled to orient their purchasing decisions towards energy-efficient appliances and technologies and to alter

their power consumption behavior.

Engineering. Household electricity consumption. Philippines.

- 0313 A hypothetical perpetual motion machine of the second kind. Viray, Arnold M.. **Transactions of the National Academy of Science and Technology Philippines**, , :359

A perpetual motion machine of the second kind is an impossibility, according to the second law of thermodynamics. The machine refers to a continuously operating device that extracts heat from a reservoir at a particular temperature and then converts this heat completely into work. Its impossibility rests on the assumption that a heat-to-work conversion requires a temperature difference.

Any device for converting heat into work is called a heat engine, whose operation involves, typically, the following:

- 1) a high-temperature reservoir at absolute temperatures T_1 supplies heat to the engine
- 2) a portion of the inputted heat is converted by the engine into work
- 3) the remaining heat is exhausted to a low-temperature reservoir at absolute temperature T_2 .

How efficiently the conversion takes place is a function of the temperatures of the two reservoirs:

$$e_{\max} = 1 - T_2/T_1$$

This equation, which defines the maximum thermal efficiency, affirms that assumption on which the second law depends; i.e., a heat-to-work conversion requires a temperature difference. Thus, if we are to harness the heat content, say, of the atmosphere at 300 K in order to operate a conventional heat engine, we must provide another reservoir at a sufficiently lower temperature.

Such a requirement, however, is by passed in the following hypothetical heat engine-in essence, a multimicrogenerator system activated by spontaneous pressure fluctuations arising from the intrinsic random molecular motion of the gaseous substance.

For the derivation of this second-circumventing-technological-possibility, three principles are relied mainly upon: Brownian motion, electromagnetic induction and energy conservation. **(Author's abstract)**

Hypothetical perpetual motion machine.

- 0314 An improved microwave radiometer for measurements on the human body. Osterrieder,

S., Schaller, G.. **Philippine Engineering Journal**, , 4(1):36-43

The construction and performance of a 4 GHz-radiometer for measurements on the human body is presented. The radiometer measures the temperature and emissivity simultaneously and independent of each other. Experimental and theoretical results are given and the resolution of the radiometer is investigated.

Engineering. Microwave radiometer. Human body measurement.

- 0315 The influence on temperature of noise, air velocity and window area during chamber tests. Santos, Arturo Martin B.. **Philippine Engineering Journal**, , 19(2):85-93

When establishing the optimal level of an indoor climate parameter in a limited economy, there is often a cost expressed as a reduced comfort level for one or more of the other parameters. Very little knowledge currently exists regarding optimal levels when two or more parameters are linked. There is an obvious need for empirical determination of the trade-off between some of these parameters. Thirty (30) heat-adapted subjects participated in ten 3.5 hour exposures in climate chambers. Each subject had the option to change the air temperature in the chamber by adjusting a vote knob when prompted every five minutes. The subjects were exposed to temperature linked with each of the parameters noise, air velocity and window area in a randomized design. In a reference exposure, temperature was not linked with the other parameters. They were given instructions to optimize the climate in their respective chambers by adjusting the temperature while acknowledging the cost in one of the other parameters. During the last 15 minutes of each exposure the perceptions of subjects, skin temperature and simple performance measures were registered. A warmer temperature was increasingly preferred when each of the parameters noise, air velocity and window area became more costly.

Engineering. Air velocity. Parameters noise. Window area. Chamber tests.

- 0316 Kinematic analysis of three-link spatial mechanisms containing sphere-plane and sphere-groove pairs. Hernandez, Jr., Manuel V., Ghosal, Ashitava, Sandor, G.N., Kohli, D.. **Philippine Engineering Journal**, , 4(1):53-76

Kinematic pairs in a spatial mechanism are viewed either as allowing relative screw motion between links or as constraining the motion of the two chains of the mechanism connected to the two elements of the pair. Using pair geometry constraints of the sphere-plane and sphere-groove kinematic pairs, the displacement, velocity and acceleration equations are derived for, R-Sp-R, R-Sp-P, P-Sp-P, P-Sp-R and R-Sg-C three-link mechanisms. For known values of the input variable, other variables are computed in closed form. The analysis procedures are illustrated using numerical examples.

Engineering. Kinematic analysis. Three-link spatial mechanisms. Sphere-plane

pair. Sphere-groove pair.

- 0317 Light-mediated response of *Anabaena* sp. strain BATG-01 to salt stress. Cao, Ernelea P., Conopio, Mark Arthur S., Gayao, Louie Leonides M., Platon, Petrocelli O.. **Transactions of the National Academy of Science and Technology Philippines**, , :336

Cyanobacteria or the blue-green algae are important constituents of tropical agricultural fields. They are mostly capable of nitrogen fixation. They are also reported to exhibit considerable tolerance to salt and osmotic stress. Salinity, as a consequence of organic and industrial pollution, is a critical deterrent to agriculture since it reduces crop yield. Salt-tolerant strains of cyanobacteria have been used for the reclamation of saline soils, particularly rice paddy fields. Light has also been postulated to play an important role in the adaptation of cyanobacteria to different environmental stresses (Leukart and Hanelt 1995).

The main objective of this study is to determine whether varying light periods would affect the response of a cyanobacterial isolate from Batangas, *Anabaena* sp. strain Batg-01. Cultures of the isolate were grown under four different light regimes; Set 1 (24 h high: 0 h dark), Set II (16 h light: 8 h dark), Set III (12 h light: 12 h dark), and Set IV (8 h light: 16 h dark). The growth rate and generation time was computed for each set-up. DMRT analysis showed that set-Up III had the highest growth rate and subsequently the shortest generation time. The cultures were then treated with 240 mM NaCl (the maximum concentration that allows growth of the cyanobacterium based on previous studies) upon reaching the mid-log phase. After 0, 4 and 8 hours of salt-treatment, proteins were extracted, quantified and visualized for the presence or absence of salt stress proteins (SSP). Results showed that light influenced the synthesis of SSPs that are produced as a response to salt stress such that more proteins were synthesis of SSPs that are produced as a response to salt stress such that more proteins were synthesized in cultures exposed to longer light periods. **(Author's abstract)**

Cyanobacteria. Blue-green algae. Salt stress. NaCl. Light. Salinity. Growth rate. Generation time. DMRT analysis. Salt stress proteins.

- 0318 Material characterization and modeling of silicone putty using fractional derivatives. Hernandez, Jr., Jaime Y., Tanzo, William. **Philippine Engineering Journal**, , 20(1):25-34

Material characterization and modeling of materials being used in energy-dissipating devices is a prerequisite in the development of accurate models which can predict the behavior of these devices. One such material is silicone putty used in the Shock Transmission Unit (STU). This paper discusses the material characterization of silicone putty using a flat plate rheometer and its modeling using a fractional derivative maxwell model under low frequencies of loading. The resulting constitutive equation is approximated using the LI-Algorithm for fractional derivatives.

Engineering. Silicone putty. Material characterization and modeling. Fractional derivatives.

- 0319 Mean lifetime measurement of the 14 keV state in the transition of ^{57}Co to ^{57}Fe . Garcia, Merlita C., Bacala, Angelina M.. **Transactions of the National Academy of Science and Technology Philippines**, , :352-353

In the beta decay of ^{57}Co to ^{57}Fe the de-excitation of the second excited state to the first excited state gives off a 122 keV gamma ray photon while the de-excitation of the first excited state to the ground state gives off a 14 keV gamma ray photon. In this decay made the emission of the gamma photons are in cascade and are then considered to be coincident. Lifetime measurement uses the principle of the method of coincidence.

Two different detectors were used: a 2" in diameter by 2" thick scintillator to detect the 122 keV gamma photon and a 1" in diameter by 0.25" thick scintillator to detect the 14 keV gamma photon. Using the Nuclear Instrumentation Modules (NIM) and the Computer Automated Measurements and Control (CAMAC) modules such as the Analog to Digital Converters (ADC) and the Time to Digital Converters (TDC) with their proper calibrations, and a macro in fortran, the energy spectran of the particles of interest incident on these detectors were viewed in the monitor of a personal computer and the time between the detection of these two energies determined. The ADC and the TDC spectra were analyzed using the ROOT data analysis system for histogramming and fitting.

Results showed that the individual time spectrum for each set of data taken on different times gave a mean lifetime value for the 15 keV state which agrees well with an internationally accepted value of 141 ns.

From these results it can be seen that Nuclear Instrumentation Modules (NIM) and the Computer Automated Measurement and Control (CAMAC) modules available at the MSU-IIT High Energy Physics Laboratory are capable of measuring lifetimes of nuclear states which are less than a second.
(Author's abstract)

Lifetime. Gamma photons. Scintillator. Photomultiplier. NIM. CAMAC. ADC. TDC. Energy spectrum. Time spectrum.

- 0320 Measurement of the W boson mass using the JLC study framework(JSF). Arogancia, Dennis C., Sanchez, Allister Levi C., Magallanes, Jingle B., Gooc, Hermogenes C., Bacala, Angelina M., Fujii, Keisuke, Miyamoto, Akiya. **Transactions of the National Academy of Science and Technology Philippines**, , :349-350

The Standard Model (SM) asserts that the matter is ultimately composed of three generations of pointlike particles called quarks and leptons and their intermediary particles called gauge bosons; all of which have been directly observed to date except for the Higgs boson. To search for this elusive particle, the Asian high energy physics community has proposed a next-generation linear accelerator facility to be built in Japan called the Joint

Linear Collider (JLC) which runs at center-of-mass energies of 500 GeV to 1.5 TeV.

Since the Higgs boson is sensitive to the precision measurements of the weak bosons, we investigated the reaction $e^+e^- \rightarrow \nu W$ using computer simulation work at MSU-IIT Computational Physics Laboratory. Events from this reaction were generated and analyzed by using the JLC Study Framework (JSF); a software library based on the ROOT suite of programs provided by the European high energy physics laboratory called CERN. In running JSF, other software libraries were installed such as CERNLIB, ROOT, and LCLIB; all from CERN and the PHYSSIM library by KEK physicists. Default configurations of the JLC detectors such as the different *vertex detectors*, *central drift chamber*, *calorimeter*, *muon detector*, and *superconducting solenoid magnet* were already set in the simulation; so with the 3 Tesla detector parameter setting.

Measurement of the W boson mass used the semileptonic channel particularly $e^+e^- \rightarrow \nu W$ because it has a larger cross section and does not have an ambiguity due to final state color exchange in 4 jets final state. Event generation and simulation used the packages called BASES/SPRING and JSF Quick Simulator respectively with a center of mass energy set at 500 GeV. Data analysis used graphical user analysis (GUI) which include effects from *initial state radiation* (ISR) and *beamsstrahlung*. Calculation of total cross section in such process was done in using BASES. W mass was measured directly from its decayed products, particularly quarks. In the event selection criteria, neutrinos were removed and all particles that went into the beam pipe direction. Theoretically, the mass of the W boson is about 80 GeV which was used as input mass in the computer simulation. In this paper the mass of the W boson was measured to be 80.41 GeV with ISR effects and 80.40 GeV with beamsstrahlung effects. Based on this result the relative error is less than 1%.
(Author's abstract)

Standard model. JLC Study Framework
(JSF). ROOT. LCLIB. CERNLIB. PHYSSIM. JSF. Quick
simulator. BASES/SPRING. ISR. Beamsstrahlung.

0321 Measuring process capability. Raneses, Nestor O.. **Philippine Engineering Journal**, ,
15(1):17-40

Process capability indices are succinct unitless statistical metric which measures the amount of common cause variation present in a process. They indicate the ability of the process to meet engineering specifications or whether process centering poses a problem. First and second generation indices: Cp, CpL, Cpu, Cpk, k, Cpm and Pearson process capability indices are presented, examined and compared. Single and confidence interval estimates of these indices are described. Finally, applications, drawbacks and uses of these indices are discussed.

Process capability indices. Engineering.

- 0322 Membrane assemblages for dialysis separation of solutes. Chu, Richard Q., Bellotindos, Luzvisminda M.. **Philippine Engineering Journal**, , 19(1):1-20

This paper examines the performance of several configurations dialysis units for the separation of two solutes. Dialyzers arranged in series, in parallel and the continuous column in countercurrent flow are studied. The single dialysis unit is also included. For the recovery of the less permeable solute, the series configuration can give good performance. The parallel configuration favors the recovery of the more permeable component. The continuous column has better capabilities for the separation and recovery of both the more permeable component and the less permeable component.

Engineering. Membrane assemblages. Solutes dialysis separation.

- 0323 A method of sampling tracheid cross-sectional dimensions in coniferous woods. Lantican, C.B., Hughes, J.F.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :14-20

A randomization procedure for sampling tracheid cross-sectional dimensions within individual samples of early wood and latewood was described. The application of variance component analysis in the estimation of sample sizes was demonstrated and tested. It was found that the estimates of the means of the samples used in the study are of high precision and well within the limit of 10% acceptable in wood anatomy studies – an indication of the efficacy of the procedure used for estimating sample sizes. **(Author's abstract)**

Pinus caribaea.

- 0324 Microelectronics design for the Philippine Electronics Industry. Deoma, Aileen Joy A., Tabangcura, Michelle Marga C., Sabido, IX, Delfin Jay M.. **Philippine Journal of ICT & Microelectronics**, , 1(2):45-48

Microelectronics has become an integral part of the Philippine economy, with electronics exports being the country's top dollar earner for the past few years. However, there are more aspects to consider in this technology, and a shift in our country's efforts may be needed for the Philippine electronics industry to survive. This paper offers a brief introduction on Microelectronics design and its importance, and tackles the present status and weaknesses of the local electronics industry. Strategies that the government and the academe have begun to adopt to address these weaknesses will also be presented. Finally, the paper offers recommendations and future directions necessary for the country to survive and thrive in the global new economy. **(Author's abstract)**

Philippine electronics industry. Microelectronics. Philippines.

- 0325 MMDF electronic mail. Abaya, Efren F.. **Philippine Engineering Journal**, , 14(2):75-84

E-mail is a system for sending electronic messages through a computer network. This paper discusses the internal processes of a mail system in a Unix and TCP/IP environment, focusing on the Multi-channel Memorandum Distribution Facility (MMDF).

Engineering. Multi-channel memorandum distribution facility (MMDF). Electronic mail. Unix. TCP/IP.

- 0326 Modeling land use change:. Ballesteros, Jr., Florencio, Qui, Zeyuan. **Philippine Engineering Journal**, , 29(2):57-78

We develop a parcel-based spatial land use change prediction model by coupling machine learning and interpretation algorithms such as cellular automata and decision tree in a Geographic Information System environment. We collect and process historical land use data and various driving factors that affect land use changes in Hunterdon County of New Jersey using decision tree J48 Classifier to develop a set of transition rules that illustrate the land use change processes during the period 1986-1995. Then we apply the derived transition rules to the 1995 land use data in a cellular automata model Agent Analyst® to predict the spatial land use pattern in 2004. We validate these by the actual land use in 2002. The developed decision tree-based cellular automata model has a reasonable overall accuracy of 84.46 percent in predicting land use changes. It shows a much higher capability in predicting quantitative changes (92.5%) than location changes (74.8%) in land use. With such an encouraging measure of validity, we use the model to simulate the 2011 land use patterns in Hunterdon County based on the actual land uses in 2002. We build two scenarios: the "business as usual" scenario and the "policy" scenario (with imposed government policy). The simulation results show that successfully implementing current land use policies such as down-zoning, open space, and farmland preservation could prevent 973 agricultural and 870 forest parcels (a total of 2,856 hectares) from future urban encroachment in Hunterdon County during the period 2002-2011. It becomes a significant policy instrument for government to reckon with.

Engineering. Chemical engineering. Land use change. Cellular automata. Geographic information system. Agent analyst. J48 classifier. Hunterdon county.

- 0327 Moisture and thermal degradation of cyanate-ester-based die attach material. Gonzales, John Ivan J., Mena, Manolo G.. **Philippine Engineering Journal**, , 18(1):13-35

Cyanate-ester-based thermo-setting die attach materials, commonly known as Low Temperature Die Attach (LTDA) are the newest innovation in Hermetic Die Attach Technology due to their improved manufacturability, high decomposition temperature and a moisture gettering effect. Although their despatchability and decomposition temperatures are well documented, little information is available on the effects of prolonged exposure to moisture and thermal conditions. A study was therefore conducted to investigate the

behavior of LTDA under thermal and moisture conditioning. Results of the experiment showed that the LTDA initially exhibit weight loss and subsequent weight gain after prolonged exposure. Incorporation of the moisture into the polymeric structure was verified by Infrared Spectroscopy. Die shear strength was also observed to decrease exponentially with exposure time. The time-to-failure equation (10 kilograms die shear strength) as a function of temperature and humidity was established to follow the model.

Engineering. Metallurgical engineering. Low temperature die attach (LTDA). Hermetic die attach technology. Moisture and thermal degradation. Infrared spectroscopy.

- 0328 Morphological and flexural properties of lightweight gypsum based fiber reinforced composite. Jorillo Jr., Pablo A.. **Philippine Engineering Journal**, , 16(1):1-25

This paper describes the results of the experimental investigations of the properties of lightweight gypsum based fiber reinforced composites. Two general types of fiber reinforcement were examined, namely, polymer based fibers and natural fibers. The study is essentially a developmental research with the objective of evaluating the properties of natural fibers in comparison with synthetic fibers of the same density in a gypsum matrix. A gypsum-cellulose pulp and a gypsum-Shirasu balloon sand were used as lightweight gypsum matrices. Experimental and analytical results on both standard specimens and full scale structural elements such as wall panel are presented.

Engineering. Gypsum based fiber reinforced composite.

- 0329 Mosfet dosimetry for radiotherapy interface measurements. Bengua, Gerard, Rozonfeld, Anatoly, Metcalfe, Peter. **Transactions of the National Academy of Science and Technology Philippines**, , :351-352

An n-channel Metal Oxide Semiconductor Field Effect Transistor (MOSFET) was used to investigate the dose distribution near interfaces. The MOSFETs were irradiated in $5 \times 5 \text{ cm}^2$ and $10 \times 10 \text{ cm}^2$ radiation field with 6MV x-rays and 12MeV electron beams from a Varian 2100c linear accelerator. The dosimeters were operated in an active mode, biased gate, during irradiation. Two different air cavity geometries were modeled using solid water sheets. An Attix chamber and sheets of Gafchromic films were used to measure the dose near and at the interfaces. Results obtained by these detectors were used as benchmarks for data comparison. Additionally the results from an ADAC-Pinnacle dose planning system and EGS4 Monte Carlo simulation of the dose build up and build down effects for tissue-air-tissue and tissue-lung interfaces have been simulated.

Dose measurements for tissue-lung interface were carried out using an anthropomorphic phantom made from plastic water and inserts of lung phantom material. Depth increments as small as 100 μm enabled the detailed measurement of dose at the interfaces by utilizing the MOSFET dosimeter. In all cases, the effects of the loss of electronic equilibrium and the

reduced backscatter due to the existence of inhomogeneities were shown.

Interface dose distribution obtained by the MOSFET dosimeters were within 5% to 6% of the results of the Attix chamber measurements and Monte Carlo EGS4 simulation results. Comparison of the dose distribution near interfaces generated by the ADAC-Pinnacle planning computer system and those experimentally measured showed that the former overestimates the dose near the interface ($<2\text{mm}$ from interface) by around 7% for small cavity sizes ($2\times2\times30\text{cm}^3$) irradiated with $5\times5\text{cm}^2$ field size and about 12% for a large cavity sizes ($2\times2\times30\text{cm}^3$) using the same field size.

Present inhomogeneity correction algorithms have been found to predict dose distributions where tissue-lung interface is involved to a reasonable accuracy (3%) compared with experimental results.

The good agreement between the data obtained by the MOSFET with that of Attix chamber, Radiochromic film and Monte-Carlo EGS4 simulated data indicated the viability of its use as a clinical dosimeter for interface dose measurements. **(Author's abstract)**

MOSFET. Interface. Inhomogeneity. Monte-Carlo EGS4. Planning computer. Radiochromic film. Dosimeter. Dose. Cavity. Attix chamber.

- 0330 Mutagen-induced chromosome lesions. Enriquez, Ma. Luisa D., Postor, Irene Q., Cheng, Christine R., Hamoy, Geohana L., Santos, Doris R., Natividad, Filipinas F.. **Transactions of the National Academy of Science and Technology Philippines**, , :344

Drivers of public utility vehicles particularly jeepneys which are not airconditioned are constantly exposed to the hazards of pollution. In this study, jeepney drivers were chosen to provide initial data on the possible effects of this exposure on the sensitivity of chromosomes. Thirty-five (35) Filipino jeepney drivers were chosen to participate in this study. Peripheral blood samples were collected and cultured following the routine 72-hours microculture technique. Five hours before harvest, the cells were exposed to bleomycin, a radiomimetic agent. Mutagen-induced chromosome lesions indicate the responses of the cells to the clastogenic effects of mutagen. These effects are measured in terms of the average number of chromatid lesions or breaks per cell (b/c). The mean b/c in the drivers group is 1.46 while that of the control group is 0.75. Results also show that 77.14% of the drivers showed a b/c value higher than 1.0, which is established as the borderline for mutagen sensitivity. In the control group, only 22.8% have a b/c value higher than 1.0. Since sensitivity to mutagens is an indirect measure of DNA repair capacity, results of this study indicate that drivers of jeepneys may have a high risk of acquiring environment-induced cancer. **(Author's abstract)**

Mutagen. Chromosomes. Bleomycin. Pollution. DNA repair capacity. Chromatid breaks. Jeepney drivers.

- 0331 A new method for the kinematic analysis of planar four-bar mechanisms. Hernandez, Jr., Manuel V., Si, Willie C.. **Philippine Engineering Journal**, , 6(1):46-55

A convenient method for the analysis of planar four-bar mechanisms is achieved by applying the concept of direct linkage constraints and motion parameters based on the displacements of the mechanism. Vectors are used extensively to make the derivation simpler and to make resulting analysis equations more compact. The new method also eliminates the need to determine intermediate motion parameters. Thus, only the motion parameters of interest are obtained directly and explicitly. Higher order motion parameters are also derived from the basic linkage constraints. The formulation of the method is shown and applied to the analysis of a crank-rocker and a slider-crank mechanism.

Engineering. Mechanical engineering. Planar four-bar mechanisms. Kinematic analysis. Direct linkage constraints. Motion parameters.

- 0332 A new silver-zinc battery configuration:. Jose, Wilfredo I.. **Philippine Engineering Journal**, , 6(2):44-53

A new design of a silver-zinc cell is presented. The system consists of a circular zinc electrode disk (negative electrode) which is rotated on the perpendicular axis passing thru its center and two circular disks with porous silver oxide coating (positive electrode) sandwiching the negative electrode. The electrolyte is 40 percent potassium hydroxide solution. The cell is charged with both the zinc electrode being rotated in a set of runs and stationary in another set. The rotating electrode has a more uniform plating of zinc while the stationary electrode has dendritic and mossy growth and unevenly plated zinc. The performance of the cells at the two different conditions are nearly identical. Problems on the proper current distribution as well as electrical contact in the negative electrode were encountered. The design can help increase the number of charge-discharge cycles of the cell. However, the energy density is lower due to the space requirements of the rotating disk and accessories.

Engineering. Silver-zinc cell. Rotating electrode. Charge-discharge cycles.

- 0333 Operation and applications of rice hull gasifier-combustors. Vinluan, Jr., F.D., Santos, A., Pacatang, L., Canayon, A., Valdecanas, M., Balais, W., Sungaben, E., Barnuevo, E., Lontok, N., Padua, R. , Carandang, A.. **Philippine Engineering Journal**, , 12(1):49-68

The gasifier-combustors operate on the principle of the open core, batch type gasifier. The gas generated in the reactor, which has a heating value of 3,900-4,000 kJ/SCM is ignited in the gas exit or piped to a thermal equipment. Two (2) reactors with internal diameters 45.72 cm. (drum-size) and a large (square) unit with 105 cm. in cross section were used. The drum-size gasifier-combustors were used to fire clay bricks in a small wood-fired kiln. Four (4) drum-size units were also used to fire bricks in a shuttle kiln. The results show that a temperature of 750-850°C within the kiln was attained in 8-hour firing period. The laboratory tests on the fired products revealed that their properties are within set standards.

Initial tests on the use of the drum size units in a food drier (indirect

drying) and in a grain drier (direct) show that the gasifier-combustor can maintain the required temperature within the drying chamber or plenum. The economic projections show that it is economically feasible to adopt the gasifier combustor for food and grain drying. Other agrowastes such as coconut husks, corn cobs and coffee hulls were also tested successfully as fuels in the drum-size units.

The large unit which is capable of delivering 1 million kJ/hr will be attached to a 6 cu. m. wood-fired kiln for brickfiring. As envisioned, this type of equipment will be used as heat source of a boiler for power generation and process heat.

Engineering. Rice hull gasifier-combustors. Operation and applications.

- 0334 An operations research and systems analysis study of weighing scales used for growth surveillance. Ranases, Nestor O., Manegdeg, Ferdinand G., Ramos, Adelisa C.. **Philippine Engineering Journal**, , 15(1):41-62

Weight is the accepted indicator of growth in the growth monitoring system in the Philippines. The right choice and correct use of the appropriate weighing instrument or scale is of paramount importance for procuring accurate weight during weight surveillance (Operation Timbang). This operations research and systems study evaluates the different weighing scales used in the field, examines the different factors causing inaccuracies in weighing, investigates the feasibility of locally manufacturing the required weighing scales, and scrutinizes the calibration, maintenance and procedure needs of the recommended weighing scales. Seventy-eight (40 Rural Health Units and 38 Barangay Health Stations) health stations in Marikina, Quezon City, Pangasinan and Cavite were surveyed. The bar scale, the Salter spring-type weighing scale, the adult clinical scale and the bathroom scale were found to be the most commonly used weighing instruments. Calibration, maintenance and proper use were generally observed to be wanting and inadequate.

The study recommends the phase out of the bathroom scale; the use of the Salter spring type; the infant beam scale and the bar scale when weighing in the field; and the use of adult clinical scale or beam type clinical scale at health stations. It further recommends the standardized regular calibration and maintenance procedure for all scales used in growth monitoring. All procedures are recommended to be in simple instructional form. For calibration, the use of standard test weights is recommended. The study finally recommends a modified weighing scale and crib design and the establishment of a regular replacement cycle for these weighing instruments. The local manufacture of weighing scale was found to be feasible.

Engineering. Weighing scales.

- 0335 An opportunity cost-based modified genetic algorithm for the P-k median problem. Resurreccion, Joanna Z., Resurreccion, Augustus C.. **Philippine Engineering Journal**, , 25(1):61-87

Median problems are combinatorial problems that associate the allocation cost of demand points to the selection of different location sites for a number of facilities that satisfy the total demand. This study focuses on the P-k median

problem of minimizing the total weighted distance between n demand points and these location sites when the number of existing facilities, k , on a given network is increased to P . Initial combinations of possible locations for the additional $P-k$ facilities are iteratively improved using a proposed modified genetic algorithm. The algorithm implements a new opportunity cost-based child reproduction procedure for the generation of better solutions with biased parent selection probabilities. This creates the best possible offspring without affecting the locations of existing facilities while current information from having the existing k facilities simplifies the choice of location for increasing the number of facilities from k to P . The generated combinations of facility locations are tested on the Galvao-100 median set deriving 30 $P-k$ median problems from the Lagrangian relaxation solutions. Average percentage difference from the optimal solution found at 0.52% outperforms the neighborhood search improvement made on the myopic algorithm at higher values of $P-k$.

Engineering. Genetic algorithm. $P-k$ median problem. Opportunity cost.

- 0336 Optimization of fluidized bed combustion of semirara coal. Elauria, Jessie C., Cruz, Ibarra E.. **Philippine Engineering Journal**, , 14(2):1-20

A study was conducted to determine the suitability of local coal as fuel in fluidized bed combustor (FBC) and to establish the optimum operating conditions of the FBC unit. A 6-inch diameter reactor with Pampanga river sand (mean particle size of 1.139 micrometer) as inert bed material was used in the conduct of the experiment. Combustion tests were run at air flow rates of 180 and 260 L/min, A/F ratios of 7.6 and 11.0 kg of dry air per kg of fuel, bed depths of 6 and 9 inches and bed temperatures of 820 and 910C. Coal sizes of $-1/16 + 1/32$, $-1/8 + 1/16$, and $-1/4 + 1/16$ inch were evaluated based on their fluidization characteristics prior to experimentation. Coal size of $-1/16 + 1/32$ inch registered a minimum fluidizing velocity close to that of the bed material but coal size of $-1/16 + 40$ mesh is recommended due to higher recovery during size reduction. Combustion efficiency ranged from 52 to 98 percent, while heat output rates ranged from 1,438 to 3,295 Kcal/kg of fuel equivalent to 27.6 and 63.3 percent thermal efficiencies. Combustion and thermal efficiencies are directly affected by air flow, A/F ratio and bed depth. Temperature is also positively related to thermal efficiency. The optimum performance of the FBC unit was found to be at bed temperature range from 902 to 910C, A/F ratio of 11.0 and 11.6 air flow of 260 to 285 L/min and bed depth of 9.0 to 11.1 inches. The study as a whole showed that low quality coal (low heating value and high ash content) such as Semirara is a viable fuel in fluidized bed combustor.

Engineering. Semirara coal. Optimization. Fluidized bed combustion.

- 0337 Packet radio network for volcano monitoring. Machenbaum, Roland. **Philippine Engineering Journal**, , 17(1):13-18

This paper describes an implementation of a packet radio network on Taal volcano. The network, based on amateur radio hardware and software, allows

the Philippine Institute of Volcanology and Seismology (PHILVOLCS) to retrieve real time data from various instruments located on and around the volcano island. The actual list of instruments includes 10 digital seismic stations, 3 tiltmeters, 2 radon sensors, 1 geochemical station (water temperature and conductivity) and an acoustic station. The original features of the network are the use of only one radio frequency simplifying frequency allocation procedures and equipment management, redundancy allowing failures of nodes without loss of data, low power consumption reducing the cost of field power supplies.

The network is linked to the internet by a radio link from PHILVOLCS to the University of the Philippines (UP). This link allows foreign organizations to access the data and provides basic internet services (mail, ftp, telnet, ...) to PHILVOLCS and any user located in the Taal vicinity.

Engineering. Packet radio network. Taal volcano. PHILVOLCS.

- 0338 Partial sequences of the mitochondrial 16s rRNA and cytochrome B genes of *Loriculus philippensis* (Philippine hanging parrot) from different locations in the Philippines. Hedreyda, Cynthia T., Tahimic, Candice Ginn T., Ibañez, Vinzon C., Lagman, Angel, Gonzalez, Juan Carlos T., Imbao, Roselle. **Transactions of the National Academy of Science and Technology Philippines**, , :340

Molecular data on wildlife species in the country could be used in understanding their taxonomic relationships and thus could also be valuable in evaluating the conservation status of the species. The research was aimed at developing a DNA-based procedure to study the Philippine Hanging Parrot or Colasisi (*Loriculus philippensis*), an avian species endemic to the Philippines. One to three parrots were obtained from Laguna, Negros, Davao, Leyte, and Cebu. Extraction of total DNA from avian blood samples was optimized based on reported procedures of Seutin, Kirby, Wang and their co-workers. Extracted DNA was successfully used for restriction enzyme digestion and Polymerase chain reaction. Parameters for the optimized PCR amplification of mitochondrial 16s rRNA and cytochrome b of the samples used were determined. Amplified products of about 600 and 350 bp for the mitochondrial 16s rRNA and *cyt b* gene, respectively, were cloned into the pUC18 or pUC19 plasmid vectors for DNA sequencing. Partial sequences of the mitochondrial genes were obtained and sequence analyses were performed including homology searches, DNA sequence alignment, and construction of genetic distance tree using Phylip ver 3.573. This paper reports the partial DNA sequences for Colasisi obtained from Laguna, Negros, Davao, Leyte, and Cebu. Although avian blood samples were limited to just one to three birds from each location, partial DNA sequences of the 16s rRNA and cytochrome b genes from these birds were determined and suggest greater than 90% homology among Colasisi from different places in the country. There is a need, however, for obtaining complete sequences for genes studied and to get phenotypic and geographical data in order to fully assess their phylogenetic relationships. More importantly, this study has shown that the molecular-based characterization of avian species is feasible and that the procedure can be performed in the country. **(Author's abstract)**

Loriculus philippensis. PCR. Cytochrome b gene. 16s rRNA gene. Genetic distance tree.

- 0339 A path planning algorithm for soccer playing robots based on repeated modification of bezier polynomials. Pedrasa, Michael Angelo A.. **Philippine Engineering Journal**, , 26(1):1-20

The Bezier curvature algorithm is a path-planning algorithm for soccer robots based on repeated modification of Bezier polynomials. The robot is steered by choosing an appropriate Bezier curve that connects its current position and its destination, and the robot is made to traverse the initial section of the curve. The wheel velocities of the differentially-driven robot are computed from the curvature of that curve section. The process is repeated until the robot finally reaches its destination. The algorithm was compared to two other path-planning algorithms for soccer robots: the uni-vector field and line-circle algorithms. The algorithms were made to execute 17 test cases and their performances were compared. The test cases have different robot, ball and obstacle locations. The objective of the robot is to kick the ball towards the center of the target goal. The goal success rate, kicking accuracy and frequency of collisions were compared. The results showed that the principles behind the Bezier curvature algorithm are valid, and it performed better than the two algorithms.

Keywords: path planning, robot soccer, robot soccer simulation, collision avoidance, repeated path modification.

Engineering. Path planning. robot soccer. Robot soccer simulation. Collision avoidance. Repeated path modification.

- 0340 Performance of a watergy audit on the submersible pumps of the Talamban Raw Water System in Cebu City. Reyes, Joseph Gerard T., Odulio, Carl F.. **Philippine Engineering Journal**, , 26(2):25-40

As part of its efforts to promote awareness of energy-efficiency in water-production and distribution companies in the Philippines, the Alliance to Save Energy (ASE) partnered with two provincial public water utility companies, one of which was the Metropolitan Cebu Water District in Cebu City. With the application of a methodology developed by the ASE and the Energy Research Institute (TERI) of India, a Watergy audit was performed on the submersible pumps of production wells within a selected raw water system of the MCWD, situated in the town of Talamban, Cebu City. The results of the audit led to the identification of opportunities for improvement of the pumps' performance and the formulation of recommended feasible measures toward attaining energy-efficiency.

Engineering. Energy efficiency. Watergy. Specific energy consumption (SEC). Talamban Raw Water System.

- 0341 Perspectives on the training and education of world-class engineers. Gopez, Adolfo Jesus R.. **Philippine Engineering Journal**, , 14(2):95-108

World class manufacturing implies a philosophy of manufacturing excellence. It is strongly dependent on having properly trained engineers. It is also strongly linked to the ability of a company to compete in the global market. Using Michael E. Porter's

Engineering. World-class engineers. Training and education perspectives.

- 0342 Philippine automated water information system. Resurreccion, Jr., Alejandro N.. **Philippine Engineering Journal**, , 4(2):118-127

The Philippine Automated Water Information System is a computer-based system for the storage, retrieval and analysis of water data. It is aimed to provide a systematic and more efficient means of data accumulation and dissemination. The system is divided into three components, namely: Data Management component which is responsible for the creation and maintenance of its requisite files, Data Retrieval component which is responsible in satisfying the user's request for data and the Data Analysis component which is responsible in providing the user with the results of processing and analyzing data.

Engineering. Philippine Automated Water Information System. Data management. Data retrieval. Data analysis.

- 0343 Philippine country report: Gopez, Adolfo Jesus R., Alcantar, Leonardo A.. **Philippine Engineering Journal**, , 12(3):95-106

This paper gives a country report on the status, technology, manpower, and development plans of the welding, metalforming and metal casting sectors of the Metals and Engineering Industry. Welding is used predominantly by about 1400 small-scale iron works fabrication shops, 35 vehicle chassis and body makers and 13 pipe and tubemakers with an existing aggregate capacity of 300,000 mt. In metalforming there are 25 bar-rolling facilities, 8 wire rod rolling facilities and 6 structural section rolling facilities with an aggregate of 938,400 MT. There are sixty firms utilizing wire forming techniques to manufacture wire products, while only five firms offer mechanized steel forging. Smithery or hand forging is widely practiced in at least 6 regions of the country. Extrusion technology is used by five firms, while sheet metalforming is widespread in the urban communities. The country has 221 metalcasting plants but only 153 are operating. Equipment inventory in welding showed that about 60% are metal arc welding machines while 21% are oxy-acetylene welding sets. In metalforming, industry sources have estimated that 60% of the facilities use second hand equipment at least 20 years old. The degree of mechanization of metalcasting plants is low, with only 24% of the parts being partially mechanized. Manpower needs of the three sectors, according to a study by the National Manpower and Youth Council, are substantial, with about 1800 additional welders, 1700 additional mill workers, 1000 sheet metal workers needed per year up to 1993. No figures are cited for the metalcasting sector. The strength of all three sectors, and the Metals and Engineering Industry as a whole includes the existence of a large pool of trainable manpower, a large potential domestic market, and to a certain extent product acceptance in the

international market. The weaknesses are lack of adequate or up-to-date facilities, difficulty in sourcing good quality low cost raw materials, and the prevailing low productivity levels. The development plans for the three sectors are taken from the Metals and Engineering Industries National Action Plan 1990-2000, considered as a blueprint towards industrialization of the country. The plan was formulated by a multi-sectoral body composed of government officials, industry captains and members of the academe.

Engineering. Metals engineering industry. Welding. Metalforming. Metal casting.

- 0344 Philippine population database at STR locus FGA for forensic applications. Tabbada, Kristina A., Magno, Michelle Music F., De Ungria, Ma. Corazon A., Halos, Saturnina C.. **Transactions of the National Academy of Science and Technology Philippines**, , :334

A Filipino population database has previously been established at eight short tandem repeat (STR) loci. In the United states and in Europe, STR locus FGA has been widely used in forensic DNA typing due to its high degree of polymorphism and amenability to PCR amplification. The allele frequency distribution for a Filipino population from the National Capital Region (NCR, N=107) was determined for STR locus FGA. DNA was extracted and amplified using standard procedures and analyzed using an automated DNA sequencer (ALFexpress, AP Biotech). A total of 13 alleles were found in the population, ranging from allele 17 to allele 27 and including rare variants 21.2 and 22.2. The most common allele found was 23 ($f=0.21$). Statistical analysis showed that the population conformed to Hardy-Weinberg rules ($p=0.7810$); therefore the allelic frequencies may be used for forensic calculations. FGA had an average power of paternity exclusion of 0.7185 and an index power of discrimination of 0.9001. FGA was found to be in linkage equilibrium with the eight other STR loci currently being used in the laboratory namely: F13A01, FES/FPS, vWA, FOLP23, D8S306, CSF1PO, TH01 and TPOX; therefore cumulative values for APE and PD were calculated. The addition of FGA brought the average power of paternity exclusion of the nine loci to 0.9984 and the combined power of discrimination of 0.9999999965. The data obtained in this study has therefore increased the power of DNA typing system for use in forensic testing. **(Author's abstract)**

FGA. Short tandem repeat 8. Philippines. DNA typing. Population database. Forensic. Paternity testing.

- 0345 Plunge pool scour studies using cohesive materials in a hydraulic model. Coran, Samuel R.. **Philippine Engineering Journal**, , 4(2):99-117

Rocks in situ do not slump and the traditional technique of using loose gravel in the model consequently cannot give a good representation of scour patterns in the prototype. Thus, a refined modelling technique utilizing cohesive materials (a mixture of granular materials with a paste composed of clay binder, chalk powder, and water) to simulate the plunge pool geology is introduced. This technique is applied to the plunge pool scour investigations in a 1:100 hydraulic scale model of a spillway project for the purpose of defining

an adequate flip bucket toe protection system. The methods, procedures, and results of the investigations are presented.

Plunge pool scour. Engineering. Hydraulic model. Flip bucket toe.

- 0346 Polythiophene and polypyrrole thin films as radiation sensors. Alguno, Arnold C., Bantaculo, Ancelie, Castillon, Ancelie, Bacala, Angelina M., Miyata, Hitoshi, Biogroup2. **Transactions of the National Academy of Science and Technology Philippines**, , :350-351

Radiation detectors play a vital role in understanding what makes up matter and in the development of various fields of science especially in medical and physical sciences. The most commonly used material in radiation detectors is silicon (Si) which provides high efficiency in radiation detection.

However, when the large detector is needed, Si cannot be used because it is too difficult to make large silicon crystals, and it is also very expensive to make a large silicon semiconductor detector.

This research explored the possibility of using conducting polymers that are organic semiconductors as radiation sensors that could replace silicon.

Polythiophene and polypyrrole thin freestanding films were prepared through electrochemical polymerization by passing a constant electric potential across indium-tin oxide and platinum-plated titanium plate electrodes. These electrodes were immersed in an electrolytic solution containing thiophene and pyrrole, lithium tetrachloroborate (electrolyte salt) and acetonitrile (solvent). The resulting films were dedoped in pure acetonitrile at a higher negative bias potential for a longer time. Polypyrrole and polythiophene sensors were fabricated using the corresponding thin films prepared. Aluminum mylar sheets and gold sheets were attached to both ends of the sensors that served as electrodes. The voltage-current (V-I) curves showed evident responses when they irradiated with ultraviolet (UV) light illumination, Strontium 90 (^{90}Sr) beta ray and Nd:YAG laser. Signals coming from these sensors established good ohmic relationship and conductivities were found to be in the orders of magnitude of 10^{-10} to $10^{-5} \text{ S.cm}^{-1}$. This study shows that signals obtained with the polymers were similar to those from using Si-PIN photodiode. **(Author's abstract)**

Radiation sensor. Dopant concentration. Conductivity. Polythiophene. Polypyrrole. Tetrachloroborate. Solvent. Electropolymerization. Freestanding film. Conducting polymer.

- 0347 Pozzolanic behavior of Mt. Pinatubo ejecta under natural and accelerated curing condition. Jorillo Jr., Pablo A., Verdejo, Benjamin D.. **Philippine Engineering Journal**, , 16(1):49-72

This paper describes the results of the study on the evaluation of the pozzolanic behavior of Mt. Pinatubo ejecta under natural and accelerated curing conditions. The study is essentially a developmental research aimed in

providing a comprehensive characterization of the volcanic ejecta in comparison with the local fly-ash. Two types of accelerated curing were examined viz., high pressure steam curing and boiling-cooling method. Various types of ejecta materials and percentage cement replacements were investigated to determine the optimum type and proportion in a cement based mortar matrix based on the criteria of strength and dimension stability.

Engineering. Mt. Pinatubo. Pozzolan behavior.

- 0348 Precise frequency generation with digital modulation using direct digital synthesis. Ong, Johann L.. **Philippine Engineering Journal**, , 17(1):45-54

Frequency synthesis or generation of baseband continuous wave signals is usually implemented through traditional analog techniques using tuned LC tank circuits, quartz crystals or phase-locked loops. This paper discusses a digital alternative, direct digital synthesis (DDS), and compares it with analog methods. A commercially available DDS chip and the results of a DDS system implemented using it are also presented.

Engineering. Communications engineering. Direct digital synthesis (DDS).

- 0349 A productivity index model for Philippine engineering schools. Matias, Aura C.. **Philippine Engineering Journal**, , 17(2):29-38

The measurements of the productivity of education systems necessarily rely on numerous interrelated aspects and judgements. This paper illustrates an application of the concepts of multi-attribute utility evaluation of productivity for engineering educational institutions based on the assessment of deans of engineering schools/colleges in the Philippines. The school administrators selected for the surveys and elicitation process were from school that offered both B.S. Chemical and B.S. Mechanical Engineering undergraduate programs. Fifteen schools from the total list of 196 engineering schools (based on the official list of recognized engineering schools as of 1987, Technical Panel for Engineering Education) responded to the survey. Five of these respondents were selected for the further development and assessment of the proposed model.

Seventeen quantitative and qualitative measures of productivity were identified. The assessment produced an additive multi-attribute function with a bilinear sub-model for quality and quantity of research outputs. The model was tested using 4 engineering schools in the National Capital Region. The model was partially successful in evaluating the performance of the selected schools.

The potential application of the resulting aggregate measure is promising. However, it will have to go through refinements and adjustments to be truly representative of the preference consensus of the different school administrators. The development of a model relating the productivity index with a capability index is suggested as the most interesting extension of the model.

Engineering. Philippine engineering schools. Education productivity index model.

- 0350 The relation between preparation, microstructure and mechanical properties of alumina ceramics. de la Cuesta, L., Mena, M., Sison, G.N., Bernardo, S., Cho, S.J., Uematsu, K.. **Philippine Engineering Journal**, , 26(2):41-56

The starting alumina powders were synthesized by chemical method under varied pH conditions - pH 6.5 and pH 8.5. The resulting powders were characterized by fine particle sizes, high surface area and crystalline structure. Powders at pH 8.5 were noted to have finer particle size than at pH 6.5. Due to their fine characteristic, the powders agglomerated during preparation of compacts.

The alumina compacts were fabricated by (1) cold isostatic press (CIP) and sintered at 1550°C and 1650°C and (2) hot isostatic press (HIP) and also sintered at 1550°C and 1650°C. The CIP compacts showed large grains of alumina, whereas the HIP compacts were relatively fine-grained. The microstructure of both compacts exhibited abnormal grain growth more particularly in the CIP compacts.

The synthesized powders were contaminated with Ca which accounted for the abnormal grain growth in both alumina compacts. The Ca present in HIP fabricated alumina compacts at pH 8.5 and sintered at 1650°C, gave high flexural strength. This was due to the formation of fine-elongated grains of regular pattern in between the fine-grains in the alumina matrix. The Ca present in the CIP fabricated alumina compacts at pH 8.5 and sintered at 1650°C gave relatively low values of flexural strength. Flexural strength of alumina compacts fabricated by HIP at pH 8.5 significantly increased with an increase in sintering temperature.

For HIP alumina compacts at pH 8.5, fracture toughness increase with an increase in sintering temperature. Such increase in toughness was due to the growth of needle-like grains.

Alumina ceramics. Microstructure properties. Mechanical properties. Engineering.

- 0351 Residue handling and soil disturbance of an inclined tine furrow opener. Borlagdan, Paterno C., Quick, Graeme R., Lantin, Reynaldo M.. **Philippine Engineering Journal**, , 16(2):61-76

A vertical and an inclined tine-furrow opener, with 30° angle of inclination with respect to the vertical axis perpendicular to the toll bar, were compared and evaluated at different rake angles (60°, 75°, 90° and 105°) in terms of residue handling and soil disturbance.

Three straw conditions were used namely: 1) standing rice stubbles without cut straw, 2) standing stubbles with wet cut straws, and 3) standing stubbles with dry cut straws.

The thirty degree tine with 60° rake angle has the best residue handling capability but with lifting effect on soil. Inclined tine with 90° rake angle has a neutral soil working effect. The residue handling capability of the vertical and inclined tine decreases as the rake angle increases. Soil lifting effect was apparent at rake angles less than 90°. At rake angles greater than 90° there was soil compression.

Engineering. Tine furrow opener. Residue handling and soil disturbance.

- 0352 A review of oscillating screen-blower cleaners for grains. Pasikatan, Melchor C., Quick, Graeme R.. **Philippine Engineering Journal**, , 16(2):77-97

The literature concerned with grain or seed cleaners using blower and linearly oscillating screens, and related machines and mechanisms was reviewed. Attempts in developing the theory and mechanics of cleaners was discussed. Grain, straw and chaff aerodynamic and mechanical properties which affect separation were assessed. The potentials and limits of pure aerodynamic separation, effects of design, operating and material parameters on cleaning performance were critically examined.

The available information may be limited, but sufficient to provide rough parameters for design under different operating conditions. Researches show that to achieve good cleaning performance at high material capacity in wheat and paddy, air velocity of 7.2-9.2 m/s, air direction of 40-45°, height of drop of 70-102 mm, and hanger angles of 15-25° should be used.

Attempts to relate cleaning performance with two or more influencing factors are rare in the literature. Results derived with wheat and based on straw walker and shoe assembly of combines need to be validated for rice, rice threshers and cleaners. Further studies that will lead to a universal cleaning equation and a good understanding of particle motion as influenced by several variables are needed.

Engineering. Oscillating screen-blower cleaners. Grain.

- 0353 RF Characterization of square spiral inductors on a 0.25µm digital CMOS process. Hizon, John Richard E., Rosales, Marc D. , Alarcon, Louis P., Sabido IX, Delfin Jay. **Philippine Engineering Journal**, , 26(1):55-66

The growth of wireless application in the low GHz range has been a catalyst in numerous research activities to develop wireless applications in standard digital CMOS processes. The relatively lower costs in developing single chip solutions for wireless applications in CMOS technology is considered its main advantage over other semiconductor processes. Thus, with the integration of RF systems in CMOS, planar inductors will have a dominant role in defining the achievable performance of the system as a whole.

The inductors used in this study were used in the input impedance matching for an LNA at 2.4 GHz. Plain square spiral inductors and square spiral inductors with Q enhancement structures are implemented on a 0.25µm digital CMOS process with inductance values of 1.8 nH and 10 nH. On Wafer RF characterization of the inductors done using an inductor model proposed by Yue. Results obtained show that parasitic resistance limits the Q of square spiral inductors on a digital CMOS Process. Measured results also show how Q enhancement techniques reported in literature affect inductor Q on a digital CMOS process. It is recommended that shunted metals be used in improving inductor Q.

Engineering. Square spiral inductors. CMOS.

- 0354 River models. Castro, Peter P.M. . **Philippine Engineering Journal**, , 4(2):138-145

Rigid bed physical and mathematical modelling are each discussed at review level. A brief historical background, an introduction to the theoretical basis for validity, and some sub-classifications and variants are included. The two techniques are then compared, and some criteria for selection of method to use are mentioned. It is suggested that problem definition should govern in the choice of models. Recent trends that are radically changing the criteria are also mentioned.

Engineering. River models. Mathematical model. Physical hydraulic model.

- 0355 Routing broadcast packets along a minimum diameter tree. Abaya, Efren F.. **Philippine Engineering Journal**, , 16(2):1-8

In traditional computer networks, such as X.25 and TCP/IP networks, packets generally traverse the lowest cost route going from one source to one destination. In recent years, new classes of computer and video services have emerged that transfer multiple copies of a packet from one source to many destinations (multicast or broadcast).

This paper models the broadcast routing problem in a mesh computer network as a graph theory problem with a cost function that has to be minimized. The paper proposes a new criterion for routing broadcast packets when each node in the network may be a source of broadcast packets directed to the other nodes. Constraining broadcast packets to follow a single spanning tree, it is shown that a minimum diameter spanning tree is a suitable choice for routing purposes. A heuristic for generating a minimum diameter spanning tree is presented.

Engineering. Routing broadcast packets.

- 0356 Selection framework for powerplant capacity mix. Manegdeg, Ferdinand G., Portal, Marisol G.. **Philippine Engineering Journal**, , 16(2):35-59

This paper illustrates multiattribute decision analysis in selecting powerplant capacity mix for the National Power Corporation that will meet the power demand of the Philippines by 2005. The objective of this study is to provide a framework for the decision making analysis of the Systems Planning Department of National Power Corporation. The preferences of two managers from the System Planning Department were elicited.

The preferences and value judgments of the two decision makers on specified levels of production cost (capital cost, operation and maintenance costs, thermal energy needed), fatalities, environmental degradation (radioactive waste, sulfur dioxide, air particulate, nitrogen dioxide and hydrogen sulfide releases), socio-political acceptability and land use were

determined. There were ten (10) powerplant capacity mix alternatives generated.

The preference model of decision maker 1 is multiplicative while decision maker 2 is multiplicative with additive submodels. The alternatives that maximizes the use of combined cycle gas turbine and the use of fuel oil were ranked first and second, respectively, by the decision makers.

Engineering. National Power Corporation. Powerplant capacity.

- 0357 Slope failures triggered by heavy rainfall. Orense, Rolando P.. **Philippine Engineering Journal**, , 25(2):73-89

Landslides occur frequently during or following periods of heavy rainfall. This is illustrated by the large-scale landslides and debris flows in Quezon Province which were triggered by a series of typhoons and tropical storms last November-December 2004. In order to understand the mechanism and conditions leading to these slope failures, a comprehensive testing program consisting of constant shear stress drained triaxial tests and model slope experiments was performed using sandy materials obtained from a former landslide site in Japan. Results of both element tests and model experiments clearly showed that slope failure is induced due to the development pore-water pressure in slope. As soil moisture contents within the slope approach critical values, ground deformations are mobilized. Therefore, by properly selecting regions where soil moisture contents must be monitored, possibly in areas where seepage forces will develop, failure initiation in slopes can be predicted. Based on this, a simple monitoring scheme to predict in real-time the occurrence of failures in critical slopes was proposed.

Engineering. Landslides. Slope failures. Heavy rainfall.

- 0358 The smallest non-associative inverse property loop and some generalizations. Carrascal, Alexander S.. **Transactions of the National Academy of Science and Technology Philippines**, , :354

The smallest non-associative loop with *inverse property (IP)* is of order 7. Up to isomorphism, this is the only IP loop of that order. This unique loop possesses interesting properties that can be generalized for the construction of IP loops of higher order. These generalizations led to the discovery and construction of several special families of IP loop of order 7 is the smallest member. These special families include IP loops of order (1) $n = 3m - 2$, $m \geq 3$; (2) $n = 4m - 1$, $m \geq 2$, and (3) $n = 2^k - 1$, $k \geq 3$. The properties of the IP loops of order $n = 3m - 2$ and $n = 2^k - 1$ can be combined together to construct an IP family of order $n = (2k-1)m - 2^k + 1$, where $k \geq 3$ and $m \geq 3$. Moreover, each of these families could be further generalized to construct other families of IP loops. Finally, a particular member of one family can be used as a subloop in the construction of a higher order member of that family or another family.
(Author's abstract)

Non-associative loop. Inverse property (IP).

- 0359 Soil incompressibility by 'mixed' and penalty methods. Borja, Ronaldo I.. **Philippine Engineering Journal**, , 6(1):56-65

In this paper two numerical methods of treating soil incompressibility are discussed, namely: (1) solution by 'mixed' formulation and (2) solution by penalty formulation. The numerical methods presented herein are finite element-based and assume that in the no-flow (undrained) condition, the deformation and pore pressure behavior of a saturated soil medium can be analyzed either by considering a two-phase soil-water relationship or by a single-phase continuum formulation.

Engineering. Civil engineering. Soil incompressibility. Mixed formulation. Penalty formulation.

- 0360 Statistical analysis of a quantizer design algorithm. Abaya, Efren F.. **Philippine Engineering Journal**, , 4(1):77-91

Suppose that a sequence of probability distribution functions $[F_n]$ converges weakly to a distribution function F . Does the sequence of optimal quantizers for the F_n 's converge to an optimal quantizer for F ? If so, do the respective distortions converge to the optimal distortion for F ? It is shown that uniform integrability of the cost function with respect to the sequence $\{F_n\}$ is sufficient to obtain such convergence for mean-square distortion. These questions are used to motivate a study of the strong consistency properties of optimal quantizer designs based on sampled data.

Engineering. Quantizer design algorithm. Statistical analysis.

- 0361 Strain-induced molecular orientation in sheared polycarbonate. Gopez, Adolfo Jesus R.. **Philippine Engineering Journal**, , 6(1):74-103

Characterization of molecular orientation was done on polycarbonate samples previously deformed in plane simple shear. Birefringence and extinction angle values and x-ray data indicated the presence of molecular orientation. Measurements done on undeformed samples showed no evidence of orientation indicating that the orientation in the deformed sample is strain-induced. A theoretical expression giving birefringence as a function of draw ratio was derived using the pseudo-affine hypothesis. Good agreement was found with the birefringence data. Comparison with samples deformed in uniaxial tension showed that for the same draw ratio, samples deformed in simple shear had higher birefringence.

Engineering. Metallurgical engineering. Molecular orientation. Strain-induced. Sheared

polycarbonate.

- 0362 Stress stiffening and dynamic stress computation in flexible multibody dynamics. Ledesma, Ragnar. **Philippine Engineering Journal**, , 16(2):9-34

A formulation for the dynamics of flexible multibody systems is presented in this paper. This formulation relies on the use of floating reference frames to describe the configuration of the multibody system. Component flexibility is described in terms of the finite element deformation coordinates. The equations of motion are derived through the generalized d'Alembert principle, and the resulting set of differential-algebraic equations are reduced to ordinary differential equations through the use of the augmented Lagrangian penalty method. Modal reduction is utilized to reduce the dimension of the deformation coordinates. Stiffening effect is included through the use of a stress stiffening matrix, which is computed efficiently as a linear combination of constant stress stiffness matrices with time-dependent scalar coefficients. The same formulation is used to devise an efficient method for computing the dynamic stresses which include the effects of inertia due to gross motion and elastic deformation.

Engineering. Dynamics of flexible multibody systems.

- 0363 Studies on the fusibility of coal ash. Pugal, D.L., Herrera, A.B., Quilao, T.A., Balais, W.A., Abarquez, F.I., Bion, H.H., Magpantay, C.G., Vinluan, F.D., Yamada, K., Tsurue, T., Takeda, S., Ishizaki, K.. **Philippine Engineering Journal**, , 16(1):85-102

A study, which aims to develop a technology for the preparation of a high quality adsorbent for SO_x using coal ash to control air pollution caused by coal-fired thermal power plants in the Philippines, is currently being jointly undertaken by ITDI and HNIRI. During its first year of implementation, the physical, chemical and thermal characteristics of Philippine and Japanese coal ash samples were determined. Results show that Philippine coal ash samples are of the silicoaluminous type while that of the Japanese coal samples are of the aluminosiliceous type. Three (3) common major elements, namely, quartz, mullite and hematite are found in all coal ash samples. A correlation between the melting point and chemical composition of the coal ash samples shows that the coal ash samples having a low acid-base index resulted in high melting points.

Engineering. Coal ash.

- 0364 A study on roadside noise generated by tricycles. Vergel, Karl N., Cacho, Frielly T., Capiz, Cheryl Lyne E.. **Philippine Engineering Journal**, , 25(2):1-22

The study is aimed at quantifying the levels of noise contributed by tricycles in the roadside residential environment. Specific objectives include the measurement of roadside noise levels, relating noise levels and road traffic flow characteristics and relating the noise performance of tricycles with

loading, speed and road gradient (sloping or level) at on-road conditions, and with type of engine, loading, fuel-oil mix ratio and type of lubricant at simulated loading conditions. Tricycles comprise majority of the traffic passing through the study area. Results from the 24-hour survey of noise levels have shown that all readings exceeded the existing local standards. A multiple linear regression model predicting roadside noise level as a function of the traffic speed and tricycle traffic volume is developed with a relatively high correlation, indicating the significant contribution to noise by tricycles. There is a relationship of on-road noise performance of tricycles with its speed and load and type of road. With respect to noise performance under simulated loading, there is an increase in noise level with increase in speed level.

Tricycle generated noise. Quantifying roadside noise levels. Engineering.

- 0365 On teaching different amplifiers using a "T" transistor model. Escoto, Jr., Miguel T.. **Philippine Engineering Journal**, , 4(1):26-35

This paper presents a practical circuit approach in the analysis of an emitter-coupled differential amplifier pair. Development and analysis center around parameter keywords like differential gain (AD), common mode gain (AC) and common mode rejection ratio (CMRR). The Ebers-Moll Model is used to derive a "T" transistor model for signal analysis.

Engineering. Amplifier. Differential gain (AD). Common mode gain (AC). Common mode rejection ratio (CMRR). T transistor model.

- 0366 On the use of entropic regularization for identification of cohesive crack parameters. Que, Norbert S.. **Philippine Engineering Journal**, , 25(2):53-72

The fracture parameters governing the cohesive crack model is obtained through the use of entropic regularization. Specifically, it is employed as a smoothing technique that lends to the solution of a difficult identification problem cast as a mathematical program with equilibrium constraints (MPEC). Results suggest that reformulation of MPEC as a nonlinear programming problem using entropic regularization show promise in the solution of the parameter identification problems considered in this paper.

Engineering. Engineering sciences. Cohesive crack parameters. Entropic regularization. Identification.

- 0367 Thermal management in electronic packages. Mena, Manolo G.. **Philippine Engineering Journal**, , 18(1):79-86

Packaging of an integrated circuit not only involves the physical isolation of the delicate integrated circuit or

Engineering. Electronic packages. Thermal management. Silicon chip. Thermal resistances.

- 0368 Transcripts and clone contig mapping within 13q32, a susceptibility region for bipolar disorder and schizophrenia. Reyes, Gloria D., Corona, Wilson, Ferraren, Dilberto, Detera-Wadleigh, Sevilla D., Minje, Virginia D.. **Transactions of the National Academy of Science and Technology Philippines**, , :335-336

Recently, independent reports highlight the importance of chromosome 13q32 as possible location for genes that may underlie bipolar disorder and schizophrenia, indicating a possible overlap of susceptibility locus. To obtain a fine resolution of loci mapping in this region and determine positional candidate genes, a high resolution physical map was assembled using bacterial artificial chromosome (BAC) cloning system. Unique transcripts (Expressed sequence tags, ESTs) and linked markers D13S1252 and D13S1271 found within the region were used as primers in isolating by PCR 25 BAC clones which were eventually used to assemble a clone contig within the ~2 cM interval stSG9874-D13S1267. The BAC contig reduced the physical distance of the interval from 2.4 Mb to ~600-800 kb. *NotI* digestion of BAC DNA released inserts and revealed 12 *NotI* sites reportedly associated with CpG islands marking location of multiple active transcribing units. The terminal ends of selected BAC clones were sequenced to obtained 19 new end sequences, 14 of which were found to be novel and five showed homologies in the databases. The sequences are nearly 100% homologous with random sequences in high throughput genome sequences (HTGS) in Genbank. New sequence tagged sites (STSs) generated become new landmarks that increase loci resolution and serve as template for further dissection of the region.

Considered as first positional candidates were the transcripts and genes that were localized nearest the linked markers. The presence of *EB12* (Epstein Barr virus induced gene 2), a G protein-coupled receptor involved in phosphatidylinositol (P1) pathway, supports *IMPA2*, one of the key enzymes of this signaling pathway, as a strong candidate gene. One of the candidate ESTs in NIB529, a novel EST expressed in the brain that elicited a low homology to a microtubule-associated protein (MAP). NIB529 was used to initially extend cDNA towards the 5' end as an attempt to obtain the full-length cDNA sequence using random amplification of CDNA ends (RACE)-PCR coupled with database search. The refined physical map showing positional candidates is a valuable resource for facilitating the precise localization and identification of candidate genes for these diseases and for other diseases linked to these regions. **(Author's abstract)**

Bipolar disorder. Schizophrenia. ESTs. BAC. 13q32.

- 0369 Treatment of dental amalgam wastes. de la Paz Clemente, Eligia. **Philippine Engineering Journal**, , 22(2):75-88

Extraction and recovery of Hg from dental amalgam waste was done by

retorting and gravity separation. It was found out that Hg exists in three phases in the dental amalgam waste slurry. In the first phase Hg existed as a free metal, 557.2 g of free Hg was recovered from the three 300 ml samples of dental amalgam waste. The samples were first drained of water and then filtered using a nylon or linen cloth wherein Hg was easily squeezed out. The filtrate, which is the dental amalgam alloy, was hand-panned to recover remaining free mercury that was not squeezed out of the cloth. After panning, the dental amalgam alloy was air dried to remove excess water and to prepare it for retorting. In the second phase, Hg existed in the dental amalgam waste alloyed in the amalgam. The set amalgam will ideally consist of 50% Hg but it may contain as high as 60% and as low as 40% by weight. Overall, 617.7 g of dental amalgam was collected from 900 ml of sample waste. The dental amalgam was retorted, using a ThermEx retort, for 30 min per 100 g of dental amalgam. There was an average of 88.53% recovery. From the expected recovery of 150 g, only 132.8 g were collected from the three trials. This perhaps is an indication that the time of retorting may have been insufficient to ensure 100% recovery. Moreover, the original amalgam alloy's Hg-alloy ratio could have been lower than the ideal 1:1 ratio. In addition, the manner or method of mixing of Hg with the dental alloy probably did not promote complete mixing during preparation thus failing to provide optimum absorption of Hg. The third phase of Hg in the dental amalgam waste consists of the dispersed Hg in water. Extraction of Hg from this phase will require a separate study.

Engineering. Dental amalgam wastes. Treatment.

- 0370 Use of chromatographic techniques for the detection of marijuana in urine samples.. Portilla, Ma. Cristina B., Pascual, Cherrie B.. **Transactions of the National Academy of Science and Technology Philippines**, , :347

Marijuana a hallucinogen, is one of the most commonly used dangerous drug in the Philippines. The major psychoactive component is tetrahydrocannabinol, which could be monitored in urine. Different chromatographic techniques (Thin Layer Chromatography, High Performance Liquid Chromatography and Gas Chromatography-Mass Spectrometry) were developed to detect marijuana in urine sample. After collection, the urine sample was prepared by basic hydrolysis and the drug was extracted using liquid-liquid extraction. Different fractions were utilized for TLC, HPLC and GC-MS analysis. In the TLC method, R_f of marijuana was found at ~0.68 and limit of detection at 60 ng/ml. Marijuana was detected at 215 nm, in the HPLC method, with a retention time of ~12.0 min. Prior to GC-MS analysis, the marijuana extract was changed to its trimethylsilyl derivative. Electron impact was used as the ionization mode. Selected ion monitoring (SIM) was used to confirm the presence of the parent metabolite of marijuana, 9-Carboxy-11-nor- Δ^9 -tetrahydrocannabinoid, by monitoring the diagnostic ions 371, 473, 488. The retention time was found at ~11.9 min and a cut-off level of 60 ng/ml were used to confirm positive urine samples.

The method developed is used for routine hospital screening and confirmation of marijuana in urine. **(Author's abstract)**

Marijuana. Hallucinogen. Chromatography. TLC. HPLC. GC-MS. Dangerous drugs. Urine. Tetrahydrocannabinol.

- 0371 Variability in thickness measurements using x-ray fluorescence technique. Baltazar, Inmaculada C., Mena, Manolo G.. **Philippine Engineering Journal**, , 18(1):1-12

Thirty units of tin plated Dual In-line Packages were used to evaluate the measurement system for tin thickness using the X-ray Fluorescence technique. The results showed that the system is sensitive to inspector technique and the total measurement error estimate was about 22 microinches. This system for obtaining tin thickness measurements had been recommended only when the variability of the process is at least 80 microinches. Otherwise, a more sensitive method must be used.

Engineering. Metallurgical engineering. Dual in-line packages. Thickness measurements. X-ray fluorescence technique.

- 0372 A VHF Crystal oscillator for Satellite receiver. Olesco, Richard O.. **Philippine Engineering Journal**, , 17(1):33-44

This paper will discuss the design of a crystal oscillator used as a local oscillation (LO) for satellite receivers in the VHF band.

Engineering. Communications engineering. VHF crystal oscillator.

- 0373 Volcanic sand in asphalt concrete. Pagbilao, Dominador S., Verdejo, Benjamin D., Lopez Jr., Romeo G.. **Philippine Engineering Journal**, , 16(1):73-84

Volcanic sand from three river sources, Abacan, Bacolor and Lubao, were investigated as an aggregate component of hot mix asphalt. Laboratory test samples of asphalt mixtures containing these materials were evaluated according to their Marshall properties and their sensitivity to moisture damage. The Marshall properties of mixtures containing volcanic sand as fine aggregate were found to be inadequate. The use of volcanic sand as a partial substitute to fine aggregate, on the other hand, do not adversely affect the Marshall properties of the mixtures significantly, however, their resistance to moisture damage were significantly reduced and the binder requirement were increased by 20%.

Engineering. Volcanic sand. Asphalt concrete.

- 0374 The Y-chromosome STR system and forensic DNA analysis in the Philippines. Delfin, Frederick C., Calacal, Gayvelline C., Halos, Saturnina C., De Ungria, Ma. Corazon A.. **Transactions of the National Academy of Science and Technology Philippines**, , :333-334

Conventional procedures for mix strain analysis incorporate differential lysis to separate male and female DNA for effective profiling. Various protocols for differential lysis were previously validated by the laboratory and were found to be effective in identifying female and male DNA in mixed samples using the autosomal STR system. But in cases of trace evidence, more DNA is lost when differential lysis methods are used. To circumvent this problem, the Y-chromosome Short Tandem Repeat (STE) system was developed and validated.

Using in-house laboratory validated protocols, a Y-chromosome database in the DYS19, DYS390, DYS393, DYS385 Y-STR loci was constructed and the systems to analyze the reference and mixed samples. Results show the Y-STR system was successful in first, determining the presence of male DNA and second, in identifying the male source of the DNA relatively high probability in all mixed samples tested. In tandem with the autosomal STR system, a higher power of discrimination was achieved thus demonstrating the effectiveness of the Y-STR database for forensic cases. Overall, this shows a new system that can compliment the already existing autosomal database of the Philippine population. **(Author's abstract)**

Forensic. Y-chromosome. Short tandem repeat. DNA typing. DYS19. DYS390. DYS393. DYS385.

ENVIRONMENTAL SCIENCE

- 0375 An assessment on the status and distribution of endemic and threatened birds of Siquijor Island, Philippines:. Bucol, Abner A., Bucol, Aladin B.. **Silliman Journal**, , 48(1):33-42

This paper presents the results of an on-going study on the avifauna of Siquijor Island utilizing point counts, transect walks, and MacKinnon Lists with ethnobiological surveys. The study covered the four major forest patches remaining on Siquijor and was visited during October-December 2007. A total of 44 species were recorded. Four of the five endemic subspecies were confirmed, namely: Steak-breasted Bulbul (*Ixos siquijorensis siquijorensis*), Yellow-bellied Whistler (*Pachycephala philippensis siquijorensis*), Oranged-bellied Flowerpecker (*Dicaeum trigonostigma besti*) and Everett's White-eye (*Zosterops everetti siquijorensis*). The Philippine Hanging-Parrot (*Loriculus philippensis siquijorensis*) was not sighted at all and is presumed to be extinct. Of all the threatened species known to inhabit the island in the past, only the Streak-breasted Bulbul was sighted; it was found in all sites with relative indices of abundance of 1.0 in Bandilaan, Canghaling, and Liloan; and 0.92 in Salagdoong. Bandilaan Natural Park, harbors the highest number of bird species (35) followed by Canghaling (33), Liloan (28) and Salagdoong (20). Habitat destruction due to firewood extraction and slash-and-burn farming as well as hunting were the observed threats to the island's avifauna and its unique biodiversity.

Environmental science. Endemic birds. Status and distribution. Siquijor island.

- 0376 Characterizing process vitality in large Philippine manufacturing companies. Siriban-Manalang, Anna Bella. **Philippine Engineering Journal**, , 21(2):14-25

As one of the key attributes of total quality management, process vitality represents the biggest in scope encompassing product design management, supplier quality management, information and analysis and process management. The paper attempts to provide a model to characterize the level of maturity of large manufacturing companies in the Philippines using key indicators of process vitality. Using multi-variate data analysis applied to a sample of 30 manufacturing companies, a predictive tool was developed to establish a taxonomy of companies on the basis of process vitality. That the resulting taxonomy can be organized using graphical representation of the level of maturity is demonstrated in terms of multi-axial diagrams from which insights on a company's plans, programs and procedures can be derived.

Total quality management. Process vitality. Product design management. Supplier quality management. Information and analysis and process management.

- 0377 Conceptualizing a multi-attribute diagnostic model for total quality management. Siriban-Manalang, Anna Bella. **Philippine Engineering Journal**, , 21(2):26-41

As part of an ongoing research on the development of a diagnostic tool for total quality management, this paper attempts to conceptually define a quantitative assessment approach to measure the dynamic and multi-attribute characteristics of TQM. From a synthesis of the various quality management approaches in the past, identified current practices and expert opinions, the level of TQM adoption at the organizational level is found to be anchored on a systems structure composed of top leadership involvement, customer focus, human resource empowerment, continuous improvement and process vitality as the characterizing attributes.

Total quality management. Multi-attribute diagnostic model.

- 0378 Evaluation and adaptive modification of a low cost paddy drying technology. Borlagdan, P.C., Diaz, C., Bakker, R.R.. **Philippine Engineering Journal**, , 21(2):42-52

A low cost paddy drying technology originating from Vietnam was evaluated and modified to suit the local grain drying requirement. The original design can dry one ton of wet paddy in 2 to 3 days depending on the moisture content and relative humidity of the drying air. Modification of the blower assembly and bin material significantly reduced the drying time compared to the original design. The modified low cost dryer (LCD) can dry wet paddy with more than 24% moisture content, down to a safe level of 18% moisture content wet basis (MCwb) in ten hours. The LCD was pilot tested with prospective end-users to solicit feedback and gauge its acceptability. The respondents compared the LCD with sun drying and suggested that if the dryer cannot dry paddy as fast as sun drying, it is not acceptable to them. It takes 6 to 8 hours to sundry paddy during sunny days compared with 15 to 30 hours in the LCD.

But sundrying is not possible during the wet season when it is needed most. Farmers realized that the LCD would be very useful in saving the wet season harvest from deterioration. LCD-dried paddy when milled has higher amount of headrice, comparable milling recovery and whiteness. Testing and evaluation for lower capacities resulted in shorter drying time and lesser energy consumption. Economic analysis showed that using the LCD during the wet season can be economically profitable, depending on the volume of grain dried.

Low cost paddy drying technology. Farm-level drying. Low cost dryer. Low temperature drying.

- 0379 A study on the state of the transportation environment in Metro Manila. Vergel, Karl, Lidasan, Hussein S.. **Philippine Engineering Journal**, , 21(2):1-13

In the 1990's, the degradation of the atmospheric environment specifically air pollution brought about by the rapid increase in motor vehicle traffic, as reflected by the rapid increase in vehicle registration in 1988-1999, had become a major concern in Metro Manila, where a number of local and foreign agencies had conducted air pollution monitoring studies. The objectives of this paper are to determine conditions and trends in the transportation environment, that is, the micro-environment of roads in Metro Manila and review urban and transportation policies of the government pertaining to the improvement of the transportation environment.

These studies have conducted that total suspended particulates or particulate matter, followed to some degree, by nitrogen oxides and carbon monoxide, are the key air pollutants attributed to motor vehicle traffic. Other pollutants such as sulfur oxides, total organic gases and lead are still below critical levels.

The National Urban Policy Agenda of the NEDA deals on policies for the improvement of the urban environment and the transportation environment of Metro Manila through the urban environment management and Metro Manila policy modules, respectively. Transportation policies through the DOTC deals on emission standards and inspection of motor vehicles through the Clean Air Act of 1999.

Environmental science. Transportation environment.

- 0380 Switch-capacitor filter for analog realization of a sinusoidal pulse width modulated induction motor drive. Andrada, Rodel Vincent, Sison, Luis G. . **Philippine Engineering Journal**, , 21(2):53-62

An analog implementation of a variable amplitude/frequency controller for a single phase DC-AC inverter with emphasis on its application for induction motor speed control is presented. A clocked switched capacitor filter is used along with an operational amplifier integrator and a comparator to generate the bipolar sinusoidal PWM pulses for the output drive. Variable frequency of operation is achieved by controlling the clock of the main controller while effective output voltage is automatically varied by the amplitude modulation ratio. It is demonstrated that the technique used is a novel and cost-effective

approach in DC-AC inverter frequency control and has advantages over microcontroller-based and DSP-based methods. This paper describes the basic concepts of the above VVVF-SPWM and preliminary test results of the prototype controller used for the experiment, which was constructed by integrating the controller with the associated driver, full bridge inverter (H-bridge) and deadtime controller.

SPWM. Switched capacitor filter. VVVF. DC-AC inverter. Amplitude modulation ratio.

FISHERIES

0381 Artificial reefs. **Technology!**, 8(6):1-16

Artificial reefs may yet restore life to marine resources ruined by illegal fishing methods at the same time save coastal communities from starvation. Fabricated artificial reefs offer enormous potentials to enhance the fishing opportunities of small fishermen.

Man-made structures constructed for several purposes, artificial reefs best serve as nursery area and shelter for juvenile fishes and invertebrates; aquarium fish attractors; and decreases fishing time, effort and energy by confining fishes in one area.

Artificial reefs are best located in protected embayments with sandy or sandy-muddy substratum at depths of 15-20 m. These are places where reefs do not pose hazards to navigation and least affected by wave action.

Discarded tires and bamboos have been used for constructing artificial reefs. These materials may be dropped at the bottom of the sea to form a jumbled mass or assembled into geometric forms. Tires last longer than bamboos, which stay intact for about 3 years.

From a 10-tire reef which costs P2,483.94, a fishermen earns a net income of P10,500 and P11,300 in the fourth and fifth year of operations in addition to the income derived from his fishing activities outside the artificial reef. If he uses a 10-bamboo reef with a production cost of P1,762.64, he obtains a net profit of P8,600 and P10,300 in the second and third year of operations.

Fisheries. Fabricated artificial reefs. Fish confinement. Protected embayments.

0382 Canning of tulingan. **Technology!**, 8(4):1-16

Once a lowly fish on the consumer's table, tulingan can now be processed as a canned product with its quality comparative to imported canned tuna.

Tulingan or frigate tuna (*Auxis thazard*, *Lacepede*) abounds in many parts of the country's marine waters. In 1984, of the tuna production of 181, 128 t harvested from 1.48 million sq km of marine waters, 44% consisted of tulingan.

Tulingan is commonly sold fresh. It is prepared as *sinaing na tulingan*, a delicacy of the Southern Tagalog and Bicol regions by cooking the fish in salt and water with or without the addition of acidulants like *camias* or green

tamarind fruits. It is also processed as smoked tulingan by salting, cooking, then finally smoking the fish. For export, tulingan is produced into katsuobushi or smoked tuna sticks.

Although sinaing na tulingan and smoked tulingan are highly acceptable by Filipinos, the short shelf life of the products still remains a problem. The development, therefore, of other processing methods for tulingan is direly needed.

Fisheries. Tulingan canning.

- 0383 Carbon dioxide sensor based on a pH sensitive polypyrrole. Tongol, Bernard John V., Binag, Christina A.. **Transactions of the National Academy of Science and Technology Philippines**, , :372

The measurement of carbon dioxide is essential in biotechnology, in health care, and in beverage industry. The simplest device for detecting dissolved CO₂ is the Severinghaus electrode. However, the pH-glass electrode used in Severinghaus electrode is bulky and fragile.

In this study, a Severinghaus-type carbon dioxide sensor is fabricated using conducting Polypyrrole (PPy) as the pH sensing device. The PPy was polymerized galvanostatically ($I = 1 \text{ mA}$) onto a Pt wire (0.17 cm^2) for 5 min in a solution containing 1.0 M pyrrole and 0.1 M NaHCO₃ solution. The PPy-pH sensor gave a sub-Nernstian response of -43.44 mV/pH with a very good linearity of -0.999 for three replicate measurements. For the fabrication of the CO₂ sensor, the PPy-pH sensor and the Ag/AgCl reference electrode are immersed in a mixture of 0.001 M NaHCO₃ and saturated KCl solutions. The sensor body is then covered with a gas permeable membrane. The sensor is sensitive to dissolved CO₂ gas from $1 \times 10^{-2} \text{ M}$ to $1 \times 10^{-5} \text{ M}$ NaHCO₃ solution. Further investigation is underway in view of optimizing the CO₂ sensor. A Pt disc which has a greater surface area than the Pt wire electrode has been employed, as well, for the electrodeposition of PPy. Surface morphology of the polymer-modified electrode has been studied using SEM while the elemental composition of the electrode surface has been analyzed through XPS and TOFSIMS. **(Author's abstract)**

Carbon dioxide. Carbon dioxide sensor. pH-sensitive. Conducting polypyrrole. SEM. XPS. TOFSIMS.

- 0384 Catch composition and relative abundance of purse seine-caught fishes. Aprieto, Virginia L.. **U.P.V. Fisheries Journal**, , 1(1):23-33

Five settings of the purse seine on nearshore fishing grounds in Southern Luzon and Central Visayas undertaken on August and October, 1983 on board the 390 GT M/V Sardinella, research and training vessel of the U.P. Visayas College of Fisheries, yielded a variety of dominant species of pelagic finfishes including *Auxis tapeinosoma*, *Euthynnus affinis*, *Rastrelliger chrysosonus*, *Sardinella gibbosa*, *Sardinella* sp., *Rastralliger faughni*, *Pempheris* sp.,

Dussumiera acuta and Stolephorus sp. and a number of incidentally-caught species often taken by pelagic as well as demersal gears.

From 1 to 3 dominant species occur in great abundance comprising from 71.4 to 95.5% of catch in each haul.

Different species dominated the catch in different fishing grounds. A variety of less abundant species contributed from less than 1 to 5 percent to each haul.

Unlike in trawl fishing where each haul may yield over a hundred different species, no more than 20, but no less than 10 different species, were taken and no more than 3 species were dominant in each purse seine haul.

Relative abundance. Catch composition. Fisheries. Purse seine-caught fishes.

- 0385 A comparative cost analysis of the use of different fish containers. Cordial, Nena, Peralta, Jose P., Orejana, F.M.. **U.P.V. Fisheries Journal**, , 1(1):57-66

Five fish containers, an ordinary styrophore box, reinforced styrophore box, rattan basket, banera and bamboo basket (tiklis) were compared in terms of their insulation properties and cost incurred with the use of each. Each container was exposed in open air for 24 hours, using equal amount of ice and the ambient temperature was monitored during the period.

Based on the annual cost of operation, results indicate that the ordinary styrophore box is not only the least expensive but also has the best insulation. However, the reinforced styrophore box is more durable and more hygienic to use than the ordinary styrophore box. Although the former has a higher melting rate of 4 to 47 percent compared to the latter, both boxes cost approximately the same.

Compared to the ordinary styrophore box, the commonly used banera had the highest melting rate (4 to 5 times more) and had the highest annual cost (1.5 to 2 times more). The tiklis and rattan baskets, on the other hand, exhibited a slower melting rate and cost 22 percent less than the banera annually.

Fish containers. Cost analysis. Fisheries.

- 0386 A comparative study of the toxicity of three commercially available detergents on tilapia (*Oreochromis niloticus*). Espiritu, Emilyn Q., Teran, Andrea B., Gonzales, Billy Martin V.. **Transactions of the National Academy of Science and Technology Philippines**, , :317-318

Although there have been studies conducted locally on the toxicity of surfactants on aquatic organisms, little is known about the impacts of the detergents themselves. Studies have shown that such complex chemical mixtures can be significantly influenced by factors like temperature, pH, water hardness, antagonism, synergism, and length of exposure, which altogether can affect their toxicity to the test organism. Thus, it is important that data on the toxicity of detergents on a local fish species be established.

Both 96-hr range-finding and definitive toxicity tests were conducted on the

following commercial detergents using tilapia (*Oreochromis niloticus*) as test organisms: Brand B (approx. 10% national market share by volume), Brand T (approx. 17% national market share volume) and Brand V (<1% national market share volume). Test set-ups were monitored daily for significant water parameters such as dissolved oxygen and temperature, as well as fish mortality. Seventy percent of the test solutions were renewed daily. Reference tests were also performed simultaneously using copper sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$; Ajax Chemicals, Analytical Grade). tests were considered valid if the controls exhibited a 90% survival.

The results of the first set of definitive tests indicate that the mean LC_{50} s of the three detergents belong to the same order of magnitude. Their rank order of toxicity is as follows: Brand B (mean 96-hr $\text{LC}_{50} = 10.92 \pm 1.29$ mg/ or 9.16 Toxic Units) Brand T (mean 96-hr $\text{LC}_{50} = 24.47 \pm 0.8$ mg/L or 4.09 Toxic Units) > Brand V (mean 96-hr $\text{LC}_{50} = 33.19 \pm 2.84$ mg/L or 3.01 Toxic Units). The data indicate that Brand B is two times more toxic than Brand T, and three times more toxic than Brand V. Since no specific guidelines for toxicity classification has ben provided by the DENR, the following classification proposed by Persoone *et al.* (1993) was applied in this study. The data shows that the resulting LC_{50} values (expressed in Toxic Units) fall under the category of TOXIC substances. Given the fact that these three detergents comprise nearly 28% of the total volume consumed by the market, their potential adverse impact on our aquatic ecosystems must be thoroughly investigated.
(Author's abstract)

Fish toxicity tests. LC_{50} . Detergents. Copper sulfate. Tilapia. Water quality.

- 0387 The development and commercialization of the YY-male tilapia technology. Abella, Tereso A., Abucay, Jose S., Sevilleja, Ruben C., Mair, Graham C.. **Transactions of the National Academy of Science and Technology Philippines**, , :71-77

The birth of the "supermale tilapia" has significantly contributed to the freshwater aquaculture in the Philippines. This technology is the result of a breeding program for Nile tilapia (*Oreochromis niloticus*), combining sex-reversal and progeny testing to produce novel 'YY' male genotype with the objective of producing an all-male tilapia population known as the genetically male tilapia (GMT). YY-males when mated to XX females produced a mean progeny sex ratio of 95% male. The GMT the product of the technology have shown better growth performance in grown-out ponds and other production facilities. The technology has proven to be an effective means of controlling unwanted reproduction in tilapia and overcrowding in ponds. This technology has been commercialized and has benefited tilapia farmers.
(Author's abstract)

Fisheries. YY-male tilapia. Tilapia. Supermale tilapia. *Oreochromis niloticus*.

- 0388 Effect of storage conditions on rice noodle quality. Romero, Marissa V., Saito, Michihiko. **Transactions of the National Academy of Science and Technology Philippines**, , :312

The quality of rice noodles especially those with high moisture content, deteriorates upon storage. In this study, the effects of key storage conditions on rice noodle quality were determined. The factors investigated were packaging materials, storage temperature, and addition of a mold retardant. The packaging materials evaluated were LDPE 30, HDPE 50, OPP 20/EVA 15/LDPE 40, and OPP/CPP 50 while the storage temperatures were 5°C and 25°C. Negamold, a commercial mold retardant was used. For each packaging material, four samples were prepared: two with Negamold and two without Negamold. One set of each sample was stored at 5°C while the other set at 25°C. The samples were examined for physical appearance and mold growth during storage. The latter was evaluated both visually at 6, 12, and 18 days of storage and by plating in PDA at the initial and final days of storage. All the samples stored at 5°C, regardless of packaging materials and presence or absence of Negamold remained acceptable and free for molds even up to 18 days of storage. At 25°C storage, the best packaging materials were OPP 20/EVA 15/LDPE 40 and OPP/CPP 50, which combined with Negamold kept the rice noodles visually acceptable and mold-free until the last day of observation. **(Author's abstract)**

Storage. Quality deterioration. Packaging. Polyethylene. Polypropylene. Storage temperature. Mold retardant. Negamold. Visual examination. Microbiological examination.

- 0389 Effect of temperature and photoperiod on ovarian recrudescence of catfish, *clarias macrocephalus gunther*, during the preparatory stage of the reproductive cycle. Abrajano, Aurea A., Natividad, Filipinas F., Pacoli, Cecily Q., Junio, Gobleth D.. **U.P.V. Fisheries Journal**, , 1(1):35-46

Females of *Clarias macrocephalus* Gunther caught during the preparatory period of their ovarian cycle were exposed for 40 days to 12 combinations of photoperiod (hours of light L and darkness D) and temperature: 11L, 13D; OL, 24D; 24L, OD at 22°C, ambient temperature and 32°C. Recrudescence was observed in fishes maintained at 32°C and ambient temperature (27-30°C), regardless of photoperiod. Ovaries of fishes maintained at these temperatures had significantly higher ($p < 0.01$) GSI (gonosomatic index) than those maintained at 22°C. Undeveloped ovaries of those exposed to 22°C contained mostly Stage I (non-yolky) oocytes while those maintained at higher temperatures had mostly stage III (yolky) oocytes.

Ovarian growth and formation of non-yolky oocytes are apparently purely dependent on temperature. However, formation of yolky oocytes is influenced by the interaction between temperature and photoperiod.

Reproductive cycle. Preparatory stage. Ovarian recrudescence. Catfish (*clarias macrocephalus gunther*). Fisheries.

- 0390 The effect of using piggery wastes in brackishwater fishpond on fish production. Catedrilla, Leah C., Fortes, Norma R., Tamse, Armando F., Yuseco, J. Edward H.. **U.P.V. Fisheries Journal**, , 1(1):69-76

This study explores the feasibility of using piggery waste effluent from biogas digesters in brackishwater ponds for fish production. It also attempts to determine the practical duration of fermentation necessary to produce nutrient-rich effluent, the optimum dosage which would not deplete dissolved oxygen and its role in improving pond productivity. In addition, it also evaluates the effect of the different frequencies of application of effluent/slurry on the production of all-male *Tilapia mossambica*.

The study was conducted in three phases. In phase I, fresh pig manure was loaded in a galvanized iron digester to ferment up to 19 weeks and the following were determined: total and available phosphorus, available silica, dry matter, ash and total nitrogen. Phase II evaluated rates of application of slurry as follows: I-control, (no slurry added); II-low dosage, (0.15 g/l); III-medium-low (0.30 g/l); IV-medium-high (0.6 g/l); V-high (1.5 g/l). Phase III studied four ways of effluent application as follows: I-no manuring; II-five times per week; III-twice a week; and IV-once a week.

Highest nutrient levels were observed within the 14th to 17th week of fermentation as follows: total phosphorus (1108.44-1318.43 mg/l), available phosphorus (117.21-21.85 mg/l); dry matter (9.19-13.18 mg/l); total nitrogen (3.91-5.24 mg/l). It was observed that every gram of slurry/liter with 5 percent dry matter would consume 0.55 mg/l of oxygen per day. Significantly increased production of tilapia was obtained when manuring treatments were given five times/week and twice a week with net production equivalent to 544.5 kg/ha and 468.9 kg/ha, respectively. Treatments receiving once a week manuring and those without manuring whatsoever had lower net production of 316.4 kg/ha and 371.6 kg/ha, respectively.

Piggery wastes. Brackishwater fishpond. Fisheries. Fish production.

- 0391 Extraction of essential oil from *Pogostemon cablin* BENTH (Patchouli) leaves using supercritical carbon dioxide. Navidad, Suzeth V., Malaluan, Roberto M.. **Transactions of the National Academy of Science and Technology Philippines**, , :366-367

The supercritical carbon dioxide extraction of patchouli oil was studied using air-dried patchouli leaves as raw materials at temperatures 35°C and 40°C and pressures of 80, 100 and 120 atm. The percentage oil yield at 35°C at pressures of 80, 100 and 120 atm averaged 4.86, 6.25 and 8.81%, respectively. At 40°C at the same pressures, the yields averaged 4.92, 7.15 and 8.93%, respectively. The conventional steam distillation process used by Pilipinas Kao Inc. yields only between 1.3 to 1.8% from air-dried samples of patchouli leaves.

Colors of the supercritical carbon dioxide extracts were yellow. The intensity of the color however, increased as temperature and pressure were increased. The extract obtained at 40°C and 100 atm was considered good since no waxy substances were obtained under said conditions.

The refractive index of the supercritical carbon dioxide extract at 40°C and 100 atm was 1.37192 and that from the steam distilled extract was 1.50840.

Gas chromatographic analyses were done for the different SC-CO₂ extracts and the extract from the steam distillation process. Chromatograms from SC-CO₂ extracts showed a few peaks while that of the steam distilled-extract showed many peaks. The presence of several peaks in the

latter extract indicates the formation of other components due to thermal degradation.

The percentage oil yield at 40°C and 100 atm was 7.15%. This condition was chosen to be the best among other conditions because it was at this temperature and pressure that no waxy substances were observed.

The conditions of 40°C and 100 atm produced percent oil yield of 7.15% without any waxy substances. Thus, these conditions were chosen to be the best among the conditions tested. **(Author's abstract)**

- 0392 Fertilization management in brackishwater fishponds. **Technology!**, , 7(6):1-16

Fishponds are capable of producing more and better quality fish if these are provided with the correct management.

Fertilizer is one major input that increases fish production. As a source of plant nutrient, fertilizer is a supplement to the existing nutrient supply of the pond to meet the growth requirements of natural food for the fish such as benthic algae, diatoms and plankton.

Since 1971, studies on fishpond fertilization management have been undertaken at the Brackishwater Aquaculture Center (BAC) of the University of the Philippines in the Visayas (UPV). Continuing studies on pond fertilization are being conducted by various research agencies to refine existing techniques, develop new and efficient methods to reduce the cost of fertilization, discover alternative sources of nutrients, and develop a specific fertilizer recommendation for a particular environment.

Fertilization management in brackishwater fishponds is a package of technology that contains information on the proper use of fertilizers (organic and inorganic) in order to improve fish production at a maximum benefit.

Based on an average increase in fish yield of 163 kg/ha per cropping with fertilization, a fish farmer nets an additional income of P1,089.50/ha per cropping.

Fisheries. Fertilization management. Brackishwater fishponds.

- 0393 Filipino women in coastal resources management: . Oracion, Enrique G. **Silliman Journal**, , 41(2):8-25

This paper focuses on the involvement in coastal resources management of women in subsistence fishing households and their specific contributions as managers of scarce resources. Recognizing the major involvement of wives in household as well as in the local fishing economy, this paper argues that women have equal right as their husbands to be considered as stakeholders in carrying out the objectives of a community coastal resource management program. Like their husbands, women have equal responsibilities as well as privileges in the program. Their concerns are equally important and must be similarly recognized. In arguing this case for women, this paper will examine

the community-based coastal resources management program of Apo Island in the Philippines to demonstrate the extent of women's involvement from the initial stage of its implementation to the present. As such, this paper is intended to be a response to the challenge of feminist environmental groups to recognize the emerging visibility of women, particularly the wives, in all aspects of the local economy.

Fisheries. Filipino women. Coastal resources management. Social recognition.

- 0394 Habitat as a determinant of Geographical distribution of diversity in Philippine *Conus*. Vallejo, Jr., Benjamin. **Transactions of the National Academy of Science and Technology Philippines**, , :315

Cone snails (*Conus*) comprise the most diverse coral reef gastropod taxon. The Philippines has the most diverse cone snail fauna in the world. The biogeography of these snails can give new insights on the nature and distribution of marine biological diversity in the Philippines. Using Professor Alan Kohn's published data on ecology and life history and the primary material deposited with the Philippine National Museum (PNM), habitat, life, history parameters and cone snail geographic distribution were explored to predict the distribution of cone snail diversity in the Philippines. Geographical occurrence of 27 shallow water *Conus* species whose life and habitat characteristics are known was plotted. A stepwise multiple regression of *Conus* occurrences in 15 geographical regions in the Philippines on habitat characteristics of the sites where the PNM collected the snails was done. Initial findings suggest that distribution of predominantly sandy habitats is a greater determinant of cone snail diversity than planktonic precompetency as a life history strategy and other habitat factors. This supports the ecological determinism hypothesis of coral reef species diversity. **(Author's abstract)**

- 0395 Improved drying method for roundscad ("galunggong"). **Technology!**, , 6(3):1-11

Drying galunggong in the cabinet dehydrator takes only seven hours, prolongs storage life, and improves product quality

Roundsad (*Decapterus macrosoma*, *D. russelli*, and *D. maruadsi*), commonly known as "galunggong," is an abundant marine species, usually processed as dried fish. Dried roundsad is a staple food item found acceptable to all income groups.

Sun-drying, the traditional and the cheapest drying method usually takes one or three days under normal weather condition. This exposes the fish to contamination by dust, hence, the keeping quality is rather short and the product is inferior.

Several types of dryers have been developed to minimize these problems. To determine their performance, research institutions, like NIST, UPV-CF, UPLB, BFAR and PWU conducted efficiency evaluations. With funding from PCARRD, BFAR carried out a verification project to determine the best drying method.

The cabinet-type dehydrator shows the best performance on roundscads, producing superior dried fish in the shortest drying time of seven hours. It is also simple and can be fueled by indigenous materials or agricultural by-products.

On three operations a day, the fish processor using the cabinet dehydrator fueled by firewood or LPG, nets a monthly income of P3,131.36 and P3,184.97, respectively. This is comparable to the income derived from sun-drying during the dry (summer) season.

However, the dehydrator will allow continued drying of fish even during rainy days. The fish processor can make use of the sun-drying method during dry months and the cabinet dehydrator on rainy months to achieve maximum profit. Another major advantage is that the dehydrator-dried fish retains its good quality longer up to 25 weeks over the ordinary sun-dried fish which keeps only for about nine weeks.

Fisheries. Dried fish production. Roundscad ("galunggong"). Sun-drying. Cabinet-type dehydrator.

0396 Management of fishponds with acid sulfate soils. **Technology!**, 5(2):1-16

Soil scientists suspect that low fish yields of brackishwater ponds may partly be attributed to the inhibitory influence of acid sulfate soils. As with other types of soils where acidity is high, these soils respond poorly to phosphorus fertilization. Fish food grows poorly resulting in slow fish growth. Nearly-lethal concentrations of aluminum and iron are also released.

Acid sulfate soils are found extensively in mangrove areas where the abundance of sulfates and organic matter favors their formation. The extent of the acid-sulfate-soil problem in the Philippines has not been fully established. Soil survey reveals that at least 15,000-18,000 ha of brackishwater fishponds are affected in the island of Panay alone.

In 1979, the Brackishwater Aquaculture Center of the University of the Philippines in the Visayas initiated intensive studies on the identification and management of acid sulfate soils. Research efforts were done in collaboration with the National Science and Technology Authority (NSTA) and the United States Agency for International Development (USAID).

The technology developed for reclamation of these soils involves repeated sequence of intensive draining, drying, and flooding before residual acids are neutralized by liming. Reclamation work takes about three months and is started in the early part of the dry season in the locality.

Total reclamation costs amount to P914/ha of which 94% goes to labor requirements. Based on an increase in milkfish yield of 322 kg/ha/cropping, through reclamation, the return per peso invested is P 1.35.

Fisheries. Brackishwater fishpond management. Acid sulfate soils.

0397 Mechanism of glue penetration in plywood bond formation. Villafior, Armando A.. **The Pterocarpus: A Philippine Science Journal of Forestry**, :38-43

The pathways and depths of glue penetration in plywood as a function of assembly time, species, sapwood or heartwood were tested on five species: almaciga (*Agathis philippinensis* Warb.), apitong (*Dipterocarpus grandiflorus* Blco.), palosapis (*Anisoptera thurifera* Blco. Bl), red lauan (*Shorea negrosensis* Foxw), and Spanish cedar (*Cedrela odorata* L.). The phenolic resin adhesive became mobile during simultaneous applications of heat and pressure due to lowering of the surface tension of its water molecules, so that the adhesive penetrated the pores or vessels, tracheids, resin ducts, and lathe checks.

The degree of resin penetration, as determined by a fluorescence microscope in incident ultraviolet light, was highest at 5-minute and lowest at 80-minute assembly times. The depth of glue penetration in softwood was less than that of heartwood due to their anatomical dissimilarity. The differences in the magnitude of glue penetration between sapwood and heartwood were attributed to the presence of tyloses and/or smaller pores or tracheids in the latter. Bond formation in plywood with both high wood failure and shear strength was obtained at relatively low penetration. **(Author's abstract)**

Substrate. Glueline. Fluorescence. Ultraviolet light. Assembly time. Sapwood. Heartwood. Tyloses. Shear strength. Wood failure.

- 0398 Morphological, physiological, and molecular characterization of Philippine *Naegleria* isolates. Fontanilla, Ian Kendrick C., Matias, Ronald R., Enriquez, Gloria L.. **Transactions of the National Academy of Science and Technology Philippines**, , :320

Naegleria is an amoeba with a transient flagellate stage and a resistant cyst in a life cycle. At least two members of the genus are known to cause primary amoebic meningoencephalitis (PAM) in humans. Eight environmental isolates of *Naegleria* were obtained from Calamba, Laguna (Cal A and Cal B), UP Diliman (Mal A and Mal B), Marikina (Mari B), Mt. Arayat (MA-B), and Taal Island (Taal A and Taal B), after which they were subsequently cloned. Together with a cloned local clinical isolate (RITM) previously from the Department of Parasitology, Kurume University of Medicine, Japan, these isolates were characterized using morphological, physiological, and molecular parameters. Cyst morphology demonstrated that the Taal isolates had the largest cyst diameter while Cal A had the smallest. The number of pores varied within isolate, but only *N. fowleri* (IT9611) had no rim or lip on its pores. Rate of encystment of individual cells on non-nutrient agar indicated that Cal B, Ma-B, *N. fowleri*, and RITM took the longest time to encyst with 4 hours on the average. Enflagellation of individual cells in distilled water also revealed that the RITM and *N. fowleri* had the longest time of enflagellation with 3.0-4.0 hours and 4.0 hours, respectively. Cal B took 1.25 hours while the rest enflagellated in 0.5-0.75 hours. Thermal tolerance at 45°C demonstrated that only MA-B, Mal A, Mal B, and *N. fowleri* were thermophilic. *Naegleria fowleri* persisted as trophozoites at 45°C while the other three thermophilic isolates encysted. Sequence analysis of the 5.8 S rDNA gene and internal transcribed spacers (ITS) of the isolates showed that the 5.8 S rDNA region was highly conserved for the Philippine isolates. Polymorphism was exhibited in the two ITS regions that flank the gene due to base substitutions, insertions, or deletions of several sites, most notably in the ITS 2. Cluster analysis of the 5.8 S rDNA gene and ITS sequence was done on the isolates in this study and the

known *Naegleria* species with available sequence using UPGMA algorithm and Euclidean measure. Of the 4 major clusters formed in the dendrogram, 3 contained the local isolates and *N. fowleri*. Cluster 1 included Cal A, Cal B, Mari B, and RITM. Cal A was closely related to *N. australiensis* while Cal B was most similar to *N. jamiesoni* and *N. andersoni*. Mar B and the clinical isolate RITM were branched together with the *N. gruberi* AUD1 isolate. Cluster 2 included the three thermophilic local isolates and the Taal isolates. MA-B, Mal A and Mal B formed one group that was independent of the thermophilic *N. fowleri* and *N. lovaniensis* while the Taal isolates were most similar to *N. clarki*. *N. fowleri* (IT9611) used in this study and all the other *N. fowleri* isolates formed the *N. fowleri* cluster. The study concludes that the local *Naegleria* isolates do not form a homogenous group. **(Author's abstract)**

Naegleria. Encystment. Enflagellation. Thermal tolerance. DNA sequencing 5.8 S rDNA gene. ITS. Cluster analysis.

0399 Mussel production. **Technology!**, , 4(4):1-16

The widespread cultivation of "tahong" or green bay mussel will not only help meet the nation's growing demand for a low-cost, high-quality protein food but will also generate additional income for fishermen and, to a certain extent, employment for the unskilled labor force in the coastal areas. The Philippines has numerous bays, coves, estuaries, and channels which can be used for mussel cultivation.

Mussel technology is relatively simple, and cost of investment is minimal. In general, it is not labor intensive; hence, production can be done simultaneously with the fisherman's regular fishing activities for subsistence.

Collectors or cultches are needed to catch mussel spats (free-swimming mussel larvae that are ready to settle or attach themselves to solid objects). Spats are abundant during spat-fall in natural collecting grounds. It is feasible to introduce them in areas where they are absent; provided, the basic requirements for their culture are met.

Three types of farming methods can be used: stake or "tulos," rope-web, and raft. The stake is the simplest, the cheapest, and the most commonly used. In Bacoar Bay, a family-size farm (1,000 sq m) on the stake method nets an average income of P 12,415 or a return of P 1.61 per peso invested.

Fisheries. Mussel production ("tahong").

0400 Organogenesis in the supermale YY, genetically male (GMT) and mixed sex tilapia (MST). Herrera, Annabelle A., Tandoc, Erlito, Fish Genetics Breeding Group. **Transactions of the National Academy of Science and Technology Philippines**, , :315-316

The genetic manipulation of tilapia sex by the University of Sansea, UK and the Central Luzon State University, Muñoz, Nueva Ecija has produced an all-male population of tilapia: the supermale YY and the genetically manipulated (GMT) XY tilapia. To determine if the lack of an X chromosome which is fatal in humans has an effect on the development of organs in the supermale, organogenesis was compared up to 10 days postfertilization in YY,

GMT, and MST. No abnormalities were observed in the organogenesis of the digestive, excretory and respiratory structures, although the general trend was that towards the free-swimming larva stage, differences in measurements taken of the size of the organs, layers, tubeles and lining cells became statistically significant giving the YY developmental superiority. **(Author's abstract)**

Supermale UU. Genetically male tilapia (GMT). Mixed sex tilapia (MST). *Oreochromis niloticus*.

- 0401 A polypyrrole-based pH sensor characterized by flow injection analysis. Abaya-Perez, Milagros A., Binag, Christina A.. **Transactions of the National Academy of Science and Technology Philippines**, , :369

A conducting Polypyrrole-based pH sensor by flow injection potentiometry was developed and characterized. The electroactivation parameters optimized for polymerization consisted of 0.1 M pyrrole monomer in 0.1 M phosphate buffer (pH 7.0), and bovine serum albumin (3.0 mg) as dopant. A current density of 9.02 mA cm^{-2} was applied to the platinum wire (0.102 mm \varnothing) for a 5-minute galvanostatic deposition. The polypyrrole coated-pH sensor was placed in a fabricated wal jet perspex glass cell. Its potentiometric response against a Ag/AgCl reference electrode was monitored using universal buffer solutions at working pH range of 3-10. Optimization of flow injection variables such as nature, concentration, and pH of carrier solutions and the length of the manifold's line tubing were investigated.

The Polypyrrole-based pH transducer was characterized electrochemically and the feasibility of the sensing device under the established working conditions was evaluated. The pH sensor showed a sub Nernstian response ($m = -31.8 \text{ mV/pH}$), a good Pearson's correlation coefficient (linearity, $r = -0.996$) and a highly reproducible response ($\text{RSD} = 1.803\%$). The sensor showed low hysteresis ($\Delta m = -3.8 \text{ mV/pH}$) and minimal drift at pH 7 ($\text{RSD} = 0.443\%$) and at pH 10 ($\text{RSD} = 0.708\%$). The sensor is highly selective ($k_{ij} > 10^{-7}$) in the presence of Na^{+1} , K^{+1} , Mg^{+2} , Ca^{+2} , Ac^{-1} , and NO_3^{-1} ions. The sensor's lifetime for a period of two months revealed a 3-fold decrease in the sensitivity, from -28.6 mV/pH to -10.3 mV/pH . **(Author's abstract)**

Polypyrrole. pH sensor. Conducting polymer. Potentiometry. Nernstian.

- 0402 Reproductive anatomy, histology and gestation of the Philippine Seahorse *Hippocampus barbouri*. Oconer, Edna P., Herrera, Annabelle A., Amparado, Edna A., Wetzal, James T.. **Transactions of the National Academy of Science and Technology Philippines**, , :318

Male and female seahorses obtained from the waters of Santiago Island, Bolinao, Pangasinan were compared morphologically and histologically for structural differences. Paraffin sections were prepared to examine the histological profile of gonads involved in selected stages of reproduction. Morpo-histological results confirmed the presence of paired tubular testes and ovaries which converge to form into a common spermatic duct and oviduct in

male and female seahorses, respectively. Mature gametes are released through the anal pore. During fertilization, females deposit eggs into the brood pouch opening of the male. At the time of oviposition, sperm are ejaculated immediately which traverse quickly from the anal pore into the brood pouch opening via minute connecting canal. Fertilization follows shortly inside the male brood pouch cavity. During gestation, histo-physiological results confirmed the presence of gradually thickening epithelial linings to support and protect the developing embryos. Likewise, tiny crevices where the embryos lie in quiescent were prominent from mid to late pregnancy. Paraffin sections showed that signs of active spermatogenesis were observed during the course of gestation. **(Author's abstract)**

- 0403 Shrimp cake making. de Guzman, Dalisay L.. **Technology!**, , 10(1):1-16

The processing of balao into shrimp cakes extends the shelf life of the shrimps. However, adoption of modified processing technologies on shrimp cake making could yield better product and improve net return of investment.

Fisheries. Shrimp cake making.

- 0404 Studies on the existence of *Dynophysis* sp. and *Gambierdiscus* sp. in Philippine Coastal Water. Floresca, Maria Cristina Grace Z., Fajardo, Ferdinand F., Nicdao, Jose Leonardo V., Yturzeta, Kriskarla P., Co, Jandrick P., Pakingan, Joan T.. **Transactions of the National Academy of Science and Technology Philippines**, , :316-317

Diarrhetic Shellfish Poisoning (DSP) and Ciguatera Fish Poisoning (CFP) are types of human illnesses associated with red tide that has been reported in the Philippines and extensively in other parts of Asia. In the Philippines, however, there are still very little documentations about DSP and CFP. The present study aimed to determine the presence of some of the causal organisms of DSP (*Dynophysis* sp) and CFP (*Gambierdiscus* sp.) in the Philippines. This was carried out by isolation and examination of the toxins [dinophysistoxins (DTX) & okadaic acid for DSP and ciguatoxins (CTX) for CFP] associated with these organisms. Samples from suspected red tide areas in the country, i.e., shellfish and fish from both Masbate and Zambales were gathered for analysis. Toxin extraction was done using the modified method of Lewis et al. (1998). Fish viscera and shellfish meat were cooked in AP grade acetone at 56°C and allowed to stand overnight. A portion of the acetone layer was used in mouse bioassay. The solution was then decanted and later evaporated in a rotary evaporator. Further cleanup was carried out by separatory funnel extraction method using a 1:1 petroleum ether and methanol: water (4:1) solution. The methanol: water layer was extracted twice with petroleum ether and finally evaporated to dryness in a rotavap at 60-70°C at 25 rpm. Samples for High Performance Liquid Chromatography (HPLC) analysis were redissolved in 5 ml of 0.1% heptanesulfonic acid prior to injection. Certain fractions of these injected samples were used for HPLC-mass spectrometer (MS) analysis. Based on earlier studies elsewhere,

the retention times for DTX-1 and okadaic acid were 24 and 28 min, respectively. The chromatograms of the Zambales' shellfish showed peaks at 24.9 and 28.4 min with 0.02% and 0.07% of total area, respectively, which may indicate that both toxins were present. The bioassay further proved the presence of toxins from these samples as indicated by the death and paralysis of two and one mice, respectively. Results of the MS revealed that DTX-1 (819.5 m/z) was most likely the toxin present in the Zambales shellfish samples because the observed peak had a value of 819.2 m/z. P-CTX-1, on the other hand, was the most likely toxin present in the Masbate fish samples. Mass spectra of the samples gave two peaks with 1111.1 and 1111.9 m/z, while previous studies set the value of P-CTX-1 at 1110.3291 m/z. Overall, there are strong indications that red tide organisms, in this study, namely *Gambierdiscus* sp. and *Dinophysis* sp. are present in selected Philippine coastal waters. (Author's abstract)

Red tide. Toxins. Diarrhetic. Ciguatera. Poisoning. Mouse bioassay. Mass spectra. Ciguatoxin. Dinophysis toxin. HPLC. Mass spectrometry.

- 0405 Tarpon as biological control in milkfish-tilapia polyculture. Fortes, Romeo D.. **U.P.V. Fisheries Journal**, , 1(1):47-55

Two experiments were designed to evaluate the efficiency of tarpon (*Megalops cyprinoides*) to control the young of tilapia (*Tilapia mossambica*) in polyculture with milkfish (*Chanos chanos*). One experiment assessed the production of marketable-size milkfish and tilapia with and without tarpon. The other experiment compared fish yields from milkfish-mixed-sex tilapia-tarpon combination with that obtained from milkfish-all-male-tilapia polyculture.

Tarpon predation on young tilapia resulted in larger percentages of marketable-size fish (25% adult tilapia, 66% adult milkfish) than when young tilapia were uncontrolled (22% adult tilapia, 37% milkfish). Total fish production from milkfish-mixed-sex tilapia-tarpon polyculture was higher than mixed-sex tilapia-milkfish combination without tarpon by 32.6%; production in the former was also higher than all-male tilapia-milkfish combination by 4%. Milkfish-mixed-sex tilapia combination in the presence of tarpon appeared more desirable than milkfish-all-male tilapia polyculture in terms of milkfish production.

Tarpon as biological control. Fisheries. Milkfish-tilapia polyculture.

FOOD SCIENCE AND TECHNOLOGY

- 0406 The combined effect of salt treatment and pH level on the drying characteristics and cooking quality of blackeye beans. Cordero, Evelyn Z.. **Nucleus**, , 2(2):99-106

Blanching blackeye beans (*Vigna unguiculata*) for two minutes, soaking them for 24 hours at 20°C in either 1.5% NaHCO₃, 0.5% Na₂CO₃ or 1.0% Na₅P₃O₁₀, unadjusted and adjusted with citric acid to pH 4.00, 5.00 and 6.00, prior to rinsing, draining and dehydration (55°C for 5 hours), did not result in

apparent or significant differences in drying characteristics (after 40 minutes of drying), moisture content at varying stages of the process, dried and drained weight and texture when cooked ($P < 0.01$). The use of the above salts did not produce any significant differences in terms of per cent reduction in cooking time and some organoleptic properties such as color and appearance of the dried, treated beans, color and flavor of the cooked, dried, treated samples, but the use of different pH levels did ($P < 0.01$).

Cooking quality. Salt treatment and pH level. Blackeye beans. Drying characteristics. Food science and technology.

- 0407 Development of quality sauce from blends of tomato and squash. Zara, Lydia M., Patnugot, Mila M.. **Plant Industry Bulletin**, , 9(2):30-37

A formulation study was conducted on varying blends of tomato and squash. The CL 2815-1-1-7 tomato variety from the Economic Garden and the Aroman variety of squash from Bicol were the materials used. The procedure for tomato catsup-making developed by the Laboratory Services Division was followed. Three formulations were tested, Formulation I used 100% tomato puree, Formulation II used 75% tomato puree and 25% squash puree, while Formulation III used 50% tomato puree and 50% squash puree. Artificial food coloring was not added. The formulations were subjected to sensory evaluation and microbiological analysis. Total soluble solids content of the formulations were also determined.

Food science and technology. Quality sauce. Tomato. Squash.

- 0408 Improvement of the formulation of selected pickled products. Bayubay, Erlinda Trinidad P., Gallardo, Ma. Victoria G., Conde, Lourdes R.. **Plant Industry Bulletin**, , 17(1):15-36

The study was to improve existing technologies for mango chutney, pickled santol and pickled onions. Products processed were evaluated to determine the shelf-life and acceptability. The effect of brining and processing time and temperature were also determined. Evaluation of the chemical analysis, microbiological analysis and sensory evaluation was conducted to determine any chemical changes on shelf-life and acceptability of the products.

Results of the various analysis indicated that brining and processing and temperature affect the quality of the products. Brining of santol at 15% salt gave satisfactory result based on high mean scores for texture (firm). Processing of mango chutney at 70°C for 15 minutes and pickled onions at 70°C for 10 minutes was chosen based on satisfactory result of the sensory evaluation.

Food science and technology. Food processing.

FORESTRY

- 0409 Blood transfusion practice in the management of dengue hemorrhagic fever in 0 to 19 years old at a private tertiary medical center. Madatu, Sitti Nur-en R., Ty, Florentina U.. **Philippine Scientific Journal**, , 43(1):6-11

Dengue virus and virulent Dengue Hemorrhagic Fever (DHF) represent an international health issue that remains untreatable with traditional antiviral and vaccine therapy. A Cross Sectional Descriptive study was conducted to review blood transfusion (BT) practice in the management of Dengue Hemorrhagic Fever in **MCU-FDTMF** Hospital from year 2006-2008 to assess the outcome of patients with or without transfusion. There were a total of 80 patients from 0-19 years old admitted due to DHF. Diagnosis was confirmed according to WHO criteria for DHF. From a total of 80 patients, 11 were given BT comprising 14% of total population; 43 patients presented as grade 1 (54%), 28 grade 2 (35%), 4 as grade 3 (5%) and 5 patients presented as grade 4 (6%). Most common indication for blood transfusion is bleeding followed by decreased platelet count. It was shown that there were a significant number of cases who developed bleeding such as melena, hematemesis and pulmonary hemorrhage given blood transfusion compared to patients who were not given blood transfusion. The length of hospital stay is longer in the patients with blood transfusion compared to those with out blood transfusion. Complications of DHF were mostly observed in patients given blood transfusion compared to those not transfused. All of the mortalities belong to the group who underwent blood transfusion. Urticarial rash and intravascular volume load are the adverse effects that were observed after blood transfusion. **(Author's abstract)**

- 0410 Charcoal production. **Technology!**, , 4(8):1-16

The present trend in the economics of petroleum calls for the development of alternative sources of energy which are cheap, renewable, and locally available. One of the promising alternatives is charcoal. It is usually prepared from wood, coconut husks and shells, or other suitable materials.

The widespread use of charcoal in households and industries in the country can generate a yearly national savings of US \$35.5 million. This is due to reduced importation of crude oil. On the household level, FPRDI reported that an average family can save P500 to P 800 per year by using charcoal instead of liquified petroleum gas (LPG).

Charcoal burns 3.5 to 4 times better than wood and generates twice as much heat. Moreover, it is a clean fuel, nearly smokeless, and sulfur-free.

Many industries and households are willing to shift to charcoal as long as there is enough supply. This further calls for more wood-material base for charcoal production.

The Forest Products Research and Development Institute (FPRDI) has evolved simple and inexpensive ways of making charcoal either in small or large-scale production. For small backyard operations, the Institute developed the modified drum-kiln; for the cottage industry and large-scale productions, it came up with the Kaunlaran and Vitoria beehive ovens. These charcoal

technologies are proven to be economical and efficient. They produce good-quality charcoal suitable for domestic and industrial uses.

In the modified drum method, the profit per sack (15 kg) of charcoal is about P 9.75 for giant ipil-ipil and P 5.40 for coconut shell.

With the Kaunlaran and Vitoria ovens, the farmer earns annual incomes of around P24,000 and P25,000, respectively. He gets better profits if he grows his own ipil-ipil plantation.

There is a need to develop the charcoal industry to meet the demand both here and abroad. To be able to do this, full support from the government is needed. Also, more dendrothermal plantations have to be established to serve as source of raw materials for the industry.

Forestry. Charcoal production. Wood-material base. Charcoal technologies. Drum-kiln. Kaunlaran and Vitoria beehive ovens. Dendrothermal plantations.

- 0411 Coconut coirdust flour as filler in phenolic resin adhesives for plywood. Ramos, Jaime R., Villaflor, Armando A.. **The Pterocarpus**, , 3(2):11-18

Air-dried coconut coirdust flours which passed the 140-mesh screen were used as filler at various concentrations for phenolic resin adhesives in the gluing of re lauan, *Shorea negrosensis* Foxw., and toog, *Petersianthus quadrialata* Merr., rotary-cut veneers into 3-ply, 6mm x 30 cm plywood, with coconut shell flour as the filler control.

Cyclic-boil test for type I bond indicated that the bond quality of phenolic glues with coconut coirdust flour filler and effective resin solids content 24.8% is comparable to those with coconut shell flour filler and effective resin solids content of 34.4%. However, as the coconut coirdust flour content increased beyond 16 parts by weight in the phenolic adhesive mix, the durability of the glue lines decreased due to its affinity to the water molecules and the subsequent reduction in its effective resin solids content. The requirement for type I glue bond is met provided the resin solids content of the phenolic glue-mix with coconut coirdust flour filler does not fall below 20.1%.

The results also indicated that toog veneers are glueable into plywood with type I bond.

Plywood. Filler extender. Coconut shell flour. Forestry. Coconut coirdust flour. Phenolic resin adhesive.

- 0412 Comparative study of linux distribution for desktop use
. Quinton, Suzette, Vida, Sheilafel, Ruiz, Erwin, Liguit, Michael, Cabeza, Ivy, Gonzales, Joanna, Pagador, Emily, Banzon, Peter. **Philippine Journal of ICT & Microelectronics**, , 1(2):36-44

This paper tests different Linux distributions to come up with a recommended open source operating system best suited for desktop computers. Benchmarking was done to statistically compute the performance

of each Linux distribution. A user survey was also conducted to complement the result of the benchmark.

The Linux Benchmarking Toolkit was used to benchmark three of the most popular Linux distributions: Caldera 3.1, Red Hat 7.2 and Mandrake 8.1. Each distribution was installed on a Pentium III machine and subjected to four benchmarking suites.

The user survey subjects a set of individuals to installation sessions. The total number of successful installations was considered. Respondents were also asked for the easiest operating system to install and their recommendations. **(Author's abstract)**

Bench marking. Linux. Operating system. Open source.

- 0413 Comparison of different raingages in upper Agno river basin. Veracion, V.P., De los Santos, A.E., Rondilla, C.S.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :24-25

Testing 4 different raingages (Philippine Standard, U.S. Standard, Helmann, and Recording) for measurement of rainfall in the Upper Agno River Basin showed no significant difference among them. **(Author's abstract)**

- 0414 Comparison of the quantity and composition of the wood extractives of unsteamed and steamed apitong (*dipterocarpus grandiflorus* blanco). Salud, Erlinda C.. **The Pterocarpus**, , 2(2):123-134

A comparison was made of the quantity and composition of the wood extractives from unsteamed and steamed apitong, *Dipterocarpus grandiflorus* Blanco. Percentage yield of exudates increased from the top to the bottom portion of the wood and with longer steaming time. The differences in acetone extractives between trees and between sapwood and heartwood were significant. The interactions between trees and treatments, between trees and heights, and between trees, heights, and treatments were also highly significant. Fractional separation of the components of the acetone extractives of the unsteamed and steamed butt heartwood samples showed that resin acids were reduced by steaming.

Forestry. Steamed and unsteamed apitong. Extraction. Resinous exudates.

- 0415 Correlation between the duration of right lower quadrant abdominal pain and clinical stage of acute appendicitis among patients who underwent appendectomy at MCU-FDTMF hospital. Batallones, Jr., Bonifacio H.. **Philippine Scientific Journal**, , 43(1):12-16

Right lower quadrant abdominal pain is the prime symptom of acute

appendicitis. The surgical treatment of appendicitis is one of the great public health advancement of the last 150 years.

The objective of this study is to correlate the duration of right lower quadrant abdominal pain with the clinical stage (Pathologic diagnosis) on patients who underwent appendectomy at MCU-FDTMF Hospital from January 2006 to December 2006.

This is a cross-sectional study. There were one hundred and ninety four (194) patients who presented with right lower quadrant abdominal pain and underwent appendectomy. One hundred and eighty six (186/194) had acute appendicitis during surgery and eight (8/194) patients with normal appendix. The 3 most common diagnoses on patients with normal appendices were pelvic inflammatory disease, ovarian torsion and urinary tract infection. The total number of patients who underwent appendectomy surpassed the required sample size of at least 130 observations. A Chi-square test was used for univariate analysis of data.

The study revealed that right lower quadrant abdominal pain of acute appendicitis < 12 hours was either congestive or suppurative (94%) stage and for pain duration of > 24 hours increased the likelihood of a ruptured appendicitis (98.5%). **(Author's abstract)**

0416 Crybabies. Salavaria-Imperial, Ma. Lourdes A., Agrasada, Ma. Gracia V.. **Postgraduate Pediatrics**, , 12(1):59-70

A study on what mothers perceive to be infantile colic was carried out in the out-patient clinics of a tertiary hospital. Seventy-eight mother completed self-administered questionnaires on characteristics of colicky episodes, beliefs regarding its etiology, mothers' responses to the colicky infant and interventions done to relieve the infant's crying. Results showed that 72% (56/72) exhibited colic with onset between 4-8 weeks and with occurrence at any time during the day, each episode lasting up to 15 minutes. Colic was typically manifested as flushing of the skin, crying as if in pain, passage of a lot of gas and the infant being inconsolable. Mothers react to these episodes with feelings of distress (57%) panic (34%) and fear (20%). These mothers believed that colic could be a normal pattern of crying (41%), or be secondary to the infant's temperament (23%) or occult/supernatural forces (21%). Other evoked causes were noxious stimuli in the infant's environment, possible organic pathology, maternal anxiety and ineffective responses to the infant's crying. Intervention commonly employed were carrying (90%) and burping (59%) the infant, followed by singing to the infant (29%), use of an abdominal binder (27%), or medications (7%) to relieve perceived abdominal pain. Application of "azete de manzanilla," increased carrying and burping of the infant, as well as the use of abdominal binder constituted prophylaxis for colic episodes. Of the 56 mothers of colicky infants, 45 (80%) sought consult primarily with experienced older relatives (32%) and other mother (32%) like themselves. This was followed by consult with medical (27%) and other health personnel (20%), and practitioners of folk medicine (11%). This would indicate that although colic is a commonly observed phenomenon, it is not routinely brought to medical attention and is instead managed without a physician's

guidance. **(Author's abstract)**

- 0417 Description of the root system of a moluccan sau (*Albizia falcataria* (L.) Fosb.) tree. Domingo, Ireneo L., Jamito, Copernico O., Gonzaga, Rolando T.. **The Pterocarpus**, , 2(2):188-191

The root system of an 11-year old Moluccan sau (*Albizia falcataria* (L.) Fosb.) tree located on a ridge was excavated and the roots studied. The root system was found to consist of wide-spreading primary lateral roots extending over an area greater than the extent of the crown, an undeveloped tap-root, numerous vertical secondary roots, with some natural root graft, and numerous tertiary roots that give the network appearance of the root system.

Forestry. Moluccan sau (*Albizia falcataria* (L.) Fosb.) tree. Root system.

- 0418 Developing a Windows[®] 2000 serial driver for bluetooth[™]. Ballesteros, Janice M., Borres, Mabeth M., Botardo, Lucelle C., Caccam, Anne Margrette Q., Galang, Jr., Bienvenido H., Pucyutan, Billy S.. **Philippine Journal of ICT & Microelectronics**, , 1(2):28-31

Developing applications over Bluetooth[™] requires a device driver to enable communication with the Bluetooth[™] host controller. A device driver is a software component that provides input and output services between peripherals and the Host Operating System. This paper describes the development of a serial device driver for Bluetooth[™] in the Windows[®] 2000 platform. This is in line with the Advanced Science and Technology Institute's effort in developing a Bluetooth[™] Host-side protocol stack. **(Author's abstract)**

Bluetooth TM. Windows® 2000. Device driver. Operating system.

- 0419 Development of genetically enhanced open pollinated varieties (GEnOPVCoco) of Coconut (*Cocos nucifera* L.). Santos, G.A.. **The Philippine Journal of Coconut Studies**, , 32(1-2):57-72

Knowing the disadvantages of the farmers' practice of using F₂s, research for high yielding open pollinated varieties or OPVs using plant-breeding method apart from mass selection, reciprocal recurrent selection and progeny testing is needed. Breeding for a synthetic or a composite variety is an approach that has been proposed a long time ago in India and Sri Lanka. Unfortunately, the success of hybrid varieties in coconut suppressed the interest in other methods of breeding and relatively little or no attention has been given to the development of synthetic or composite varieties.

In Philippine Coconut Authority (PCA), the possibility of producing a synthetic coconut variety was initiated in 1979 with the establishment of selfed

lines (S1) of Laguna (LAG) and Bago-Oshiro (BAO) tall coconut populations at the Zamboanga Research Center (ZRC). It was hypothesized that the allogamous nature of tall coconut varieties makes them suitable parents for a "synthetic variety".

The paper discusses the principal and technical merits and disadvantages of this approach to achieve a more suitable type of high yielding planting materials for small coconut farmers. It also presents new data on the performance of the hybrid parents as well as the new directions being followed in the light of fresh evidence obtained from the application of DNA technology.
(Author's abstract)

Synthetic variety. Composite variety. Mass selection. Progeny testing. Reciprocal recurrent selection. Hybridization.

- 0420 Effectivity of EMLA cream for intradermal skin testing in children.. Cabaluna, MJ, Koh, MLJ, Sumpaico, Madeleine W. **Postgraduate Pediatrics**, , 12(1):43-50

To determine whether EMLA cream affects the wheal and flare response and also reduce pain perception during intradermal skin testing, twenty 5 to 7 year old boys with allergic rhinitis and bronchial asthma were studied.

EMLA cream was applied randomly either on the left or right arm and placebo on the other arm. The test areas were occluded for an hour then injected intradermally with both histamine and phosphate buffered saline. Skin reactivity was measured as wheal and flare diameter (in mm). The subjects were requested to point out their pain perception using a Faces of Feeling Scale. Paired t-test analysis of skin reactivity showed no significant difference in the wheal diameter response to histamine ($p=0.6$) and saline ($p=0.6$) in areas with EMLA compared to placebo. There was also no significant difference in flare diameter response to histamine ($p=0.4$) and saline ($p=0.6$). Wilcoxon matched pairs signed ranks analysis of pain perception showed significant reduction ($p=0.001$) of pain in areas with EMLA compared to placebo.

EMLA cream does not affect skin reactivity to histamine and saline and also reduces pain during intradermal skin testing in children. EMLA may be an option to children who are unduly distressed by intradermal skin testing.
(Author's abstract)

- 0421 Effects of drying conditions on wettability and gluability of apitong (*Dipterocarpus grandiflorus* Blanco). Pollisco, Filiberto S., Casilla, Romulo C., Tinh, Nguyen. **The Pterocarpus**, , 2(1):52-60

The effects of drying methods and drying temperature on the wettability and gluing properties of apitong, *Dipterocarpus grandiflorus* Blanco, using urea formaldehyde resin was investigated. Wettability was determined by

measuring contact angles with distilled water.

Both wettability and gluability of apitong were reduced more when the veneer was dried in an oven or in a mechanical veneer dryer than when dried in an air-conditioned room at a very much lower temperature. when dried in an oven the wettability and gluability of the veneer decreased as the temperature increased from 120° to 352°F

A positive linear correlation was found between wettability and gluability of apitong veneer.

Apitong (*Dipterocarpus grandiflorus* Blanco). Forestry. Drying conditions on wettability and gluability.

- 0422 Effects of extraction on some physical properties of ten Philippine hardwoods. Bello, Emmanuel D., Go, Lourdes A.. **The Pterocarpus**, , 4(1):1-13

Ten (10) Philippine hardwood species representing light- medium- and heavy-density woods were investigated regarding possible effects of extraction on specific gravity, shrinkage, fiber saturation point and heat of wetting.

Specific gravity of light-density species remained the same even after removal of extractives, while that of medium- and heavy- density species decreased considerably. Fiber saturation point of binuang (*Octomeles sumatrana* Miq.), apitong (*Dipterocarpus grandiflorus* Blanco) and moluccan sau (*Albizzia falcata* (L.) Back) decreased following exhaustive extraction, while that of the other species studied increased.

Removal of extractive materials resulted in an increase in average volumetric shrinkage. The amount of increase in shrinkage tended to increase with specific gravity. Extracted specimens were also found to have substantially higher heat of wetting than unextracted specimens, except for binuang, where a slight decrease was observed.

Forestry. Philippine hardwoods. Extraction. Volumetric shrinkage. Fiber saturation point and heat of wetting.

- 0423 Effects of sanding and surface aging on wettability and gluability of apitong (*dipterocarpus grandiflorus blanco*). Tinh, Nguyen, Polisco, Filiberto S., Casilla, Romulo C.. **The Pterocarpus**, , 2(2):160-171

An investigation was made on the effects of sanding and surface aging on the wettability and gluing properties of apitong, *Dipterocarpus grandiflorus* Blanco, using urea formaldehyde resin adhesive in cold pressing. Wettability was determined by measuring contact angles with distilled water.

It was found that sanding improved the wettability and gluability of unextracted apitong veneer. It also improved the wettability, but did not have a significant effect on the gluability of extracted veneer. The wettability and the gluability of sanded extracted veneer were higher than those of sanded unextracted veneer. Exposing apitong veneer after sanding in an air-conditioned room for seven days resulted in as much as 82 percent reduction in wettability, and 23 percent and 26 percent in dry shear and wet shear strengths, respectively. Wettability decreased quadratically, while shear strength decreased linearly, with surface aging.

A positive linear correlation was found between wettability and gluability of apitong veneer.

Forestry. Apitong. Veneer. Wettability.

- 0424 Effects of site preparation on field survival and growth of anthocephalus chinensis seedlings. Domingo, Ireneo L.. **The Pterocarpus**, , 3(2):33-44

Seven methods of preparing cogonal land at the Pangaw side of the Makiling Forest, Sto. Tomas, Batangas, for planting Anthocephalus chinensis Rich. ex Walp. seedlings were tested with and without fertilization.

The results showed that significant improvements in survival and growth of seedlings of the species may result when the planting site is prepared before planting by reducing partially the competing grass vegetation, cultivating the soil and fertilizing it with nitrogen. Site preparation may not accomplish its objective if it is not accompanied by fertilization. Completely removing the grass vegetation even when accompanied by cultivation of the soil and fertilization may not be sufficiently effective because of increased unfavorable effects of oth. factors in summer such as strong wind and high soil surface day temperature to which the seedlings are more exposed.

Fertilization. Forestry. Kaatoan bangkal (Anthocephalus chinensis).

- 0425 Effects underground root pruning on anthocephalus chinensis transplants. Domingo, Ireneo L., Jacaine, Domingo V.. **The Pterocarpus**, , 3(2):77-88

Kaatoan bangkal seedlings, Anthocephalus chinensis Lamk. ex Walp., were root-pruned in transplant beds at various ages and depths below the soil surface. The experimental seedlings were examined at various periods after root pruning.

The results indicate that through underground root pruning it is possible to effect several desirable characteristics of the planting stock. Pruning to any depth from 4 to 8 cm does not result in appreciable mortality of seedlings if shaded for a while and abundantly watered. It temporarily checks height growth and increases the number of secondary roots resulting in the production of better balanced (lower dry weight shoot-root ratios) bareroot Kaatoan bangkal planting stocks which are expected to have greater field survival and faster growth. Pruning can be done 45 to 60 days after transplanting and the root pruned transplants can be lifted for outplanting 45 to 60 days after pruning.

Transplants. Root-pruning-in-place. Kaatoan bangkal (Anthocephalus chinensis). Forestry.

- 0426 An eight-month old tree seedling with flower. Tandug, Eustaquito T., Domingo, Ireneo L.. **The Pterocarpus**, , 2(2):153-155

One seedling of Kaatoan bangkal, *Anthocephalus chinensis* (Lamk.) Rich. ex Walp, 8 months old, and about 20 cm in height was observed to have a flower. This phenomenon was suspected to be due to mist drift of spray of one or a combination of four plant growth regulators applied to nearby experimental seedlings.

Forestry. Seedling. Kaatoan bangkal (*Anthocephalus chinensis*).

- 0427 Emergency room utilization by adolescents at the Philippine General Hospital. Dawis, Ma. Agnes Chaluangco, Hipolito-Nancho, Rosa Ma. **Postgraduate Pediatrics**, , 12(1):33-41

The emergency room utilization by adolescents was determined by review of data. A total of 1,318 patients, 760 males and 558 females, consulted from January 1 to March 31, 1995, comprising about 22% of the total pediatric consults. Male consults were higher than female consults for all age groups. Injury (42.3%) and pain (21.8%) were the most common chief complaints. Consults related to risk-taking behavior were about 50% of the total adolescent consult and included injury (42.3%, n=557), pregnancy (5.9%, n=78), substance ingestion (1.9%, n=25) and substance abuse (<1%, n=1). Sixty-eight percent of cases seen were sent home while 23% were admitted. Forty percent of the study population (n=480) had good compliance to follow-up. Physicians should emphasize the need for follow-up where adolescents can be evaluated thoroughly and where the issues beyond their medical complaints can be addressed. **(Author's abstract)**

- 0428 Extraction and dye application of crude and powdered indigo (*indigofera tinctoria*) from Ilijan, Bago City, Negros Occidental:. Leano, Jr., Julius L., Cabansag, Jeannie Lynn J., Fenoy, Rudy C.. **Samay**, , :1-7

Through a memorandum of agreement between the Philippine Textile Research Institute and the Non-Timber Forest Products - Task Force (NTFP-TF), a seminar-workshop on the production of indigo cake and the application of crude indigo extract on abaca and pina fabrics was conducted on 25-26 August 2009. Members of the Ilijan Sustainable Farmers Association of Brgy. Ilijan, Bago City, Negros Occidental benefited from the training. The participants expressed their appreciation on natural dyeing and its economic impact on their livelihood. The indigo plant abundant in the place was also evaluated. Promising results were obtained as regards color quality using spectrophotometer and colorfastness performance using AATCC Method 15-2007 (colorfastness to perspiration) and AATCC Method 61-2007 (colorfastness to laundering).

Forestry. Technology transfer. Crude indigo (*indigofera tinctoria*). Extraction and dyeing application.

- 0429 Fertilization of potted gubas (*Endospermum peltatum* Merr.) seedlings in the nursery. Zabala, Neptale Q.. **The Pterocarpus**, , 2(2):192-196

A study was conducted to investigate the effects of nitrogen, phosphorous, and potassium fertilizers, applied singly or in combination, on the growth of potted gubas (*Endospermum peltatum* Merr.) seedlings.

Nitrogen fertilizer applied singly at 135 kg/ha increased diameter and height, phosphorous at 60 kg/ha also increased height, and potassium at 60 kg/ha increased diameter of the gubas seedlings. Mixed fertilizers at 45-90 and 90-90 (N-K) kg/ha gave the biggest height increase and appeared essential for maximum growth of potted gubas seedlings on clay-loam soil.

Forestry. Potted gubas
seedlings. Fertilization. Nitrogen. Phosphorous. potassium. Growth.

- 0430 Field grafting of yemane, *Gmelina arborea* Roxb., and large leaf mahogany, *Swietenia macrophylla* King. Zabala, Neptale Q.. **The Pterocarpus**, , 3(1):81-86

Cleft grafting was used to vegetatively propagate large leaf mahogany, *Swietenia macrophylla* King and yemane, *Gmelina arborea* Roxb. Scions of large leaf mahogany were taken from selected plus trees in a plantation at Makiling Forest, College, Laguna, while scions of yemane were taken from selected plus trees in plantations at the Osmena Reforestation Project, Minglanilla, Cebu; Magat Reforestation Project, Diadi, Nueva Vizcaya and Makiling Forest. Grafting large leaf mahogany in January and February showed 59% survival at the time of leaf flushing and had 20.6% survival 3 months after flushing. Grafting of yemane in January and February showed 76% and 61% success at the time of leaf flushing and 3 months after flushing, respectively.

Grafting success in yemane varied among scion sources. Scions from Cebu showed 88.6% take at the time of leaf flushing and 34.3% survived 3 months after leaf flushing, while those from Nueva Vizcaya had 81% after leaf flushing. Scions from the Makiling Forest grafted in August had 19% take and those grafted in December had 44% take at the time of flushing. Percentage survival 3 months after leaf flushing were 48% and 44% for August and December grafting, respectively.

Vegetative propagation of large leaf mahogany and yemane could be attained by cleft grafting and for large leaf mahogany more success could be obtained if done just before leaf flushing.

Forestry. *Gmelina arborea*. *Swietenia macrophylla*. Vegetative propagation.

- 0431 Field survival and growth of morphologically graded *Anthocephalus chinensis* (Lamk.) Rich. ex Walp. seedlings. Domingo, Ireneo L., Exile, Jr., Amado M.. **The Pterocarpus**, , 3(1):73-80

Kaatoan bangkal, *Anthocephalus chinensis* Rich. ex Walp., seedlings of various diameter and height classes were planted at the Pangaw, Sto. Tomas, Batangas portion of the Makiling Forest, U.P. at Los Banos, College of Forestry, in July, 1974 to May 1975. Performance was evaluated in the basis

of field survival and diameter and height growth at the end of both the rainy and dry seasons within the first year after planting.

Survival at the end of both the rainy and dry seasons did not vary with diameter grades within the range 0.25 to 1.0 cm root collar diameter. On the other hand, survival increased with increasing height of seedlings from 15 to 25 cms at the end of both the rainy and dry seasons.

The growth in diameter of the smallest seedlings (0.25 cm to 0.49 cm in diameter) was greater than the bigger seedlings (diameter 0.50 to 0.74 cm and 0.75 to 1.0 cm) at the end of the rainy season. During the dry season, the growth in diameter did not vary with diameter grades. Likewise the shortest seedlings (less than 16 cm) grew better in diameter than the taller seedlings during the rainy season but during the dry season, growth in diameter was reversed; i.e., taller seedlings grew better than shorter seedlings.

The growth in height varied with height grades but not with diameter grades at the end of the rainy season. Height growth increased with increasing planting stock height, (15.0 cm and shorter, 16.0 - 20.0 cm and 21.0 - 25.0 cm). During the dry season, height growth did not vary with either diameter grades or height grades.

Forestry. Kaatoan bangkal (*Anthocephalus chinensis*) seedlings. Field survival and growth.

- 0432 Finishing properties and coating systems for teak(*Tectona grandis* L.f.)and big-leafed mahogany(*Swietenia macrophylla* King)thinnings. Tavita, Yolanda L., Palisoc, Josefina G. . **FPRDI Journal**, , :35-42

The finishing properties of 7-year-old teak(*Tectona grandis* L.f.)and big-leafed mahogany(*Swietenia macrophylla* King)thinnings were studied using 1cm x 7cm x 17cm blocks. These were conditioned to 12% MC for teak and 10% for mahogany and then smoothened with a 100-180-320 grit sanding schedule. Aside from paint, clear finishes such as nitrocellulose lacquer, polyurethane and mixed almaciga resin varnish-nitrocellulose lacquer were sprayed following the straight and full finishing systems. The finishes were evaluated for their adhesion performance and hot-and-cold check resistance based on ASTM D2571-67 and ASTM D1211-60, respectively. Both species finished very well with clear finishes particularly teak whose grain was enhanced. Paint formed brownish streaks in teak and a pinkish tinge in big-leafed mahogany due to the extractives present in wood. The adhesion performance of both species under the different finishing systems was high. However, the mixed almaciga resin varnish-nitrocellulose lacquer systems exhibited poor resistance as shown by the cracks that formed on the film during the hot-and-cold check test.

Forestry. Finishing properties. Coating systems. *Tectona grandis* L.f.. *Swietenia macrophylla* King.

- 0433 Floral biology of amherstia. Garcia, Mercedes U.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :26-35

A study was conducted to observe the biology of the flower of *Amherstia*, *Amherstia nobilis* Wall, at the College of Forestry campus, College, Laguna.

Different methods of hand pollination employed were not successful. The test for natural pollination showed an 18.18% success. Iodine Test revealed a 24% pollen sterility. Ten percent sucrose was best for germination of *Amherstia* pollen in the dark with 21% success. The use of 5 ppm gibberellic acid *in vitro* germination showed a cytological manifestation of enhanced pollen tube growth. Fixed styles revealed germination of pollen but the pollen tubes did not penetrate the stylar tissues longer than 355 μ within 48 hours. Pollen failed to germinate in pistillate extract even up the 4th hour observation. The use of 200 ppm gibberellic acid in pollination was able to break an initial barrier to fertilization. Six big seeds were obtained and one germinated. **(Author's abstract)**

Pollination. Flower fertilization.

- 0434 Genetic diversity among natural populations of giant honeybee (*Apis dorsata* F.) in the Philippines. Merca, Anna E., Laude, Rita P., Tandang, Rosalina N.. **Transactions of the National Academy of Science and Technology Philippines**, , :325

SDS-PAGE and morphometric analysis was done to determine the diversity between two populations of the giant honeybee from Jubileeville, Bay, Laguna and Forestry Campus, UPLB, College, Laguna, Philippines. A total of five protein bands of high molecular weight were present in both population. Band 1, 2, and 3 were present in both population 100%. Band 4 was present in both the Jubileeville bee population, and Forestry bee populations at 100% and 85%, respectively. Band 5 had the lowest frequency of occurrence of 20 and 40% in the Jubileeville and Forestry giant honeybee populations, respectively. A total of three protein band patterns (BP) were observed. These were BP-A, with bands 1, 2, 3, 4, and 5; BP-B with bands 1, 2, 3, and 4; and BP-C with bands 1, 2, and 3. BP-A and BP-B was common to the two populations while BP-C was observed only in the Forestry population. The Jubileeville population had a high similarity index (SI) of 80-100% while the forestry samples gave a SI of 60-100%. The two populations exhibited an average SI of 71%. Morphological measurements showed that the two populations were separate from each other by clustering into two separate groups based on location. The only body part that can possibly distinguish the two populations from each other was the distance of the wax mirror. It may be concluded that the populations are highly similar to each other both morphologically and biochemically based on protein composition. **(Author's abstract)**

Honeybee. *Apis dorsata*. Genetic diversity. Protein profile. SDS-PAGE. Electrophoresis . Similar index. Morphometric analysis. Principal component analysis.

- 0435 Growth comparison between seedlings of plus and routine large leaf mahogany (*Sweitenia macrophylla* King) trees. Zabala, Neptale Q.. **The Pterocarpus**, , 4(1):14-36

Growth of seedlings from a selected plus tree and routine (random) trees were compared to determine whether phenotypically superior parent trees would likewise produce "superior" seedlings. Results of the study show that plus tree seedlings were bigger in diameter, taller, and yield more dry matter

than seedlings of routine trees.

Forestry. Mahogany (*Swietenia macrophylla* King). Plus tree seedlings. Routine tree seedlings. Seedlings growth.

- 0436 Idiopathic scoliosis among female Filipino school-children. Gonzalez-Paso, Maria Victoria SG., Agrasada, Ma. Gracia V.. **Postgraduate Pediatrics**, , 12(1):51-58

GENERAL OBJECTIVE:

To determine the prevalence of idiopathic scoliosis

SPECIFIC DESIGN:

1. To screen female Filipino schoolchildren ages 9-13, by physical examination and document scoliosis through referral to an Orthopedic surgeon and radiologic examination.

2. To determine the demographic characteristics of the disease; curve severity, curve pattern, measure the heights and weights of the subject, onset of menarche and family history.

STUDY DESIGN:

Descriptive-survey.

RESULTS:

A total of 637 subjects from Malate Catholic School were screened, 23 (3.61%) referred to the Orthopedic Surgeon. All 12 (1.88%) subjects who complied for xray were found positive. More than 65% were taller than the average Filipino weight (50th percentile).

Six (50%) had menarche with mean age of onset of 11 years 2 months Tanner's staging: 6(50%) Tanner's 1,5 (41.67%) Tanner's² and 1 (8.33%) Tanner's 3. Five (41.67%) had positive family history for scoliosis.

Curve patterns based on King's classification: Type III, 8 (66.67%), right-sided. All curves fell below 20 degrees.

Risser's staging: Risser O, 5(41.67%), Risser 2, 1 (8.33%) Risser 3, 2 (16.67%), Risser 4, 3(25%) and Risser 5, 1 (8.33%).

Idiopathic Scoliosis among Female Filipino Schoolchildren. **(Author's abstract)**

- 0437 Incidence of urinary retention necessitating maneuvers in patients with indwelling foley catheter

for seven days or less among patients at the medical intensive care unit. Buitizon, Rodel R.. **Philippine Scientific Journal**, , 43(1):2-5

Urinary retention is the inability to empty the bladder. It may be acute or chronic. Acute urinary retention is a medical emergency requiring prompt action such as insertion of a urethral catheter.

The objective of this study is to determine the incidence of bladder retention necessitating maneuvers that will induce urination in patients with indwelling foley catheter for seven days or less in an intensive care unit setting.

There were a total of 125 patients who were included and observed in this study. The primary inclusion criterion was seven days on indwelling catheter. Nine out of 125 patients or 7.2% experienced urinary retention. There was a significant association noted between age and urinary retention but no association noted between sex and urinary retention. There was a significant difference in the number of days with catheter on subjects with or without urinary retention.

The study showed that out of 125 patients who were included in this study, only nine patients (7.2%) had urinary retention. The predictive factors for the occurrence of urinary retention in catheterized patients include: ages of ≥ 80 y/o and > 4 days on indwelling catheter. The gender as well as the primary illness has no association with the occurrence of urinary retention. **(Author's abstract)**

0438 Increasing nipa sap yield through improved mechanical tapping. Quimbo, Lucio L.. **Technology!**, , 13(4):1-16

Nipa is said to be the mangrove's counterpart of coconut. It gives man various products which are essential to his everyday living. Nipa leaves are made into shingles for roofing and walling purposes. Other products derived from nipa leaves include hats, mats, and raincoats. Young nipa fruits can be eaten raw or processed into sweet preserves. But the most important product derived from nipa is its sap. The sap is made into vinegar or distilled into alcohol. Most coastal farmers depend on nipa sap production for their income.

Tapping nipa for sap production has long been practiced by the coastal farmers. The traditional method however, gives only a total sap yield of 57,750 liters/ha per year or an equivalent of P381,150. However, to increase sap yield, Prof. Lucio L. Quimbo of the College of Forestry, University of the Philippines at Los Banos developed a method better than the traditional method. This improved technology yielded a total of 101,287.50 liters sap/ha per year equivalent to P668,497.50. This means 42.98%/ha (P287,347.50) increase in the average total sap yield. As shown in the cost-and-return and partial budget analysis, the practice of improved mechanical tapping technology of nipa is economically profitable.

Forestry. Nipa sap production. Traditional tapping method. Improved tapping method.

- 0439 Infectious mononucleosis in children. Ero, Lyzeil P.. **Philippine Scientific Journal**, , 43(1):17-20

Objective: To be able to identify cases of Infectious Mononucleosis and be able to differentiate it from other common illnesses.

Design: Case Report

Setting: Department of Pediatrics

Case Summary: A case of 13 year old, female, admitted due to fever and enlarged right lateral neck mass. The mass was noted 2 weeks prior to admission as firm, movable, non tender, non-erythematous and no probable site of insect bite. No other signs and symptoms noted like fever, difficulty in swallowing, and difficulty of breathing. No consult was done, no medications were taken. Decreased appetite was also noted one week prior to admission Methissoprinol an immuno-stimulant and paracetamol for fever were given during consultation. It was persistent and fever became high grade. Mass was noted to be enlarged, thus admission. Patient presented with generalized lymphadenopathy hepatomegaly, persistent fever and pallor. Initial diagnostic evaluation also leads to malignancy. Further evaluation was done. Bone marrow aspiration was done revealing normal result. Other manifestations compatible with infectious mononucleosis appear in the latter part of the disease; It has a high result of EBV VCA IgM, one test to determine presence of infectious mononucleosis.

Described above was the atypical presentation of Infectious mononucleosis and probably happens elsewhere and left undiagnosed.

Conclusion: This case is reported because a lot of Infectious Mononucleosis cases were left undiagnosed and presentation may confuse with other illnesses. Understanding its presentation may help us physician to choose what diagnostic evaluation to request. **(Author's abstract)**

- 0440 Influence of mycorrhizal fungi and *Meloidogyne graminicola* interaction on growth of onion (*Allium cepa* L.). Gapasin, Ruben M., Balagot, Gina E., Brown, M., Gergon, Evelyn B., Miller, Susan A., Escano, C.. **Transactions of the National Academy of Science and Technology Philippines**, , :289

The interaction between vesicular-orbuscular mycorrhizal (VAM) fungi and root-knot nematode *Meloidogyne graminicola* was studied in the green house using two onion varieties, Yellow Granex and Red Creole. The first experiment used P-deficient soil without added fertilizer while in the other, the soil was fertilized with 20 bags of 14-14-14/ha. Onion plants inoculated at seeding and at transplanting with three species at VAM fungi- *Glomus mossage*, *G. Fasciculatum*, and *Gigaspora* sp. were planted in sterile soil and in soil

infested with *M. graminicola*.

Meloidogyne graminicola significantly retarded the growth of onions in the absence of VAM fungi. The growth of VAM inoculated-plants in P-deficient soil significantly increased although bulbs were not produced. Yellow Granex inoculated with *Gigaspora* sp. and a mixture of the three VAM fungi were significantly taller than those plants inoculated with *Glomus* spp. Compared with uninoculated plants, the bulb weight and diameter of Yellow Granex inoculated with mixture of the three VAM fungi increased 54% and 24% in fertilized soil without nematode. Greater increase in bulb weight (262%) and diameter (96.4%) was obtained in nematode-infested soil indicating that the mixture of three VAM fungi increased the tolerance of Yellow Granex to *M. graminicola*. Bulb weight and diameter of Red Creole increased 23% and 13%, respectively, when inoculated with *Glomus mossae* only in soil without nematode. None of the VAM fungi used in this study reduced symptoms of root-knot disease in onion as indicated by percentage of galled roots.
(Author's abstract)

Red creole. Onion. Root-knot. Interaction. *Meloidogyne graminicola*. Yellow granex. VAM.

- 0441 Infrared spectroscopy of two Philippine woods. Bibal, Jose N.. **The Pterocarpus**, , 4(1):73-85

Extractive-free, delignified, hemicellulose-free and unextracted milled sapwood and heartwood increment cores of Benguet pine, *Pinus kesiya* ex Gordon and narra, *Pterocarpus indicus* willd. were subjected to transmission infrared spectroscopy (IRS) using the potassium bromide pellet scanning technique. Upon comparison with pure isolated standards and with known infrared data, specific infrared absorption bands of the various chemical constituents of the two species were assigned, notably: alpha-cellulose (1120 cm^{-1}), lignin (1595 and 1500 cm^{-1}), 4-O-methylglu-coronoxylan (1730 cm^{-1}), glucomannan (800 cm^{-1}), beta-D-galactose/beta-L-arabinose (767 cm^{-1}), abietic acids (1378 cm^{-1}), pimaric acids (1435 cm^{-1}), saturated fatty acids (880 cm^{-1}), unsaturated fatty acids (3040 cm^{-1}) and flavanol-type polyphenols (1630 cm^{-1}).

Forestry. Infrared spectroscopy. *Pinus kesiya* (ex Gordon). *Pterocarpus indicus* (Narra).

- 0442 Integrated land use planning and sustainable watershed management. Cruz, Rex Victor O.. **Journal of Philippine Development**, , 26(1):27-50

The main purpose of this paper is to discuss the key issues and concerns regarding sustainable watershed management in the Philippines. Emphasis will be on the various requisites of sustainable watershed management, sharply focusing on the critical roles of land use planning. It is expected that the ensuing discussion can lead to a better understanding of the topics discussed and contribute to an improved operationalization of a truly

sustainable watershed management in the country.

Forestry. Integrated land use planning. Sustainable watershed management.

- 0443 The interaction of moisture content and press time on gluebond formation in paper-overlaid plywood. Villaflor, Armando A.. **The Pterocarpus**, , 2(2):180-187

Paper-overlaid plywood developed from red lauan raw plywood and decorative paper overlay with laminating acrylic emulsion as an adhesive produced gluebonds that meet the requirements of water resistant bonds. Moisture contents ranging from 3 to 12 percent did not show incompatible results on gluebond formation in paper-overlaid plywood at press times of 20 to 60 seconds at platen temperature of 115°C.

Forestry. Paper-overlaid plywood. Veneer. Adhesive. Decorative paper overlay. Water resistance. Moisture resistance. Delamination.

- 0444 Knowledge and attitudes on condom use among male Filipino adolescents. Redoble, Yvonne, Nancho, Rosa Ma. **Postgraduate Pediatrics**, , 12(1):85-90

Data were collected from 91 male fourth year high school students in Araulo High School to identify predictors of condom use during sexual intercourse. Students completed a self-report survey that assessed demographic data, knowledge, and attitudes on condom use. Using the analysis of maximum estimates, three factors were identified as associated with condom use. Peer and media influences and the attitudes of partners towards condom use were noted to be statistically significant in the adolescents' intent to use condom during sexual intercourse. **(Author's abstract)**

- 0445 Kraft pulping and papermaking properties of agosip (*Symplocos ahernii* Brand). Go, Lourdes A., Villaflor, Armando A.. **The Pterocarpus**, , 4(1):37-51

The kraft pulping characteristics of agosip (*Symplocos ahernii* Brand.) was investigated at various liquor-to-wood ratios with maximum temperature of 160°C, or 170°C. This hardwood species satisfactorily responded to kraft pulping and produced easily-bleachable pulps with permanganate numbers ranging from 18.9 to 22.1. Agosip kraft pulp handsheets have better strength properties than those made of Moluccan sau.

Forestry. Agosip (*Symplocos ahernii* Brand.). Kraft pulps. Pulp yield. Permanganate number. Bleaching.

- 0446 Notes on the variability of some wood quality indicators in Anonggo, turpinia ovalifolia, a long-fibered hardwood. Marave, Miguel D., Lantican, Celso B. . **The Pterocarpus**, , 3(2):25-32

Examination of some wood quality indicators in a single tree of anonggo, Turpinia ovalifolia, disclosed that the wood of the species possesses very long fibers (average: 2.72 mm), has a medium specific gravity (average:0.40), a low extractive content, (average:4.07%), and a Runkel ratio less than unity, suggesting that the species may be suitable for pulp and paper manufacture.

Turpinia ovalifolia (a long-fibered hardwood). Forestry. Wood quality indicators variability.

- 0447 Some observations on the microfungi of ips-infested pinus kesiya in the Philippines. de Guzman, Enrique D., Kobayashi, Takao, Quintos, Mutya Ma.. **The Pterocarpus**, , 3(2):19-24

Plating wood chips obtained from Ips-infested Benguet pine Pinus Kesiya revealed the presence of fungal species belonging to Ceratocystis, Pestalotia, Phomopsis, Penicilium and Trichoderma as well as several unidentified bacteria. Ceratocystis sp. was constantly and dominantly isolated from Ips-infested trees indicating that it possibly plays an important role in the wilt process.

Microfungi. IPS-infested pinus kesiya. Forestry. Wilt.

- 0448 Pantropic speciation of pterocarpus (leguminosae-papilionaceae) and the malesia-pacific species. Rojo, Justo P.. **The Pterocarpus**, , 3(1):19-32

The pantropic speciation of the genus Pterocarpus is discussed focusing on fruit characteristics and ecological factors probable means and cause of species dispersal and speciation. The proliferation of species names in botanical literature during the last century is largely due to vegetative variation mostly induced by the environment in relatively few polymorphic species. Of the 10 validly published names credited to occur in the Malesia-Pacific area, only one species with two forms is recognized, with most "species" relegated to synonymy under the typical form.

Pterocarpus (leguminosae-papilionaceae). Timber. Forestry. Taxonomy. Pantropic speciation.

- 0449 Particleboard production. **Technology!**, , 6(4):1-11

Particleboards are cheaper housing materials from wood wastes. The high cost of lumber and plywood used for housing and furniture calls for the utilization of other raw materials which are cheap but of good quality. One of the promising alternatives is the production of particleboards.

Particleboard is composed of small wood particles or other fibrous materials. Relatively cheap and highly versatile, it competes closely with plywood as a prime panel material. It is used for tables, cabinets, partitions, floorings, ceilings, sidings, interior panels, and doors. With the increase in housing needs, the demand for particleboard for housing and furniture will also go up.

The Forest Products Research and Development Institute (FPRDI) has put up a particleboard pilot plant. Technical and financial assistance is provided by the governments of Japan and the Philippines. Technologies on particleboard from the production to the finishing aspects are being developed at this pilot plant.

A commercial plant producing 1435 pieces of particleboards (1.2 m x 2.4 m x 18 mm) per day may get net returns of P30 million annually with returns per peso invested of P1.54.

There is a need to establish a particleboard plant on a commercial scale to demonstrate its viability and profitability. To be able to do this, full support of the government is needed. Also, more tree farms have to be established as source of raw materials for the country.

Forestry. Particleboard production. Plywood.

- 0450 Pathogenicity and cultural characteristics of *pestalotia* sp. associated with the leaf spot of narra, *pterocarpus indicus* Willd. de Guzman, Enrique D., Clavejo, Deolito T.. **The Pterocarpus**, , 3(2):1-10

Five isolates of *Pestalotia* sp. isolated from the leaf spot disease of Narra, *Pterocarpus indicus* Willd., were tested to determine the pathogenicity, effects of culture media, temperature, light conditions, pH, agar and dextrose concentrations on mycelial growth and sporulation. The host -parasite relationship and the method of dissemination were also studied.

The results showed that the different isolates were pathogenic on inoculated seedlings of Narra and exhibited variations in pathogenicity. The culture media favorable for mycelial growth and sporulation were potato-dextrose agar and Czapek's agar, while malt extract agar, corn meal agar, and water agar were unfavorable for mycelial growth and sporulation. The minimum temperature for the growth of the fungus was within the vicinity of 15°C, optimum temperature was 27±1 C, and the maximum temperature was somewhere above 30°C but below 35°C. The thermal death point was 35°C. Light did not influence mycelial production, but it was necessary for abundant conidial production. The five isolates grew over a wide range of pH (3.0 to 7.0), but the optimum pH was 5.5. Modifying the agar and the dextrose concentration of PDA to ¼ standard, 2x standard, and 3x standard did not show variations on the growth and sporulation of the five isolates. It was also observed that the germ tube which was extruded from the last colored cell of the basal segment of the conidium penetrates directly through the epidermis and the infection hyphae were intracellularly located in the mesophyll cells. Air and rain played a major role in the spores dispersal.

Narra leaf spot. Pathogenicity. *Pestalotia* sp. Forestry.

- 0451 Phenotypic diversities of coconut (*Cocos nucifera* L.) populations in Bangladesh
 . Islam, Md. N., Borromeo, T.H., Rzzaque, M.A.. **The Philippine Journal of Coconut Studies**, , 32(1-2):13-22

Genetic diversity of coconut populations in Bangladesh was assessed from June 2000 - October 2002. Twenty two sample sites were selected following the coarse grid sampling method. A suitable sized map of Bangladesh was obtained and grids of approximately 40 x 40 km were marked following latitude and longitude divisions/degree. Population in each grid was identified according to the name of the village where it was located. Multivariate analysis, including principal component analysis, clustering and D^2 statistics were carried out to assess morphological variation of the populations. D^2 values ranged from 52.48 to 921.48 indicating high variability between populations in different areas. Population from Chinashukhanja was found to be different from Buikara (921.48) and Bhola (900.64). These populations were located in different geographic regions of the country. Similarity was observed in two geographically close populations Babugonj and Uzirpur (38.01). The first two principal components accounted for 91% of the total diversity. Fruit characteristics of principal component 1 has the highest contribution on the total variation. The populations were grouped into six clusters. The inter-cluster value indicated maximum distance between Clusters II and IV followed by Cluster III and V. Populations in Cluster V were found to be homogeneous while Cluster III was heterogeneous. Thus the populations could be used as parent(s) in hybridization for getting desirable traits. Cluster VI had highest fruit weight, husk weight and liquid endosperm weight while Cluster IV had highest fruit weight, husk weight, and liquid endosperm weight while Cluster IV had highest nut weight, nut weight without liquid endosperm, shell weight, liquid endosperm weight and meat weight. Utilization of available coconut variability may greatly improve the fruit and nut characters through hybridization and selection. **(Author's abstract)**

- 0452 Physical and mechanical properties of giant ipil-ipil [*Leucaena Leucocephala* (Lam.) DE Wit.]. Alipon, Marina A., Bondad, Elvina O.. **FPRDI Journal**, , :12-22

The physical and mechanical properties of three 20-year-old giant ipil-ipil trees from Burgos, Ilocos Sur (Region 1) were determined and evaluated. The mean moisture content(MC), relative density(RD), and volumetric shrinkage(VS) from green to oven-dry condition were 95.90%, 0.578 and 9.18%, respectively. Based on the strength classification devised at FPRDI, the mechanical properties namely; static bending(SB), compression parallel-to-grain(C//), compression perpendicular-to-grain(C/), and shear fall under moderately high strength(class 2), at par with those of giant ipil-ipil trees from Canlubang, Laguna(Region IV). As far as these properties are concerned, its wood may be used for medium heavy construction, such as heavy-duty furniture and cabinets, medium grade beams, flooring, door panel and frames.

Forestry. Giant ipil-ipil. Moisture content. Relative density. Volumetric shrinkage. Strength

properties.

- 0453 Population, territoriality, and recommendations for conservation of the monkey-eating eagle, *Pithecophaga jefferyi*, in the Davao provinces. Bonnit, Carlos B., Rundquist, Lorene, Rundquist, Vaughn M.. **The Pterocarpus**, , 3(1):87-100

A 2-year study of the endangered Philippine Monkey-Eating Eagle, *Pithecophaga jefferyi*, showed a current population of 12 pairs in the Davao provinces. The major cause of population decline appeared to be habitat loss due to commercial logging operations. Recommendations for Eagle protection included campaigns of information and education, and government established sanctuaries in suitable habitats.

Forestry. Conservation. Monkey-eating eagle (*Pithecophaga jefferyi*).

- 0454 The prevalence of hepatitis C virus infection among pediatric patients with chronic liver disease at UP-Philippine General Hospital. Tejam-Baclayon, Melvina, Gabriel, Elizabeth P.. **Postgraduate Pediatrics**, , 12(1):17-24

To determine whether an association exists between HCV infection and chronic liver disease, a cross-sectional descriptive study of patients with chronic liver disease was done. Fifty-three patients between 3 months and 17 years were included. The most frequent diagnosis was chronic viral hepatitis (34%). Their serum samples were tested for anti-HCV and mean age was 4.89 yrs. with M:F ratio of 1.25:1. Prothrombin time was normal but liver enzymes and serum bilirubin were elevated. Total protein and serum albumin were decreased. Percutaneous liver biopsy in 4 cases showed early biliary cirrhosis, chronic hepatitis with cirrhosis, sinusoidal cholestasis, and neonatal hepatitis-like changes. The following risk factors were identified as: history of previous hospitalization, parenteral exposure, blood transfusion, household exposure, or alcohol intake. Subjects were grouped into high risk, if they had 3 or more risk factors, low risk if they had 2 or less & no risk factors. If they had no identifiable risk factors six were in the low risk while 3 had no risk factors. Using the Pearson correlation coefficient, no significant correlation was noted between HCV infection and sex, age, and number of risk factors. Many do not come from well-defined risk groups. Further studies must be done on the epidemiology of HCV infection and to evaluate preventive measures towards HCV infection. **(Author's abstract)**

- 0455 Quality control in kiln drying. Fernandez, Virgilio A., Casilla, Romulo C., Bello, Emmanuel D.. **The Pterocarpus**, , 3(2):45-62

A study was conducted in the kiln-drying plants of three wood-processing companies in Mindanao.

Results of the investigation showed that the application of relative cumulative frequency distribution analysis to the variation patterns in the

moisture contents of lumber before, during and after kiln drying is very effective in: (a) selecting proper kiln-drying conditions for controlling the occurrence of seasoning defects, (b) controlling the variability of the moisture contents of kiln-dried lumber, and (c) detecting assignable causes of wide moisture content variations during the kiln-drying operation.

The same study also resulted in a significant reduction of kiln drying time for each kiln load of 4/4, 5/4 and 6/4 mayapis, bagtikan and other dark and light Philippine lauans. This means not only a considerable reduction in drying costs but also an increase in kiln output.

Forestry. Quality control. Kiln drying.

0456 Rattan pole dryer. **Technology!**, , 5(4):1-12

Rattan products, especially house furnishings, are appreciated for their beauty, charm, and grace. These are export products whose artistry the Philippines can point to with pride.

Rattan is one of the most important groups of forest species after timber. It is mainly used in the manufacture of cane furniture. Currently, the rattan-furniture industry employs 10,000 workers and requires approximately 28 million poles annually. In 1981, the industry generated \$45.9 million of the \$87.3 million total furniture exports.

In the export market, the rattan furniture is preferred over and above those made of wood. There is, however, a need to improve the traditional method of drying rattan poles. This old practice contributes greatly to the decay and staining of these materials. These conditions considerably lower their market value. A moisture content (MC) below 20% protects poles from the staining fungi and from rotting.

The Forest Products Research and Development Institute (FPRDI) has designed, constructed, and tested a low-cost but efficient rattan dryer which dries scraped rattan poles to the right moisture content in just 64 hours. The estimated cost of drying per pole is P0.49 with returns per peso invested of P1.71. With the adoption of this technology we will be able to meet better the demand for quality rattan products locally and abroad.

Forestry. Rattan pole dryer.

0457 Rattan production at the village level. Palaypayon, William R., Cadiz, Rafael T.. **Technology!**, , 10(2):1-16

Given the needed support and incentives, the rattan industry is capable of contributing to the upliftment of the socio-economic status of the people in the forest community.

Rattan can be grown underneath forest trees. Rattan is well known for its multifarious uses: as food, ornamental and furniture. In 1985, the rattan industry generated US\$95 million in foreign exchange from rattan furniture exported to other countries.

Research and development efforts of the Forest Research Institute, now

the Ecosystems Research and Development Bureau (ERDB) of the Department of Environment and Natural Resources (DENR), indicated the potential of mass planting rattan in existing tree plantations, secondary forests, brushland or even coconut plantations as secondary crop.

Using the Net Present Value (NPV) to determine the economic viability of rattan plantation as an investment, a positive NPV can be obtained at a discount rate of 15% for a period of 15 years (first harvest) and 20 years (second harvest). Thus, rattan plantation is a profitable investment in spite of its long gestation period.

Forestry. Rattan production. Socio-economic status.

- 0458 Response of outplanted kaatoan bangkal (*Anthocephalus chinensis* Rich. ex Walp.) seedlings to nitrogen fertilization and mulching treatments:. Uri-dela Cruz, Loretto V., dela Cruz, Reynaldo E., Montecillo, Lupo A.. **The Pterocarpus**, , 4(1):62-72

The response of outplanted Kaatoan bangkal seedlings to 3 nitrogen levels (0, 0.6 and 1.2 g Urea/plant) and 6 Mulching treatments (no mulch, rice hull, sugarcane bagasse, banana stalk, cogon-talahib grasses and sawdust) on survival, dry matter yield, stem diameter and height growth was studied during a 6-month period under grassland conditions.

Survival of seedlings was generally enhanced by N fertilization although differences were not significant. Fertilization significantly increased dry matter yields and diameter growth increments of seedlings. Nitrogen at the rate of 1.2 g Urea/plant doubled dry matter production and diameter increments as compared to unfertilized controls. Fertilization also increased height growth but differences were statistically insignificant.

Mulching treatments did not increase survival, dry matter yield and growth in diameter and height. It was observed, however, that the addition of mulches not native to the area such as rice hull, bagasse, sawdust and banana stalk without supplemental N fertilization tended to reduce seedling survival.

It is concluded that N is a critical factor for biomass production and growth in diameter and height of Kaatoan bangkal seedlings in an open grassland. Addition of 1.2 g Urea/plant appreciably helped in the initial growth and establishment of this species. Nitrogen should be added when mulch materials such as bagasse, sawdust, rice hull and banana stalk are to be used. It is further concluded that mulching alone does not significantly affect survival or growth of seedlings under the experimental conditions which prevailed during this study.

Forestry. Outplanted kaatoan bangkal seedlings. Nitrogen fertilization. Mulching treatments. Survival and growth.

- 0459 Root development of *Albizia falcataria* (L.) Fosb. seedlings. Dalmacio, Roberto V.. **The Pterocarpus: A Philippine Science Journal of Forestry**, , :35-37

The weight of the roots and shoot of Moluccan sau, *Albizia falcataria*, (L.) Fosb., seedlings were measured on the 1st, 2nd, 4th, 6th, 8th, 10th & 12th week after sowing. The tap root and shoot length ratio decreased as the age increased starting on the 4th week. The 1:1 ratio was estimated to have

occured on the 23rd day. The root-shoot weight ratio, however, increased as age increased but the balance was never obtained during the study.
(Author's abstract)

- 0460 Rooting cuttings and grafting of giant leucocephala and pterocarpus indicus. Zabala, Neptale Q.. **The Pterocarpus**, , 3(2):71-76

Vegetative propagation by means of rooted cuttings and grafting of giant ipil-ipil, *Leucaena leucocephala* (Lam.) De Wit, and narra, *Pterocarpus indicus* Willd., was studied. Cuttings of giant ipil-ipil 40 cm and 1.5 to 1.99 cm in diameter developed more roots and vigorous shoots than the smaller and bigger sizes. About 80% of narra cuttings having uniform size developed roots, shoots, and grew. These leguminous species were satisfactorily grafted using the cleft method. Grafting successes obtained were 80% and 60% in narra and in giant ipil-ipil, respectively.

Pterocarpus indicus. Forestry. *Leucaena leucocephala*. Grafting. Rooting cuttings.

- 0461 Sawmilling characteristics of giant ipil-ipil [*Leucaena leucocephala* (Lam.) de Wit.]. Alcachupas, Pablito L., Lapitan, Francisco G.. **FPRDI Journal**, , :1-11

Sawmilling of 20-year-old giant ipil-ipil [*Leucaena leucocephala* (Lam.) de Wit.] using the FPRDI portable horizontal bandmill was conducted. Two methods of sawing were employed: modified live-sawing and the conventional sawing-around system. Modified live-sawing was 2% higher in lumber recovery than the conventional method (60.47% vs. 58.5%). However, both methods, as well as log length, did not significantly affect lumber recovery in the log samples used. Lumber manufacture cost amounted to US\$81.95/m or US\$0.193/bd ft.

Forestry. Giant ipil-ipil. Modified live-sawing. Sawing-around. Lumber recovery.

- 0462 Sawmilling characteristics of some industrial tree plantation species(ITPS)thinnings. Alcachupas, Pablito L., Lapitan, Francisco G., Asis, Augusto F.. **FPRDI Journal**, , :43-50

Log samples of thinnings from 7-year-old-leafed mahogany (*Swietenia macrophylla* King) and teak (*Tectona grandis* L.f.) were live-sawn to characterize the relative ease or difficulty of sawing and determine lumber yield and quality. The average lumber recoveries of 48% and 43% for big-leafed mahogany and teak, respectively, were lower than the standard recovery of 55% in conventional sawing of some industrial tree plantation species (ITPS) using the Wood-Mizer. Both species were classified as easy to saw. Their low lumber recovery and quality might be due to the small diameter of log samples; incidence of pith, knots and end splits, and amount of taper

and wane on boards.

Forestry. ITPS thinnings. Lumber recovery. Small diameter logs. Live-sawing.

- 0463 A simulation model of multi-source single-sink timber harvesting operations. Bonita, Manuel L.. **The Pterocarpus**, , 2(2):97-122

A model, capable of simulating multi-source, single-sink timber harvesting operations with variable internode distances, with various equipment types and combinations, and with various parameters and functional relationship, is described. The validity of the model is tested and demonstrated for an actual logging division used as a vehicle for model formulation. Some practical applications of the logging simulation model are discussed and illustrated. Among other uses, the model can be used to compare alternative operating policies and to determine equipments under different operating conditions.

Forestry. Logging. Multi-source single-sink timber harvesting operations.

- 0464 Storage stability study on rubber [*Hevea brasiliensis* (HBK.) Müell. Arg.] seed oil. Lapuz, Rebecca B., Fidel, Mildred M.. **FPRDI Journal**, , :94-102

The effect of storage on extracted rubber seed oil (RSO) was determined. The oil was stored for two months at room temperature and at 4°C, with and without purging with nitrogen gas. Results showed that there was no significant change in iodine number for all storage conditions. On the other hand, peroxide value was significantly affected by temperature, storage time and purging with nitrogen gas. Oils containing unsaturated fatty acids were prone to hydrolytic deterioration. However, there was no detectable change in the fatty acid composition of RSO after two months of storage.

Forestry. Rubber seed oil (RSO). Iodine number. Peroxide value. Storage stability.

- 0465 Structural analysis of commercially important polysaccharides from Philippine Seaweeds. Aguilan, Jennifer T., Chainani, Edward T., De Jesus, Armando H., Dancel, Ma. Cristina A., Niño, Milady R., Pasuelo, Marites J., Dayrit, Fabian M.. **Transactions of the National Academy of Science and Technology Philippines**, , :374-375

This paper aims to present studies on the structural analysis of commercially important polysaccharides such as *kappa* (*k*-) and *iota* (*i*-) carragenan obtained from major sources of Philippine seaweeds such as *Kappaphycus alvarezii*, *K. cottonii*, *Kappaphycus* sp. "sacol" variety and *Eucheuma denticulatum*.

The polysaccharide content of fresh seaweeds was analyzed in situ using FT-IR microscope. Film samples of carrageenan extracts were also prepared from native and alkali modified extract and analyzed using the FT-IR

spectrophotometer. Results obtained from both techniques were found to be comparable. The absorption peak observed at 845 cm^{-1} was characteristic of the sulfate groups at C-4 position of the galactopyranosyl residue of the *k*-carrageenan extracts from all three *Kappaphycus* species. On the other hand, absorption peaks observed at 805 cm^{-1} and 845 cm^{-1} correspond to the sulfate groups found at the C-4 position of the galactopyranosyl residue and at the C-2 position of the 3, 6-anhydrogalactopyranosyl residue from the *i*-carrageenan extracted from *E. denticulatum*.

One dimensional ^1H and ^{13}C NMR experiments were also performed on the native and alkali modified extracts obtained from the four seaweeds species studied. The anomeric signal due to C-1 of the 3, 6-anhydrogalactopyranose unit (*k*-A1) at 95.2 ppm is the major identifying features of the *k*-carrageenan bearing seaweeds such as the three *Kappaphycus* species studied. The anomeric signal due to C-1 of the 3, 6-anhydrogalactopyranose unit (*i*-A1) at 91.9 ppm is the major identifying feature of the *i*-carrageenan bearing seaweeds such as the *E. denticulatum* studied. Information on the presence of minor polysaccharide components detected from the ^1H and ^{13}C NMR were also reported.

The monosaccharide constituent analysis was performed by preparing alditol acetate derivatives by partial reductive hydrolysis of the carrageenan extracts. The glycosidic linkage was determined from partially methylated alditol acetate samples. All derivatized samples were analyzed using the GC-FID and GC-MS. Results show that a ratio of 43.2 (%):48.7(%) of 3, 6-anhydrogalactose: galactose content on the average were obtained from the three *Kappaphycus* species while a ratio of 29.6(%) : 63.8(%) was obtained for *E. denticulatum*. This shows that major monosaccharide components are a galactose and a 3, 6-anhydrogalactose which are actually the sugar units which form the disaccharide repeating unit of carrageenan. Results from the methylation or linkage analysis show that for all three *Kappaphycus* species the major components are 41.4% 1,4,5-tri-O-acetyl-2-mono-O-methyl-3,6-anhydrogalactitol and 48.6% 1,3,4,5-tetra-O-acetyl-2,6-di-O-methylgalactitol was obtained for *E. denticulatum*. The results show and confirm that the type of linkage is a 1 \rightarrow 3 linked galactopyranosyl residue and 1 \rightarrow 4 linked 3, 6-anhydrogalactopyranosyl residue. (Author's abstract)

- 0466 A study on the mosquito repellent effect of *Blumea Balsamifera* (Sambong). Pascual, Charisse G., Romero, Karen, Regachuelo, Dulce, Patricio, Anne Marie, Rom, Nyvi Lou, Quinto, May Faye, Manalaysay, Gladys, Pabalan, Karmina, Parreno, Charmaine, Peralta, Aubrey, Pilongo, Jasper, Reyes, Maureen, Salvador, Rene Mari, Tionghoy, Annal Lizza, Virola-Leh, Mary Ann. **Philippine Scientific Journal**, , 35(1):32-38

Objective: To determine the repellent effect of *Blumea balsamifera* (Sambong) leaves on mosquitoes.

Setting: MCU-FDTMF

Study Design: Experimental

Methodology: The study was divided into 2 stages. The first stage was the preparation and production of the mosquito coil from sambong leaves. The second stage, which was the experiment proper, was done in indoor and outdoor setting. This was the time when the mosquito coil made from sambong leaves was compared with the commercially available mosquito coil based on two criteria, namely: the mosquito repellent property and the time elapsed before the mosquito repellent effects were observed.

Results: Regarding the mosquito repellent property there was no significant difference between sambong and commercially available mosquito coil on different trial set up (p value > 0.05). Based on the time elapsed before the mosquito repellent effect were observed, there was a significant difference noted, with the mosquito coil made from sambong leaves taking effect earlier compared with the commercially available mosquito coil (p. value < 0.01).

Conclusion: The study revealed that the mosquito repellent effect of sambong and commercially available mosquito coil was comparable. The mosquito coil made from sambong leaves was more effective having a shorter time elapsed before it takes effect compared with the commercially available mosquito coil.
(Author's abstract)

- 0467 On the taxonomy of *Shorea agsaboensis*-Stern. Rojo, Justo P.. **The Pterocarpus**, , 3(2):63-70

The description of *tiaong*, *Shorea agsaboensis* Stern, a new Philippine dipterocarp published in 1965, was based on fruit materials. The recently collected flower specimens, together with notes on bark characteristics, provided necessary data to complete its description. Differences between *tiaong* and its closely related extra-Philippine *S. pauciflora* King are elucidated.

Taxonomy. *Shorea agsaboensis*-Stern. Forestry.

- 0468 The use of alternate woods for railroad ties. **Technology!**, , 3(1):1-11

The Philippine National Railways (PNR) needs large amounts of railroad ties in its program to expand railroad lines and replace deteriorating ties in hundreds of kilometers of railway tracks.

However, the program is hampered by acute shortage of wood species, such as *molave*, traditionally used for railroad ties. This is clearly evident by the increasing backlog in PNR's expansion and replacement program and its use of sub-standard *molave* ties.

Research at the Forest Products Research and Industries Development Commission (FORPRIDECOM), however, showed that other woods when properly treated make good substitutes for those traditionally used for railroad ties. The recommended alternate wood species are *apitong*, *bolon*, *bitaog*, *malakawayan*, *miau*, *dungon*, *akle*, *lomarau*, *sasalit*, *binggas*, *malabayabas*

and narig.

Since supply of alternate woods is adequate, procurement is easier. Also, the use of alternate woods for railway ties diversifies the uses of these species. This will redound to conservation of woods traditionally used for ties.

Alternate woods are less durable and lack some qualities of woods traditionally used for ties. However, research licked the problem through development of an economically viable technology which remedied the limitations of alternate woods. Furthermore, research proves that it is more economical to use alternate species than traditional species.

Considering only the accumulated backlog in PNR's rehabilitation and replacement program of 1,185,100 ties, the company can save about P 306,126 per year if it uses apitong ties with metal base plates instead of yakal (traditional species) ties. Apitong tie cost P0.26 less per year than yakal tie.

Forestry. Alternate woods. Railroad ties.

- 0469 Validity indices of clinical parameters in predicting lumbar puncture yield in children with febrile seizures. San Nicolas, Jr., Nicanor P., Lukban, Marissa B.. **Postgraduate Pediatrics**, , 12(1):7-16

To determine the extent at which clinical information can serve as tools in predicting lumbar puncture (LP) yield, children between 3 months to 6 years who visited the UP-PGH Pediatric Emergency Room for their first episode of seizure associated with fever were prospectively evaluated. A total of 50 patients were included in the study. Eleven (22%) cases of meningitis were diagnosed. The relation of clinical parameters with meningitis in terms of predicting LP yield was assessed using combined pooled correlation matrix (Pearson's, Point-Biserial, Phi-coefficient) and regression analysis. The following were significantly correlated with abnormal CSF results: (1) duration of fever > 3 days; (2) the presence of anorexia, vomiting and sleep disturbances; (3) a physician consult within 48 hours prior to seizures; (4) the presence of ear discharge; (5) abnormal neurologic findings like nuchal rigidity and focal signs; (6) level of consciousness; and (7) occurrence of seizures at the Emergency Room. Among these factors, the presence of anorexia, vomiting and sleep disturbances; the presence of ear discharge and a depressed level of consciousness were found to be independently associated with LP yield. **(Author's abstract)**

- 0470 Variation of some structural features and wood properties of benguet pine, pinus kesiya Royle Ex. Gord.. Lantican, Celso B.. **The Pterocarpus**, , 3(1):1-18

Tracheid length and diameter, specific gravity and per cent extractive content were found to exhibit significant variations among and within 14-year old trees of Benguet pine, Pinus kesiya Royle ex. Gord., raised in a plantation in Mountain Province. Extractive content showed no consistent pattern of variation within trees. The other features, on the other hand, exhibited

systematic patterns of changes in the axial and radial directions. Tracheid length and diameter and specific gravity were significantly correlated with ring width but the degree of correlation was weak in each case. Tracheid length and specific gravity were more closely correlated with age from the pith than with distance per se from the pith.

Forestry. Wood quality. Benguet pine (*Pinus kesiya*).

- 0471 Vegetative propagation of *Pinus caribaea* var. *hondurensis* Morelet and *Pinus oocarpa* Schneide by means of needle fascicles. Sargento, Jose O., Barker, John E. . **The Pterocarpus**, , 4(1):52-61

Rooting percentages of 97% and 67% in fascicle cuttings from 19-week old *P. caribaea* and 25-week old *P. oocarpa* seedlings were obtained, respectively. Survival was 100% for *P. caribaea* and 99% for *P. oocarpa* cuttings 16 weeks after setting.

Application of Captan helped prevent fungal damage and did not appear to reduce rooting. Treatment with indolebutyric acid (IBA) significantly increased rooting percentage and root length of *P. oocarpa* cuttings. IBA treatment increased the number of primary roots per cutting but did not affect the number of branch roots per primary root of both species. Transplanted rooted fascicles of both species have attained 97% survival and vigorous growth 7 months after transplanting into pots.

Forestry. *Pinus caribaea*. *Hondurensis* Morelet. *Pinus oocarpa* Schneide. Vegetative propagation. Needle fascicles. Root initiation. Hedging.

- 0472 Wood anatomy of teak (*Tectona grandis* L.) and big-leafed mahogany (*Swietenia macrophylla* King) thinnings. Ramos, Mario DR., Pitargue, Jr., Fernando C., Escobin, Ramiro P., America, Wilfredo M.. **FPRDI Journal**, , :23-34

The wood anatomical (macro- and microscopic) features of 7-year-old teak and big-leafed mahogany thinnings were studied to determine their distinct features for identification and wood quality assessment vis-a-vis wood from mature trees. Teak exhibits a distinct brown to dark brown heartwood, while big-leafed mahogany has a light reddish brown heartwood. Also, teak wood is straight-grained, while big-leafed mahogany wood has interlocked grain. The wood structural features common to both species include distinct growth rings marked by difference in vessel or pore diameter (ring porous for teak and semi-ring porous for big-leafed mahogany); pore arrangement and distribution (solitary and in radial multiples of 2-3); and the presence of deposits (chalky white in teak and black in big-leafed mahogany). Likewise, both species exhibit thin-walled and medium-sized fibers. However, length of vessel elements is moderately short in teak and medium-sized in big-leafed mahogany. Height of multiseriate rays, likewise, is very low in teak and extremely low in big-leafed mahogany. Ray width is medium in both species, but 2-4 cells wide (mostly 3-4 seriate) in big-leafed mahogany and 3-8 cell wide (mostly 3-4 seriate) in teak. Overall, the wood quality of teak and big-leafed mahogany thinnings is similar to that of mature trees. However, due to their smaller diameter and significant amount of juvenile wood, an

investigation on the technological and working properties of thinnings is needed to determine their suitability for high-value products.

Forestry. Wood anatomy. *Tectona grandis*. *Swietenia macrophylla*. Thinnings.

- 0473 A yield prediction model for mahogany (*Swietenia macrophylla* King) plantations. Revilla, Jr., Adolfo V., Bonita, Marcelo L., Dimapilis, Leonida L.. **The Pterocarpus**, , 2(2):172-179

An acceptable yield prediction model was developed for large-leaf mahogany (*Swietenia macrophylla* King) plantations. The model was based on 191 sampling points gathered in various government reforestation projects in Luzon and Visayas and the Makiling Forest representing all available age classes (5 to 55 years) and varying site conditions (site indices 10 to 35 meters based at age 40 years). The model developed in this study consists of site index guide equation that gives the quality of a given site in terms of the total height of an existing stand volume as a function of site index and age. No acceptable stand basal area equation based on site index and age was obtained in spite of repeated attempts to determine one which means that the stand density of large-leaf mahogany plantations is not adequately explained by site quality and age unlike in the case of natural Benguet pine stands.

Ordinary least squares was used to derive the coefficients of the model. The yield prediction model was finally found valid by testing it against a separate set of 40 yield plots in which all observed values were found to belong to the same linearized structure as the stand yield equation determined in the study.

Forestry. Mahogany (*Swietenia macrophylla* King). Site index. Yield table. Growth.

GENETICS

- 0474 The bacterial wilt organism. Raymundo, Asuncion K.. **Transactions of the National Academy of Science and Technology Philippines**, , :131-147

Ralstonia solanacearum causes the destructive bacterial wilt of many crops including banana, tomato, tobacco, potato, eggplant, ginger and peanuts. It has remained a major nemesis of agricultural crops despite decades of research spent on it. For the past few years, however, a new twist has been introduced in the hope of better understanding the causal organism. This twist is through molecular approaches.

In the late 1990s, the "bugtok" disease which causes hardening of cooking bananas was suspected to be caused by *R. solanacearum* but its relationship with the causal bacterium in wilt of Cavendish bananas (Moko) was not clear. Molecular probing of the genome of 127 strains of bugtok and Moko causing strains using different probes and through DNA amplification by polymerase chain reaction (PCR) showed that this group of strains is of only one type, and thus is monomorphic. A similar study conducted four years later yielded almost the same result. Another approach was taken to study genetic diversity and

that was to clone a repetitive element through the construction of a partial genomic library. Using this cloned rep-element for hybridization, it was shown that the group was indeed monomorphic with just an additional type, but which was not exclusive to either bugtok or Moko. Thus, it was concluded that the casual organisms of bugtok and Moko are one and the same type. In the former, the bacterium infects the plant through the inflorescence while in the latter, it does so through the roots. In the course of this study, it was established that only the banana strains harbor the rep-element). Thus the flanking regions of the rep-element were sequenced, and primers synthesized for PCR. Indeed the banana strains can be differentiated from the other strains by PCR. This constitutes a fast and efficient method of differentiating the diverse strains. Nonetheless, since PCR requires skill and a special machine, a more user-friendly method, the monoclonal antibody (MAB) technology, was developed. Using the PCR product as the immunogen, A MAB-based technique specific only to *R. solanacearum* banana strains was developed. However, the sensitivity of this MAB technique was lower than that of PCR.

Since banana strains are almost monomorphic, in contrast to tomato strains which are polymorphic, the rate of development of polymorphism was determined in a tomato strain as affected by host genotype. Through a series of PCR experiments utilizing a set of tomato varieties with different levels of resistance to bacterial wilt, a substrain, which had undergone changes in genotype and virulence, was isolated. This substrain was eventually able to cause 92% and 100% wilting of plants of the resistant cultivars C108 and 508, respectively. In contrast, the wild type strain was induced wilting in only 8.3% - 16% in the resistant cultivars. The mutant strain was conclusively shown to break down the resistance of the tomato cultivars. This type of strain can be used as tester in breeding for durable disease resistance.

Other studies conducted by Opina and Natural on the genetic diversities of tomato and potato strains indicated a polymorphic nature. A PCR technique to detect the species *R. solanacearum* was devised by Opina and collaborators. Natural and colleagues also devised a technique for the selection of bacterial wilt free potato seed pieces. Balatero and colleagues utilized market-aided selection in hastening the process of breeding for resistant varieties. Laurena *et al.* have studied the basis of bacterial wilt resistance in tomatoes.

All of these studies in the Philippines have contributed to a better understanding of the pathogen and a more effective management of the bacterial wilt. **(Author's abstract)**

Ralstonia solanacearum. bugtok. *R. solanacearum*. Genetics. Moko . Bacterial wilt.

0475 The human genome project. Ramirez, Bernadette L.. **Transactions of the National Academy of Science and Technology Philippines**, , :155-161

The human genome is the full complement of genetic material in a human cell. In 1990 the United States Department of Energy and the National Institutes of health developed a joint research plan for their genome programs. The goals of the Human Genome Project are the following: 1) genetic and physical mapping of the genome, 2) DNA sequencing, identifying and locating genes, and 3) pursuing further developments in technology and informatics. In addition, the plan emphasizes the continuing importance of the ethical, legal,

and social implications of genome research, and it underscores the critical roles of scientific training, technology transfer, and public access to research data and materials.

The public and privately-funded human genome project consortia have today jointly announced completion of a first draft of the human genome sequence by June 2000. Analysis of the sequence so far predicts 38,000 genes, far fewer than the 60- 100,000 that the genome had been thought to contain, though the total may rise to some extent as analysis continues. The "post-genomic era", involving the massive challenges of elucidating gene function and uncovering the genetic basis of human variation, has officially begun.

The atlas of the human genome will revolutionize medical practice and biological research into the 21st century and beyond. All human genes will eventually be found, and accurate diagnostics will be developed for most inherited diseases. In addition, animal models for human disease research will be more easily developed, facilitating the understanding of gene function in health and disease.

As research progresses, investigators will also uncover the mechanisms for diseases caused by several genes or by a gene interacting with environmental factors. Genetic susceptibilities have been implicated in many major disabling and fatal diseases including heart disease, stroke, diabetes, and several kinds of cancer. The identification of these genes and their proteins will pave the way to more-effective therapies and preventive measures. Investigators determining the underlying biology of genome organization and gene regulation will also begin to understand how humans develop from single cells to adults, why this process sometimes goes awry, and what changes take place as people age. New technologies developed for genome research will also find myriad applications in industry, as well as in projects to map (and ultimately improve) the genomes of economically important farm animals and crops.

Genomics has stimulated the growth of several new and exciting down-stream disciplines, namely, functional genomics, proteomics, pharmacogenomics and gene therapy. These new sciences, sitting firmly on the shoulders of genomics and genetics are set to carry on the more practical aspects of its sequencing foundations up to and including a whole new world of drug discovery and therapeutics. It will someday include individualized medicines and discreet gene replacement. The fearsome diseases of cancer, cardiovascular and metabolic disorders, Alzheimer's Diseases obesity and inherited genetic diseases have been taken on with a bravado borne of dedication, genius and cautious enthusiasm. **(Author's abstract)**

Genetics. Human genome. Human cell. Genomics.

- 0476 "SDS-PAGE-IEF as a versatile technique for mapping genetic markers in screening subjects with predisposition to genetically-determined diseases"
 . Angeles, Leticia T.. **Acta Medica Philippina** , 17(4):111-116

Sera and red blood cell membranes from a patient afflicted with Systematic Lupus Erythematosus (SLE) for the last 26 years and maintained on steroids

and the anti-inflammatory and immunosuppressive drugs, a normal male subject from Spain and a dogfish from the Cape Cod area in the North Atlantic Ocean were subjected to 1-dimensional sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) in 14 runs and the cryoglobulins from the same sera to a 2-dimensional tube gel isoelectro-focusing (IEF) and slab polyacrylamide gel electrophoresis (PAGE) (2 sets in 3 runs). Bovine serum albumin, actin, myosin lysozyme, myoglobulin and cytochrome C were used as standards and ampholines in the pH range of 3-10 and 5-7. Interesting band patterns (1 dimension slab gel) and discreet spots (2-dimensional maps) were revealed. The exact nature of such bands and spots have not been analyzed. It is hoped, nonetheless, that such patterns and maps might be of great help in routine screening of seemingly normal subjects for genetic predisposition to autoimmune diseases (and possibly other related illnesses) so that they could be warned to avoid the possible triggers that could precipitate the disease, thus saving our otherwise would-be victims from acutely fatal or a life-long battle against a chronically debilitating affliction. **(Author's summary)**

Genetics.

- 0477 In search of explant source and culture medium for generation of embryogenic tissues from *In Vitro* cultures of rice. Chico, Martha V., Desamero, Nenita V., Macabale, Sharon S.. **Transactions of the National Academy of Science and Technology Philippines**, , :294-295

Good quality embryogenic tissues are excellent explant materials for transformation work. In this study, we evaluated the *in vitro* response of various rice genotypes in different callus induction media, using different explants (mature seed scutellum and epicotyl and young inflorescence). Embryogenic calli were formed from scutellum and epicotyl of four genotypes (LX 286, IR72, IR64 1-1-4 and IR64) in two induction media (RS and RSM). Genotypic differences in callus formation, ranging from 0 to 50% was observed. The calli generated were either compact and nodular or soft, wet and nodular. Calli were formed within 11 to 27 days and 23-30 days in RS and RSM medium, respectively. The epicotyl explants were cut into top and bottom parts. Calli were formed in the bottom part of the epicotyl and in RS medium only, which varied with genotype. The sorbitol and mannitol added in the RSM medium inhibited callus formation in scutellum and epicotyl cultures.

Embryogenic tissues were also induced in young inflorescence (<1 mm) of six genotypes (IR64, IR64 1-1-4, IR64 1-3-12, IR64 1-4-6, IR641-7-7, IR64 1-7-1) in two callus induction media (MNK, P10NB). Embryogenic callus formation in 2-4, D-enriched medium (MNK), ranging from 0 to 68%, varied with genotype. Green plants were regenerated from these calli. In PAA-enriched induction medium (P10NB), tissue enlargement, direct somatic embryogenesis and plant regeneration were obtained. When transferred to regeneration medium, the enlarged tissues and somatic embryos regenerated whole plants. The success in transformation depends largely on the regeneration ability of the explant. Transformation work will be conducted using the embryogenic tissues generated in PAA-enriched medium as explants. **(Author's abstract)**

Inflorescence. Epicotyl. Scutellum. Somatic embryos. Genetics.

GEOLOGY

- 0478 Comparison of pollen assemblages at different heights of sampling. Bulalacao, Lolita J.. **Acta Medica Philippina**, , 21(4):140-143

Sampling was conducted at 2 meters and 6 meters in Las Pinas and at 19 meters in Manila to study variation of pollen types and counts with height. The similarity relations were expressed mathematically using Jaccard's and Gleason's indices of similarity. Analyses of cases indicated that the relative percentages of the more common and unique pollen types caught at 2 meters were the same as those caught at 6 meters and those caught at 6 meters were the same as in Las Piñas caught approximately the same proportion of common and unique pollen types but not necessarily the same kinds. **(Author's summary)**

Geology.

- 0479 Pollen survey in Baguio City in 1984. Bulalacao, Lolita J.. **Acta Medica Philippina**, , 21(2):51-53

The incidence of pollen pollution prevailed roughly for four months in Baguio City. During the months of January and February there is heavy pollen pollution also indicates that in July and December prevalence is at its maximum.

Pollen incidence in the atmosphere can be attributed to large quantities of Benguet pine pollen and Japanese alder pollen.

The results indicate that allergenic individuals are subjected to comparatively short heavy pollen pollution periods. When the pollution level goes beyond the annual mean it is standard practice for allergists to advice their patients to take the necessary precautions. **(Author's summary)**

Geology.

HEALTH AND WELLNESS

- 0480 An assessment of re-infection rates and treatment outcomes of patients with pulmonary paragonimiasis. Belizario, Jr., Vicente Y., de Leon, Winifreda V., Bugayong, Mark Philip G., de Guzman, Antonio D., Valderama, Maria Theresa G.. **Research Journal**, , :10-19

Pulmonary paragonimiasis or lung fluke infection is a food-borne parasitosis that is acquired by ingestion of raw or insufficiently cooked fresh water crabs. If left undiagnosed and untreated, this can lead to a severe and disabling disease that reduces human productivity and quality of life. The presence of an Integrated Tuberculosis-Paragonimiasis Surveillance Program in the municipalities of Casiguran and Irosin in Sorsogon may not be enough in trying to control this public health problem. Data on finer points such as re-infection rates are still lacking. This information is especially relevant considering that people living in endemic areas may not necessarily alter their food preferences and eating habits easily even with a proven bout with lung fluke infection. In addition, there are no local studies about the extent of clinical and parasitology responses to praziquantel therapy, amidst reports of non-response to treatment. A follow-up survey was conducted in the municipalities of Irosin and Casiguran which gave special attention to these issues. Results showed that overall infection rate did not significantly differ from previous levels found in surveys done in 1997-1998. Also, in patients with past history of paragonimiasis, 11.5% were again found positive for lung fluke ova. Non-clearance for parasite eggs even after treatment was also seen in some patients. Our survey gathered valuable data that may help justify the need for follow-up and for better health education and promotion strategies that will prevent subsequent exposure and eventual disease, and probably, in the evaluation of existing treatment guidelines.

Health and wellness. Pulmonary paragonimiasis. Lung fluke infection. Food-borne parasitosis. Re-infection rates.

0481 Helminth zoonoses in the Philippines. Eduardo, Salcedo L.. , , :105-119

A number of helminth zoonoses have been recorded in the Philippines and majority of these is transmitted through the food. This include echinostomosis, artyfechinodtosis, heterophydosis, carneophalosis, paragonimosis, opisthorchiosis, fasciolosis, taeniosis/cysticercosis, spirometrosis/sparganosis, gnathostomosis, intestinal capillariosis, angiostrongylosis and anisakiosis. The causative agents involve, animal hosts, human infections with these diseases and their distribution and transmission are discussed.

Taenia saginata asiatica is recently recognized as the one of the two causes of human taeniosis in the Philippines. Previous reports locally of *Taenia saginata* were in fact of *Taenia saginata asiatica*, thus data for the former are now referable to the latter. The pig and its liver serve as the intermediate host and organ predilection site of the cysticercus (larval form), respectively for this species. Accordingly, meat inspection of slaughter pigs should now include the examination of the liver and not only of the muscles as currently practiced. The mudfish, *Channa striata* (dalag) is recently recorded to harbor the larva of *Gnathostoma doloresi*. Human infection with the nematode may occur through ingestion of improperly cooked infected fish.

While some of these zoonotic diseases are now rarely observed, still others continue to be public health problems. Many are endemic in certain areas of the Philippines because of the food habit of consuming raw or partly cooked fish, edible snails and crustaceans and meat in these areas.

More studies on the epidemiology and transmission, including the animal hosts involved locally, are still needed for some of these problems. Changing the eating habits and practices can prevent human infection with many of these diseases. Proper disposal of fecal materials from both man and animals can also help control or if not cut the life cycle of many of these infectious agents. These however require aggressive health education campaign in order to be successful. **(Author's abstract)**

Health and wellness. Helminth zoonoses. Helminth. Taenia saginata asiatica. Zoonotic diseases. Taeniosis .

- 0482 The Metro Manila development screening test (MMDST). Williams Phoebe D.. **Acta Medica Philippina**, , 17(1):28-30

With the norms available, the test materials and procedure standardized, it is now possible to use the test for screening purposes. End-users are envisioned to be health-professionals (nurses, doctors, and allied workers) as well as those involved in early childhood education (nursery and kindergarten teachers). The ultimate aim in view is that Filipino children with developmental delays be detected early so that guidance of parents for home enrichment purposes may be made; or otherwise, an early referral is done for full diagnosis and therapy. **(Author's summary)**

Health and wellness.

INDUSTRY

- 0483 An analysis of the structure of the Philippine retail food industry. Digal, Larry N.. **Philippine Journal of Development**, , 28(1):13-54

The enactment of the Retail Trade Liberalization Act of 2000 (RA 8762), which liberalizes the Philippine retail trade business, was not based solely on the overall thrust of the government to pursue market-oriented policies. It also stemmed from the observation that the sector lacked competition. Large retailers, particularly supermarkets, continue to displace sari-sari stores and are alleged to exercise market power, such as that enjoyed by the food manufacturers. This paper examines the structure of the retail food industry and analyzes the demand and supply factors and government policies affecting the industry. It argues that while there is some evidence supporting allegations of market power in the retailing and manufacturing sectors, it appears insufficient. Thus, there is a need to test these allegations empirically.

Industry. Food industry.

- 0484 Handloom designs and weaving techniques in the Philippines. Hayin, Jovita A.. **Samay**, ,

Handloom weaving is one of the leading handicraft industries in the Philippines. Different regions and ethnic groups use their own kind of loom, raw material, fabric design, and weaving techniques, which are carefully considered in selecting the appropriate loom. This paper presents the different loom designs used by the handloom industry in the country, their advantages and disadvantages, unique characteristics, and limitations. These considerations could be a basis for future improvement and other innovations toward the context and dynamic evolution of the looms, in particular, and handloom weaving in the country, in general.

Industry. Textile. Handloom designs. Weaving techniques.

INFORMATION AND COMMUNICATIONS TECHNOLOGY

- 0485 Computers-their growth and meaning for man. Varela, Miguel Ma.. **Philippine Engineering Journal**, , 4(1):169-176

This paper will discuss the state of computer technology in the country, guidelines on the use of computers for the improved welfare of society, and some observations regarding the use and application of computers in Third World countries.

Information and Communications Technology. Computer technology. Educational technology. Microelectronics. Telecommunications.

- 0486 Deconstructing the Philippines for the knowledge era. Macaranas, Federico M.. **Transactions of the National Academy of Science and Technology Philippines**, , :3-20

Philippine productivity has deteriorated absolutely over the past four decades and relative to those of its regional competitors in the global economy. A comparative study of other reason behind the decline in the Philippine competitiveness over the last decades vis-à-vis the larger global market suggests a key catalytic role of information and communication technology (ICT); data used are from the annual global survey conducted by the Institute for International Development in Management (Switzerland) in which AIM's W. Sycip Policy Center is a partner institute.

Given their potential contribution to production and productivity in the aggregate services sector (whose share in gross domestic product has been increasing), a few niche markets in the ICT areas are analyzed. The paper finally discusses key international policy issues in the knowledge era where the Philippines can define a more pivotal role, such as those related to the creation of technology-driven human talent intermediation systems for the new economy; in part, it is inspired by the brain flow which the Philippines has contributed to many corners of the world economy but which it can further harness in the information age using both codified and tacit knowledge.

(Author's abstract)

Information and Communications Technology. Knowledge. ICT.

LIVELIHOOD

- 0487 The impact of juvenile and molting hormone analogues on silk quality of silkworm, *Bombyx mori* L Fed on mulberry leaf and artificial diet. Bharathi, D, Yungen, Miao. **Philippine Journal of Science**, , 129(2):125-130

The impact of juvenile hormone analogue, methoprene, molting hormone analogue, MH-III (phytoecdysone) and combination of methoprene and MH-III on silk quality was studied in two bivoltine hybrids viz., Jufang (Chinese)xChenxin(Japanese) and ChenxinxJufang during autumn season.

The filament length, non-breakable filament length and reelability percentage were increased over control when treated with methoprene, MH-III and combination of methoprene and MH-III. The filament weight was increased in the batches treated with methoprene, and combination of methoprene and MH-III, But the administration of MH-III showed significant decrease in the filament weight over control. The denier and size deviation were decreased significantly in the treated batches over control. The results suggest that improvement in reeling parameter lead to high grade silk which has more demand in the international market.

The effect of JH and MH-III showed increase in post-cocoon parameters in silkworm fed on mulberry leaf when compared to silkworm fed on artificial diet. The post-cocoon parameters were found to be superior in bivoltine hybrid CheninxJufang when compared to Jufang xChenxin. The application of insect hormone analogues has stimulatory effect on silk quality which has much significance in the reeling industry. **(Author's abstract)**

Silkworm. *Bombyx mori* L. Methoprene. MH-III. Denier. Reelability. Livelihood.

MARINE SCIENCE

- 0488 The identification and application of a yeast lipase for the bioorganic synthesis of (S+) -aryl propionic acid from racemic precursors. Andaya, Eleanor Rio C., Peralta, Milagros M., Revilla, Ma. Jamela R.. **Transactions of the National Academy of Science and Technology Philippines**, , :378-379

the move to go in the direction of single isomer synthesis is gaining popularity since this will result in greater efficacy, faster relief and reduced toxicity. The present study aimed to identify an approach to synthesize single enantiomerchiral aryl propionic acid, ibuprofen, a model compound for non-steroidal anti-inflammatory drugs through a process known as enzymatic

kinetic solution.

Four strains of *Candida*, the species first reported in the literature to exhibit enantiic selectivity in bioorganic reactions, were screened for hydrolase activities. An extracellular lipase from *Candida clausenii* exhibited the highest lipase activity of 312 U/mg and was chosen for the study. Production of the crude enzyme was optimized at pH 6.5 and 40°C. The enzyme was partially purified through DEAE anion exchange chromatography, eluting at 0.2 M NaCl. This resulted in an 11 fold increase in lipase specific activity when compared to the crude extract. SDS-PAGE analysis of the fraction indicated the presence of two protein bands at 59 and 67 kD, respectively. When used to catalyze hydrolysis of the synthetic ibuprofen buty ester, an apparent S(+) enantioselectivity, due to production of S(+) acid, was observed after HPLC analysis of the hydrolyses on a chiral column, S, S-Whelk-01 chiral column. With methyl ester as substrate, no products resulted. The crude extract also showed preference for the S(+) enantiomer, the fast acting desired isomer, but peak intensity was low compared to the 0.2 M fraction, emphasizing the importance of protein purification to select for the isoform that acts on the desired substrate. **(Author's abstract)**

Lipase. Yeast. Enantioselectivity. Enantiomer. Chiral.

- 0489 Isolation, purification and partial characterization of cocosin. Garcia, Roberta N., Tecson-Mendoza, Evelyn Mae, Baldiviano, Perla F., Laurena, Antonio C.. **Transactions of the National Academy of Science and Technology Philippines**, , :380

The major protein of the coconut endosperm is cocosin, one of a large class of seed storage proteins known as 11S globulins. This study aimed to isolate, purify and characterize the cocosin, an essential requirement in cloning and characterizing its gene.

Cocosin was isolated and purified by salt extraction (0.35 M NaCl), Fast Protein Liquid Chromatography (FPLC)-gel filtration using Hiload 26/60 Superdex 200TM column and FPLC-anion exchange chromatography with RESOURCE Mono QTM column. The native molecular weight of cocosin was estimated to be 326000. Electrophoretic analysis revealed one set of 2 closely migrating bands at approximately 34,000 (acidic polypeptides) and another set of 2 bands at 24000 (basic polypeptides). Each set consisted of one darkly stained band and one lightly stained band. Preliminary N-terminal amino acid sequencing of the 34kD protein band gave the following sequence. SVRSVNEFRXE.

Cocosin was readily extracted by 0.35 M NaCl. In the absence of β -mercaptoethanol, the 55kD band representing the complexed subunit species was heavily stained indicating the presence of disulfide linkages in the molecule. All the bands tested positively for the presence of carbohydrate moieties using periodic acid-Schiff's reagent. Quanti-Scan analysis showed that cocosin comprised 80% of the total globulins. **(Author's abstract)**

Coconut. 11S globulins. Cocosin.

- 0490 Metabolism of a Northwestern Philippine Coral Reef flat measured at two spatial scales. Yap, Helen T., Dizon, Romeo M., Montebon, A. Rex F.. **Philippine Journal of Science**, , 128(3):211-223

In order to determine whether the scale of measurement of primary production and respiration in a coral reef has an effect on the result, a direct comparison of open flow and enclosure techniques was carried out in a tropical coral reef flat. The spatial scales concerned were hundreds of square meters versus square centimeters, respectively. Using open flow methods, the reef flat was found to have a net positive primary production during the day, and respiration at night, conforming to what has been established for these systems. Metabolic rates measured with both techniques were closely similar, indicating that artifacts possibly introduced by the enclosure method were negligible. With the enclosure technique, however, it was possible to detect discrete differences among substrates (coral, rubble and sand), as well as specific responses to environmental factors such as light, temperature and salinity. On the other hand, measurements using open flow techniques yielded a greater variability in rates so that significant effects of environmental factors were not evident on the larger scale. However, differences in reef metabolism between the dry-cool and wet seasons which the enclosure method failed to detect were shown to be significant using results derived from fixed station respirometry. It is clear that measurements at the larger scale (open system) encompass more factors and processes than do those at the smaller scale (enclosure). Results obtained using the latter, however, are more precise and replicable, and help to explain the more complex patterns that emerge at the broader system level. **(Author's abstract)**

System metabolism. Enclosure method. Primary production. Open flow respirometry. Marine science.

- 0491 Mode of action of isoquinuclidine alkaloids from tropical yam, *Dioscorea hispida* SCHLUSSEL against rice armyworm, *Pseudaletia separata* larvae. Banaag, Alexie B.. **Transactions of the National Academy of Science and Technology Philippines**, , :377

Alkaloids have been studied intensively because of their medicinal importance and great diversity of structure and pharmacological activity.

This paper reports the effect of two alkaloids (dioscorine and dioscorine N-oxide) on the behavior of rice armyworm, *Pseudaletia separata*.

Several chemical components isolated from the rhizome of tropical yam, *Dioscorea hispida* have been found to have insecticidal and antifeedant activities to insect. Nothing is known about the mechanism of action of the isolated chemical of this tropical plant.

The behavioral effects of chemical components such as dioscorine and dioscorine N-oxide were examined against rice armyworm, *Pseudaletia separata*. The effects of the two alkaloids were compared to synthetic

insecticides such as cartap, dichlorvos, and nicotine.

Isolated chemicals from *Dioscorea hispida* (dioscorine and dioscorine N-oxide) were found to have depressive effects against rice armyworm. These effects were similar to those of larvae treated with cartap. Hyperactive symptom was observed in dichlorvos and nicotine-treated larvae but not in larvae treated with the two alkaloids. **(Author's abstract)**

Dioscorea. Armyworm. Pseudaletia. Isoquinuclidine. Alkaloids.

- 0492 A new alkaloid predicted as intermediate in the biogenesis of the *Pandanus* alkaloids from *Pandanus amaryllifolius* ROXB.. Lopez, Daisy, Ichikawa, Tomotake, Takayama, Hiromitsu, Kitajima, Mariko, Aimi, Norio, Nonato, Maribel G.. **Transactions of the National Academy of Science and Technology Philippines**, , :377-378

Mature leaves of Marikina grown *Pandanus amaryllifolius* Roxb. collected quarterly throughout the year 1999 yield crude alkaloid fractions of similar TLC profile. Alkaloids were detected in the dichloromethane, and n-butanol fractions obtained after extraction of the crude extract with solvents of different polarity (Hexane, dichloromethane and n-butanol). After a series of chromatographic purification, the dichloromethane yield five alkaloids.

A mid-polar alkaloid from the DCM fraction which was further purified by MPLC gave ^1H and ^{13}C NMR spectra identical to the secondary amine intermediate proposed in the biomimetic synthesis of Pandamarilactonine-A and -B [1]. These two alkaloids together with Pandamarilactone-1 [2] were also found in the dichloromethane fraction. Further 2-D NMR spectra of the secondary alkaloid confirmed its structure. This secondary amine is predicted biogenetically to be the possible intermediate of the reported *Pandanus* alkaloids. **(Author's abstract)**

- 0493 Non-alkaloid components detected in tropical yam, *Dioscorea hispida* SCHLUSSEL. Banaag, Alexie B., Honda, Hiroshi, Matsuyama, Shigeru, Matsuda, Kazuhiko. **Transactions of the National Academy of Science and Technology Philippines**, , :376

Chemical analyses and structural elucidation of the naturally occurring active chemical components are very important for finding application, directly or as lead compounds or as new pest control agents.

Extracts of non-alkaloids were prepared by extracting the rhizomes of *D. hispida* with methanol, concentrated and re-extracted with ether. The ether extract was then concentrated by the same procedure above and subjected to open column chromatography eluted with different solvents. Mass spectra of non-alkaloid fractions were analyzed by 5890 Series II Plus Gas Chromatography and M-80B High Resolution mass spectrometer (in direct inlet mode).

Non-alkaloid chemicals from *Dioscorea hispida* which significantly controlled the activities of insect pest, *Plutella xylostella* L. (DBM) were identified. These activities affects insect's behavior as feeding deterrents, inhibitors of growth and development, and are also toxic against DBM Larvae.

These non-alkaloid chemicals were identified to be phthalate (compound 1), and unsaturated fatty acids (compounds 2 and 3). **(Author's abstract)**

Dioscorea. Non-alkaloid. Plant extracts. Diamondback moth. Unsaturated fatty acids.

- 0494 Reef check data reveal rapid recovery from coral bleaching in the Mamanucas, Fiji. Harding, Simon P., Solandt, Jean-Luc, Walker, Ryan C.J., Walker, Dianne, Taylor, Jessica, Haycock, Simon, Davis, Melanie T., Raines, Peter S. **Silliman Journal**, , 44(2):81-99

Twenty two fringing reef sites within the Mamanuca Islands, western Fiji were surveyed during 2001 and 2002, using Reef Check methods. A mean increase of 14.3% in hard coral cover was recorded over the 12-month period. This increase in hard coral cover suggests a significant recovery of scleractinian coral colonies that were originally impacted by the 2000 mass bleaching episode in the South Pacific. The event was reported to have caused >80% coral mortality in the southern and eastern regions of Fiji. Between 2001 and 2002 the coral reefs of the Mamanucas progressed from

Marine science. Reef check. Coral bleaching. Mamanucas, Fiji.

- 0495 Spill-over effects of a community-based marine protected area:. Ledesma, Gerardo L., Dacles, Terence, Raines, Peter S., Solandt, Jean-Luc, Beger, Maria, Harborne, Alistaire R., Harding, Simon P., Lizaris, Juny **Silliman Journal**, , 44(2):61-80

The Philippine Reef and Rainforest Project (PRRP) began in 1995 as a collaborative project between the Philippine-based NGO, the Philippine Reef and Rainforest Conservation Foundation Inc. (PRRCFI), and the UK-based NGO, Coral Cay Conservation (CCC). The initial aims of the project were to gather information on the natural resources of Danjungan Island, facilitate training in scientific survey techniques and eco-tourism related professions, and to provide comprehensive coral reef education to schools and local communities. The results of scientific surveys carried out by CCC volunteers and PRRCFI staff between 1995 and 1999 led to the establishment of the Danjungan Island Marine Reserve and Sanctuaries (DIMRS) as a statutory marine reserve under the Philippine provincial law in February 2000. Interest in the reserve has filtered through to communities beyond Danjungan and the work expanded to mainland Negros to survey two further municipalities through another project, the Southern Negros Coastal Development Project (SNCDP), between 1998 and 2001. The positive influence of the DIMRS has led local barangays to develop their own voluntary marine reserves with the technical assistance of PRRCFI staff. Dive surveys in southern municipalities between 1998 and 2001 have provided information on four more proposed marine reserves. Effective long-term community-based education and training, coupled with the provision of alternative livelihood capacity, has resulted in the

success of the project near to source, at Danjugan Island, and within the municipality of Cauayan, Negros Occidental. However, the impact of the overall project is reduced in areas further to the south of Negros Occidental as a likely result of limited resources.

Marine science. Danjugan island marine reserves and sanctuaries. Community-based marine protected area. Spill-over effects.

- 0496 A survey of corals found in Siasi, Sulu. Que, Jr., Samson O. , Sulit, Sylvia Y. . **Research Journal**, , 10(1):11-17

The survey was conducted in Siasi, Sulu from December 21-30, 1985 for a duration of ten days, in order to obtain some data of the species which may prove to be significant and beneficial to us. The survey was conducted in two collecting stations the Hambilan Beach and the Siganggang Beach respectively. The said selected stations in the place yielded a total of twenty different coral species. Keys to species as well as the morphological descriptions, distribution as well as generic groupings and illustrations of species are specifically presented.

Marine science. Corals. Morphological descriptions, distribution, generic groupings and illustrations of species.

- 0497 A survey of marine benthic algae in selected areas of Zamboanga City. Madamba, Ma. Luisa A., Miole, Dennis. **Research Journal**, , 10(1):8-10

This is a survey of marine benthic algae conducted in three months in certain areas of Zamboanga City. The survey yielded a total of twenty-three marine benthic algae species, eleven of which are green, nine are red and three are brown.

Marine science. Marine benthic algae.

MATHEMATICS

- 0498 The pre-algebra course:. Mamhot, Millard R., Mamhot, Alice A., Kilat, Kemmons S.. **Silliman Journal**, , 48(1):101-116

One reality in our educational system is that a sizable number of our high school graduates are not prepared for college and a good portion of this are under-prepared to take regular college mathematics courses. A survey conducted in one of the state universities in Central Visayas, Philippines in school year 2004-2005 showed that about 90% of its college entrants have a hard time doing elementary operations on fractions, decimal, and percent. One resulting recommendation was that a bridge program be set up for these

students. A subsequent study by Kilat (2006) noted five variables that most likely relate to students' grade in College Algebra: HighSchool General Average (HSG), High School Mathematics Grade (HSM), Silliman University Admission and Placement Examination (SUAPE) Score, SUAPE Math component score (SM), and College Algebra Grade (CAG) is strongly correlated with HSG and SM. The linear regression model with Durbin-Watson d statistic of 2.16 showed that $CAG = 0.076HSG + 0.073SM - 6.23$. With this equation, a desired CAG can be set to a certain value and the values of the other two variables may also be computed. A flowchart was drawn to aid the university admission office in identifying students who need to take the pre-algebra course. Three semesters after its implementation, the percentage of those who obtained below average and failure significantly decreased from 39.77% to 29.67%. It is recommended that schools who wish to set up a bridge program for their incoming first year students adopt this method or a variation of this method according to the nature of their admission policy. If a school does not intend to put up a bridge program for their regular mathematics courses, it is suggested that students still be grouped according to their mathematical abilities in order to lighten the teacher's task of managing the classroom and diversifying one's approach to maximize effectiveness in transmitting mathematical knowledge to students.

Mathematics. Bridge program. Pre-algebra course. Under-prepared college entrants.

MEDICINE

- 0499 Angiolymphoid hyperplasia with eosinophilia. Guirnela Edwin, Coronel-Pastolero, Gemma **Acta Medica Philippina**, , 21(2):63-65

Seven (7) cases of angiolymphoid hyperplasia with eosinophilia were seen at the Surgical Pathology Section of the UP-PGH spanning a 3-year period. Clinical and histologic data were presented and compared to other series reported in literature. Minor variations were noted such as location and correlation with the age of the lesion. **(Author's abstract)**

Medicine.

- 0500 Anti-blood coagulant activity and hypocholesterolemic property of Philippine Carrageenan. Briones, A.V., Ambal, W.O., Estrella, R.R., Lanto, E.A., Sison, F., Villanueva, M.A.. **Philippine Journal of Science**, , 129(2):85-91

The anti-coagulant and hypocholesterolemic properties of Philippine carrageenan were studied. *Kappa* and *iota* type carrageenan were recovered from *Eucheuma* species while *lambda* type carrageenan was extracted from *Halymenia durvillaei*, Bory de Sainte Vincent. The three types of carrageenan used in this experiment conformed with the specifications set by USP XXII (1990). The acute oral toxicity test (LD_{50}) for *kappa* and *iota* carrageenan is 10.6610 ± 0.1514 g/kg. The *lambda* carrageenan administered orally to male Swiss mice, at a high dose of 15 g/kg, did not cause death in the test animals.

Lambda carrageenan effected significant higher anti-blood coagulant activity (*in vitro*) than *kappa* and *iota* type.

The influence of the administration of carrageenan by different modes in rats were determined against the coagulation time of blood. By intravenous route, its effect was instantaneous while intra-peritoneal route recorded a time of 4.339 minutes. Subcutaneous administration recorded a time of 2.73 minutes.

No traces of deactivated carrageenan were detected in the blood of rats 30 minutes after injection.

A 3.0% concentration of *iota* carrageenan added to the specially prepared diet showed an 11.68% decrease in cholesterol level in rats after feeding them for 4 to 6 weeks. *Lambda* carrageenan elicited 1.95% decrease in cholesterol level after 2 to 6 weeks feeding. An increase in weight by 14.73% to 20.17% was observed in rats fed with the three different types of carrageenan. **(Author's abstract)**

Anti-blood coagulant. Hypocholesterolemic. Kappa carrageenan. Iota carrageenan. Lambda carrageenan. Medicine.

- 0501 On atherosclerosis and diseases of "degeneration". Dayrit, Conrado S.. **Transactions of the National Academy of Science and Technology Philippines**, , :163-177

Twenty-five years ago, in 1876, when this Academy was formed, atherosclerosis or hardening of the arteries was believed to be caused principally by saturated animal fats. This came to be known as the Lipid Theory of Anitzkov who produced atherosclerotic lesions in rabbit aortas by loading their diet with fat and cholesterol. Today, 25 years later, while cholesterol and saturated fats are still of causative importance, we know so very much more about this disease – its predisposing, exciting exacerbating and propelling causes, its mechanisms of progression and termination – that even if we may not have yet succeeded in completely controlling it, we have an armamentarium of remedies now available to slow its progress with even more promising remedies soon, we hope, to be available. These advances in knowledge of atherogenesis and "degenerative" conditions like arthritis and diabetic complications will be recounted in this paper. The basic underlying processes are genetic (Inheritance), Infection, Immunology, and Inflammation – the I's of Human Diseases. **(Author's abstract)**

Medicine. Atherogenesis. Armamentarium. Genetic. Anitzkov. Degeneration.

- 0502 Bioceramic orbital plate implant. Reyes, J.P., Celorico, J.R., Dela Cuesta, L.C., Filo, J.M., Daan, L.G., Bernardo, S.T., Abano, J.. **Philippine Journal of Science**, , 129(2):93-99

Porous biphasic calcium phosphate bioceramic orbital plate implant consisting of about 77% β -TCP and 23% HAp was developed as a low cost alternative to commercially available orbital plate implant. The pore size of the material, which is 198 microns, contributed to the early fibrovascular ingrowth

into the pores of the plate implant. Twelve (12) orbits of six (6) adult domestic cats underwent orbital plate implantation. Results of biocompatibility tests show the excellent potential of the developed bioceramic orbital plate implant for orbital floor fracture reconstruction. It is biocompatible, allows vascularization, resistant to resorption, and has proven to have physiological bone induction as well as bone conduction properties. **(Author's abstract)**

Bioceramic. Orbital plate implant. Bone induction. Bone conduction. Hydroxyapatite. Biphasic. Medicine.

- 0503 Cancer of the maxillary antrum. Abes, Generoso T., Chiong, Armando T. **Acta Medica Philippina**, , 17(4):121-126

A review of thirty (30) cases of primary carcinoma of the maxillary antrum seen at the Department of Otorhinolaryngology, Philippine General Hospital over a five-year period is presented. Most of these patients were seen in the advanced stage of the disease. The paper discusses urban symptoms which will give the clinician clues in the early detection of maxillary cancer. Also we believe that a surgical exploration of the maxillary antrum is justified whenever malignancy is highly suspected. **(Author's summary)**

Medicine. Cancer. Maxillary antrum.

- 0504 Chronic sinusitis in pediatric patients with chronic respiratory symptoms in the out-patient department of PGH. Quitain, Grace Ann B., Sumpaico, Madeleine W.. **Postgraduate Pediatrics**, , 12(1):25-31

OBJECTIVE:

1. To determine the risk factors associated with the presence of chronic sinusitis in patients with chronic respiratory complaints.
2. To determine if a group of common signs and symptoms exist among these patients.
3. To determine the prevalence of chronic sinusitis among these patients.

STUDY DESIGN: Cross-sectional study

POPULATION: Patients from 2-17 years old with complaints of upper respiratory tracts symptoms for at least 3 months.

SETTING: Sick Child and Pediatric Allergy Clinics of the Out-Patient Department of PGH.

METHODS:

Patients seen from April to August 31, 1995 were interviewed and underwent allergy skin testing, upright Waters view, and serum IgG and IgA levels. The x-rays were read by a single allergy fellow. The blood samples

were examined at the Immuno-MRL laboratory of UP-PGH.

Chronic sinusitis was defined, according to the criteria proposed by Shapiro and Rachelefsky.

Data analysis was done by chi-square, relative risk determination with 95% confidence interval estimation, and multiple regression analysis.

RESULTS

Forty five new patients, 53% females and 47% males with mean age of 9.6 + 3.4 years were included in the study. The mean duration of symptoms was 2.7 + 2.6 years. Seventy one percent had positive skin tests. 68.9% has a family history of atopy, and 26.7% had a history of chronic asthma. Single sinus involvement was more frequent in the younger age group.

Wheezing was the only respiratory symptom found to have significant relative risk at 1.56 (95% CI: 1.22, 2.00). Among the possible risk factors, family history of atopy in the univariate analysis was found to be significant (RR = 4.17, 95% CI, 1.05, 16.48). However, both were not significant in the multiple regression analysis.

CONCLUSION:

Wheezing and family history of atopy were found to be significantly associated with sinusitis in the univariate analysis. However, in the multiple regression analysis, they were both not significant. In this study, 71% of pediatric patients with chronic respiratory complaints had chronic sinusitis which was higher than previous foreign studies. **(Author's abstract)**

0505 Clinical features of allergic rhinitis cases seen at UP-PGH medical center, allergy section. Agbayani, Benigno F., Roxas, Jerry, Aquino, Catalina. **Acta Medica Philippina**, , 17(4):127-136

One hundred forty-four (144) subjects with allergic rhinitis showed that 63.8% were females and 36.22% were males. The group between ages 15-29 years was the age group most affected with allergic rhinitis. This is the age group also when majority of patients developed the initial allergic symptoms.

Fifty nine percent (59.03%) were single, while 39.58% were married. Social classes 3 and 4 were where the majority of the cases clustered.

Bronchial asthma was the single allergic disease mostly associated with allergic rhinitis in almost 50% of the cases. About fifty-five percent were positive for family history of allergy and 44.44% denied or could not recall any family history of allergy. Symptoms occurred any time of the day in most cases (47%) and occurred perennially in 25% of cases. Seasonal occurrence during the months of January, February, November, and December had been noted. Sneezing, pruritus nasal stuffiness/congestion, lacrimation, and rhinorrhea were the most common symptoms complained of by patients. Other symptoms such as post-nasal drip, pain in the ear, itchy throat and headache were also

complained of but were also the usual complications of allergic rhinitis.

Changes in temperature which coincide with the colder months from November to February was the most common triggering factor incriminated by patients to have caused the symptoms in about 75% of cases.

The antigens which gave the most significant reactions of intradermal skin test are as follows: (in order of their significance)

1. Housedust Feathers and Kapok (Household Inhalents), 2. Pigweed, Tridax procumbens, and Makahiya (Weeds), 3. Yardgrass, paragrass, amor seco, and Bermuda grass (Pollens), 4. Fusarium and Aspergillus (Molds) and 5. Mango and Pine Tree (Trees) **(Author's summary)**

Medicine.

- 0506 Clinical features of atopic dermatitis cases seen at UP-PGH medical center, allergy section. Agbayani, Benigno F., Tiangco-Torres, Nila, Mendoza, Doris, Aquino, Catalina. **Acta Medica Philippina**, , 17(4):137-142

Twenty-three patients with a diagnosis of atopic dermatitis were studied with age range from 1 month to 15 years. Thirteen were females and twelve were males. The age of onset occurred at ages between 1-5 years. Hypopigmentation and papulovesicular lesions were the presenting symptoms. The cheeks (face), extensor and flexor areas were the predilection sites in the majority of patients. Food was a common culprit causing the flaring of eczema but majority of patients were unsure. Subjects in about half of those studied had associated allergic disease usually with bronchial asthma and allergic rhinitis. Chocolate and cow's milk were important allergens showing significant reactions on scratch test. **(Author's summary)**

Medicine.

- 0507 Clinical field trials of broad spectrum anthelmintics against soil-transmitted helminthiasis. Cabrera, Benjamin D., Valdez, E.V., Go, T.G. **Acta Medica Philippina**, , 17(1):31-35

Clinical trials on the three broad spectrum anthelmintics against trichuriasis, ascariasis and hookworm infections were done in a rural community in Irosin, Sorsogon. Flubendazole (Fluvermal) appears to be a promising drug against trichuriasis particularly when periodic mass treatment of a community is carried out. Mebendazole (Antiox) also appears to be promising given as single dose during mass treatment of soil-transmitted helminthiasis. As shown in previous studies by the senior author, oxantel-pyrantel (Quantrel) should be given at 15 mg/kg body weight at 12 hour intervals or 20 mg/kg body weight single dose rather than 10 mg/kg body weight in a single dose when treating trichuriasis. **(Author's summary)**

Medicine.

- 0508 Clinical limb replantation. Recto, Rafael S., Silao, Jose V., Sangalang-Tacata, Ida, Tanbonliong, Severino L.. **Acta Medica Philippina**, , 21(3):99-102

It is not the purpose at this point in time to make an in-depth analysis of the seven cases that under went replantation procedures but rather to report on the following.

1. The, Philippines, although behind by twenty years in successful limb replantation, thru the Department of Orthopedic UPCM and the Philippine General Hospital has shown the way to a bright future of microsurgery as applied to limb replantation.

2. The Foundation for the Advancement of Orthopedics and other Sciences Inc. has under written the financial requirements of the replantation team.

3. The fundamentals of microsurgery applied to limb replantation is now available to the medical undergraduates and postgraduate trainees who are interested in this field. **(Author's summary)**

Medicine.

- 0509 A comparative study of the safety and efficacy of terfenadine in perennial allergic rhinitis. Agbayani, Benigno F., De Guzman, Fita, Roxas, Jerry. **Acta Medica Philippina**, , 17(4):143-151

Thirty-five patients with a primary diagnosis of an acute exacerbation of perennial allergic rhinitis were evaluated to assess the efficacy of terfenadine, 60 mg. b.i.d., versus placebo, b.i.d. The number of patients evaluable for efficacy is too small to allow statistical analysis. Moreover, despite randomization there is uneven distribution between treatment groups. As is often the case with antihistamine studies, the placebo response is high. Nevertheless, the percentage of patients experiencing some degree of relief of symptoms with terfenadine therapy (86%) is greater than that with placebo (77%).

The incidence of adverse reactions observed was unremarkable. Headache was the most commonly reported adverse reaction with a 13% and 15% respective incidence in the Terfenadine and placebo groups. Two patients per treatment group reported an incident of "severe" headache. **(Author's abstract)**

Medicine.

- 0510 Congenital diastasis of the inferior tibio-fibular joint. Pobre, Thomas Elias Y., Ang, Reynaldo E.. **Acta Medica Philippina**, , 21(1):31-33

A newborn boy with equinovarus deformity of the right foot was initially managed as clubfoot by gentle manipulation and serial application of plaster cast. Review of x-ray ten weeks later revealed diastasis of the distal tibio-fibular joint. History of rifampin and INH intake during the first trimester of pregnancy is elicited, but correlation with the deformity needs further investigation. Mode of treatment of previously reported cases also reviewed.
(Author's summary)

Medicine.

- 0511 Correlation of clinical depression and glycemic control in adult diabetes mellitus type 2 patients in Ospital ng Makati. Bernardo, Jonathan James G., Sy, Rosa Allyn G.. **Philippine Journal of Internal Medicine**, , 43(5):253-260

OBJECTIVES:

The general objective of this study is to determine the correlation between clinical depressions and type 2 DM. The secondary objective is to determine the prevalence of depression in adult Filipino patients with Type 2 diabetes at Ospital ng Makati.

METHODS:

All patients who consulted at the Ospital ng Makati Internal Medicine Out-Patient Department or admitted in the Medical Ward or ICU who fulfilled the inclusion criteria were screened. A total of 55 patients were seen and 33 patients were included in the study. The Zung Self-Rating Depressions Scale (Zung SDS) was used to identify depression. Patients' medical histories were gathered. Fasting blood glucose, hemoglobin A1C and cholesterol levels were measured from serum samples.

STATISTICAL ANALYSIS:

Included the use of Independent T-test, Chi² Analysis, Pearson Correlation and 2-tailed Significance.

RESULTS:

No significant association were found between blood sugar levels and the presence of depression ($p=0.474$). However, higher FBS means tended to occur with depressed patients which suggest that significant associations between blood sugar levels and depression may be more evident with a larger population. Depressed individuals presented with significantly lower LDL levels than that of non-depressed patients ($p=0.024$) and there was a significant positive correlation between HDL levels and SDS scores. There was a trend in the duration of diabetes, and the presence of diabetic complications (retinopathy, diabetic neuropathy, hypertension, and macrovascular complications). Results show that with the longer duration of diabetes, and the presence of hypertension, diabetic retinopathy, and diabetic neuropathy, there seems to be a greater number of depressed patients. The prevalence of depression in Filipino diabetic patients in Ospital ng Makati is 85%.

CONCLUSION:

Trends seen between depression and diabetic complications are consistent with findings of other clinical studies and meta-analyses where the same associations were found to be significant. No study correlating cholesterol levels with depression in diabetic patients were found to either corroborate or disprove the findings in this study, however it may be postulated that the patients' diet and coping mechanisms for depression may be associated with these findings. Further studies into the relationship of cholesterol levels and BMI with depression in diabetic patients are recommended. **(Author's abstract)**

Depression. Diabetes type 2. Complications. Medicine.

- 0512 Correlative study of blood trace elements with taste, smell and symptoms during pregnancy. Lawas, Noel D., Lawas, Irineo L., Del Castillo, Teresita, Pasamba, Reynald. **Acta Medica Philippina**, , 21(4):118-125

1. A total of 81 pregnant women in various stages of gestation are tested for taste (sweet, salty, bitter and sour) and for smell (garlic-like-odor and rubber-like-odor). All of them were also interviewed regarding the symptoms felt during their pregnancy.

2. There is a significant number of pregnant women who complained of decreased taste sensation. Objective tests done of taste sensation was indeed generally depressed for all kinds of taste.

3. On the other hand, there was a significant number of women who complained of accentuation of smell. When examined objectively, their sensation of smell was found to be mostly accentuated for both the garlic-like-odor and rubber-like-odor used as test materials, as compared to the controls.

4. Determination of trace elements (both essential and non-essential) in the blood of these pregnant women, showed no significant difference with values of the general population, except for the essential trace elements Zinc which is decreased.

5. Zinc values were low, 70% of the total pregnant women fall below the established normal range for the general population. Zinc values were low in the first trimester of pregnancy, increasing somewhat in the second, and reaching higher levels during the third trimester of pregnancy.

6. It is being proposed that Zinc deficiency could be a factor in the reduced taste sensitivity of many pregnant women leading to poor appetite and/or nausea.

7. The accentuation of smell seen in the pregnant women tested only explain the tendency of many of them to be nauseated when exposed to some odors. However, hyperosmia has so far not been described in Zinc deficiency and so further studies are needed to find some other cause for the symptom.

8. As dietary supplementation of Zinc-rich foods or a mineral supplementation of the trace element for pregnant women is being

recommended when low Zinc blood levels. **(Author's abstract)**

Medicine.

- 0513 Cryptococcal meningitis in a one month old infant. Oteyza, Edgar N.. **Acta Medica Philippina**, , 17(1):24-27

Cryptococcal meningitis was diagnosed in a one month old infant initially admitted for intracranial bleeding secondary to hemorrhagic disease of the newborn. There was a complete cure with Amphotericin B and 5-Fluorocytosine, although the baby remind hydrocephalic. The relativerarity of this disease in the pediatric age group is discussed as well as its diagnosis and treatment.

Cryptococcosis, usually in the form of a meningitis, spares no age group, but is reportedly un common in the first decade of light. Approximately 80-85% of cases are between 20-60 years of age. and more common among males. A review of the pediatric literature was done by Emmanuel et al of cases diagnosed to have cryptococcal meningitis in children less than 15 years of age up to the year 1961. They were able to find only 23 cases whose ages ranged from 20 minutes after birth to 15 years of age, most of whom were from the United States. Recently we have diagnosed and treated a case of Cryptococcal Meningitis in a 2-month-old girl. This case is reported because of its rarity in this age where it is not commonly diagnosed. **(Author's summary)**

Medicine. Cryptococcal meningitis. Infants.

- 0514 Dermatomyositis and lung malignancy. Cruz-Bermudez, Charito F.. **Philippine Journal of Internal Medicine**, , 43(5):261-266

OBJECTIVE:

To present two cases of elderly onset dermatomyositis associated with lung malignancy.

STUDY DESIGN:

Case report

SETTING:

St. Luke's Medical Center, Quezon City, a tertiary hospital

CASE SUMMARY:

Case 1 is a 65 year old male with two year history of pulmonary nodule. CT scan guided needle biopsy showed fibrous tissues with neutrophils, lymphocytes and histiocytes suggestive of chronic inflammation with fibrosis, however negative for malignant cells. Empiric anti-kochs therapy was given for

six months with stable pulmonary findings on subsequent serial chest CT scan. Seven months later, the patient developed dermatomyositis for which prednisone and hydroxychloroquine were given with noted clinical improvement. Subsequently, he developed recurrent pleural effusion. Repeat CT scan biopsy of the pulmonary nodule later on revealed adenocarcinoma for which he underwent chemotherapy using cisplatin and vinorelbin.

Case 2 is a 63 year old female who was diagnosed with dermatomyositis after a two-year history of progressive proximal muscle weakness and malar rash. Five weeks later, she developed pleural effusion with enlarged paratracheal, left hilar and subcarinal lymph nodes and several pleural based nodularities which on biopsy subsequently revealed squamous cell CA. Chemotherapy with cisplatin and etoposide was given. However, ten days after her 3rd cycle of chemotherapy, she developed intraabdominal sepsis probably from a ruptured viscus. Exploratory laparotomy was suggested but the patient refused further aggressive treatment and she eventually expired. **(Author's abstract)**

Dermatomyositis. Lung malignancy. Medicine.

- 0515 Determination of HLA antibodies in multiply transfused hematologic patients. Demontano, Sergio, Caviles, Jr., Alendry P., Padua, Florecita, R.. **Philippine Journal of Allergy, Asthma and Immunology**, , 11(1):11-16

Introduction: HLA alloimmunization results from pregnancy, blood transfusion, and organ transplantation. Whereas the role of HLA antibodies have been well studied in solid organ transplantation its' role in the morbidity of repeatedly transfused hematologic patients have not been well studied up to this time. Allogeneic blood transfusion is a crude form of transplantation. This procedure introduces a multitude of foreign antigens and living cells into the recipient that will persist for a variable amount of time. A recipient who is immunocompetent often will mount an immune response to the donor antigens, resulting in a variety of clinical consequences depending on the blood cells and specific antigens involved.

Objective: This descriptive study was undertaken to provide us a picture of HLA alloimmunization in various hematologic patients and take this opportunity to see what current literature say about the role of HLA antibodies in these group of patients.

Method: Ten patient with hematologic disorders requiring multiple transfusions were randomly selected. Their clinical and transfusion records were obtained and analyzed. HLA antibody screening assay was performed to determine presence of Class I or II antibodies by microelisa. Result were analyzed.

Result: Ten multiply transfused patients were randomly selected. Of the ten patients 5 (50%) were males and 5(50%) females. Four patients were within the pediatric age group and 5 adults. Two patients had Thalassemia, 3 Leukemias, one had a primary immunodeficiency (Wiskott-Aldrich Syndrome), 2 autoimmune hemolytic disease, 1 Myelodysplastic Syndrome, 1 Congenital Erythroid Hypoplasia. Eight (80%) of the 10 patient were found to be HLA antibody positive. Five (50%) patients were sensitized to HLA Class I and II

antigen. One was sensitized to Class I alone and two to Class II only. Except for one of those with significant level of HLA antibody, all patients were highly sensitized (>50%) to either Class I or II, 2 (20%) were negative to both Class I and II antibodies.

Conclusion: In this study, results showed that 8 out of ten patients having positive Class I or II antibodies. Although, a review of their platelet transfusions showed one patient developing refractoriness, with continuous exposure there is a possibility that later other patients may develop platelet refractoriness. This study also discussed the importance of leucodepletion in reducing the risk of alloimmunization. **(Author's abstract)**

Medicine. HLA alloimmunization. Hematologic patients. Organ transplantation. HLA antibodies.

- 0516 Diabetic neuropathies. Reyes, Erlinda T., Villadolid, Leland S., Mendoza-Salonga, Aida S., Medina, Julieta F. **Acta Medica Philippina**, , 17(3):77-83

A retrospective study of ward admissions and OPD consultations from the Department of Medicine, UP-PGH Medical Center, from January 1975 - December 1979, showed that 153 (23%) of 671 known diabetic patients complained of signs/symptoms of peripheral neuropathy, which was primarily sensory, symmetrical, distal and of the "glove-and stocking" distribution. Eight (1%) suffered from autonomic and cranial nerve mononeuropathies. Peripheral neuropathy was not significantly correlated with clinical factors such as age, sex, onset and family history of diabetes. However, a neuropathic patient was shown to be more likely an overt diabetic of more than 10 years duration and under fair control. Due to certain limitations of the study, no definite conclusions can be arrived at with respect to the association of the onset/relief of diabetic neuropathies with diabetic control and management. **(Author's summary)**

Medicine.

- 0517 Diffuse idiopathic skeletal hyperostosis and dysphagia. Apolinario, Napoleon M., Soriano, Ramon M.G., Libarnes, Roseller L.. **Acta Medica Philippina**, , 21(3):105-107

A case of Diffuse Idiopathic Skeletal Hyperostosis with dysphagia based on clinical and laboratory findings is presented. Excision of the cervical osteophyte resulted in complete relief of dysphagia. However, because the exact pathogenesis of the disease is not known and because of the patient's short period of follow-up, recurrence is a possibility. **(Author's summary)**

Medicine.

- 0518 Effect of sucrose on some physical properties of different Philippine Agars.. Romero, Jumelita B., Montaño, Marco Nemesio E., Merca, Florina A., Rumbaoa, Rowena Grace O., Villanueva,

The effect of sucrose on some gelling properties of agar extracts from six Philippine agarophytes: *Gracilaria eucheumoides*, *G. firma*, *G. salicornia*, *Gelidiella acerosa*, *Gracilariopsis heteroclada* and *Laurencia flexilis* were investigated with Bacto-agar, (Difco) as reference. Sucrose-agar gels consisted of 50% sucrose in 1.5% (w/w) agar solution. Control gels contained 1.5% aqueous agar solution. Addition of sucrose resulted in significant increase ($p < 0.05$) in the gel strength and the gelling and melting temperatures of gels prepared from *G. eucheumoides*, *G. firma*, *G. salicornia*, *L. flexilis*, *G. heteroclada* and *Bacto-agar*. On the other hand, syneresis index decreased. Similar effects were observed with *Gelidiella acerosa* agar except for its gel strength which decreased in the presence of sucrose. Chemical analysis indicated high 3,6-anhydrogalactose and low sulfate contents of agar samples. The FT-IR spectra indicated sulfation at C-4 on the galactose residues of *G. eucheumoides*, *G. firma*, *G. salicornia* and *L. flexilis* agars. These agars were classified "sucrose-reactive" based on their gel strengths which increased more than twice that of the control upon sucrose addition. **(Author's abstract)**

Agarophytes. Gel strength. Syneresis index. Sucrose-agar gel. Sucrose-reactive agar. FT-IR spectroscopy. Medicine.

- 0519 Endometrial findings in menopausal women under long-term estrogen therapy. Villadolid, Leland S., Reyes, Erlinda T., Dalmacio-Cruz, Adelaida **Acta Medica Philippina**, , 17(3):69-72

Endometrial biopsies of 50 menopausal patients under prolonged, cyclic administration of naturally-conjugated estrogen were performed. Fifty-two percent (52%) showed different stages of endometrial hyperplasia, believed to be a precursor of endometrial adenocarcinoma. Hyperplastic patients were likely to be 50 years or above, in their late menopause, on high dosage, on more than 5 years of treatment, and with abnormal uterine bleeding. **(Author's summary)**

Medicine.

- 0520 Engineering antibodies for human therapy. Padlan, Eduardo A.. **Transactions of the National Academy of Science and Technology Philippines**, , :31-37

Antibodies have many potential uses in industry and medicine. Through protein engineering, the structure of an antibody can be altered and the molecule made more efficacious for human therapy. For example, the immunogenicity of a nonhuman antibody can be reduced by 'humanization' and improvement can be made on its pharmacodynamics. In addition, new properties and reactivities can be engineered into the molecule, such as multispecificity, multivalency, greater stability, etc. **(Author's abstract)**

Medicine. Antibodies. Humanization. Immunogenicity.

- 0521 Evaluation of public relations and behavioral responses to prevention and control measures against lymphatic filariasis afflicting people living in epidemic areas in Thailand. Suppadit, Tawadchai, Pounsuk, Pukkapong, Chaikitmongkol, Suporn. **Philippine Journal of Science**, , 135(2):131-137

The evaluation was conducted in order to find ways of improving public relations for greater efficiency. Questionnaires were used for data collection. Four hundred and sixty-two residents in epidemic areas were randomly selected to constitute the sample groups. Results indicated that most respondents had never attended meeting/training programs/seminars or participated in activities/exhibits related to LF. However, they had received related information through LF prevention campaigns. People's knowledge, attitudes and adoption of practices were at moderate level. Hypothesis testing showed that: (1) settlement period was related to knowledge about LF; (2) age, educational attainment and social membership were related to attitudes toward LF; (3) age, settlement period, educational attainment, occupation and social membership were related to adoption of practices on LF prevention; (4) meeting/training/seminar attendance, participation in activities/exhibits, and receiving information through campaigns were related to knowledge about LF; (5) knowledge was related to attitudes toward LF; and (6) attitudes were related to adoption of practices on LF prevention. Ways of improving public relations were recommended as follows: (1) use public relations continuously and encourage people to participate in developing public relations media; (2) emphasize production of audio-visual and public relations media which can best draw the attention of the people; and (3) produce different forms of media tools and materials. **(Author's abstract)**

Attitude. Knowledge. Lymphatic filariasis. Mosquito. Practices. Vector-borne disease. Medicine.

- 0522 Experience with post injection quadriceps contracture. Montalban, Antonio M.. **Acta Medica Philippina**, , 21(1):9-11

Five patients with six post-injection quadriceps contractures are reported. The literature on quadriceps contracture is reviewed. An additional x-ray finding of proximal tibial lengthening is described, and guidelines for surgical treatment are suggested. From the meager data available, it is the belief of the author that intramuscular injection in general should be totally banned from medical practice, especially among infants. **(Author's summary)**

Medicine.

- 0523 Giant-cell tumor of bone. Silao, Jr., Jose V., Agcaoili, Norberto R., Nitollama, Rodolfo L., Arcilla, Gerard C., Leagogo, Liberato C.. **Acta Medica Philippina**, , 21(1):21-26

The clinical profile of twenty-nine (29) cases of giant-cell tumor of bones seen at the Department of Orthopedics, UP-PGH Medical Center over an eight-year period from January 1975 to September 1983 was reviewed.

Our series revealed a male-female ratio of 1:1.3. The age range was from 14 to 55 years with an average of 29.4 years. This lesion was more common in the third decade.

Majority of the lesions occurred near the articular ends of long bones (82.7%). The three most common sites are the distal end of the radius (24.1%). The distal end of the femur (24.1%) and the proximal end of the tibia (13.7%). other sites are the proximal fibula, distal tibia, calcaneu, mandible, vertebra, ilium, and sacrum.

The clinical and characteristics roentgenographic features are likewise presented.

The management instituted depended on the site and site of the lesion and the extent of soft tissue invasion. In 64.3%, curettage, curettage followed by bone grafting, wide excision, and resection were the methods of choice for lesions in suitable sites such as the distal ulna, proximal tibia, proximal fibula, sacrum, calcaneus, and mandible. Resection-arthrodesis with fibular bone grafting were done in two patients with lesions of the distal femur. Resection with fibular bone grafting were done into two patients and centralization of the ulna in one patient with a lesion of the distal radius. One patient with a lesion of T2 vertebra underwent laminectomy and radiotherapy.

Primary ablative surgery was performed in 31.0%. Radiotherapy was instituted in two patients with lesions of the sacrum and the vertebra after primary surgical intervention.

Local recurrence rate was 13.7%. A long term follow-up result of this series has yet to be done. **(Author's abstract)**

Medicine.

0524 Herbal therapy. de Padua, Ludivina S.. **Scientia Filipinas**, , 1(1):18-23

The disappointment in most synthetic medicine's undesirable side-effects, the prohibitive cost of drugs and medical care, inadequate health care delivery and the pressing needs of the times have led Filipino scientists to take a closer look into their cultural heritage and advance the case of herbal therapy.

Medicine. Plant histochemistry. Herbal therapy. Medicinal plants.

0525 Intertrochanteric fractures of the femur treated by Jewett nailing. Ver, Mario R., Dy, Jr., Albert. **Acta Medica Philippina**, , 21(1):13-19

From January 1979 to June 1983, a total of 48 intertrochanteric fractures were treated in the Department of Orthopedics charity service; however, only 32 charts were available for analysis. From our data, the most common

problems in the treatment of these fractures were nail protrusion and cutting out of the nail when the Jewett nailing with Dimon-Hughston technique were carried out. Also noted were myocardial infarction, pressure sores, prolonged hospital stay, subchondral penetration of nail and stitch abscesses. Our overall complication rate was very high, 46.9% and therefore, unacceptable. As most of these complications occur in the unstable type, it would appear from our analysis that we abandon Jewett nailing with Dimon-Hughston in favor of sliding nails and reserve this procedure for stable types only.

We have also analyzed the flaws in our set-up and because most of these complications are preventable, we are suggesting some guidelines which are to be strictly enforced should conditions dictate the use of this technique.
(Author's summary)

Medicine.

- 0526 Liver trapping index in the evaluation of the underlying cirrhosis in hepatocellular carcinoma. Pascasio, Flora M., Domingo, Ernesto O., Lao, Judy Y., Cruz, Federico B.. **Acta Medica Philippina**, , 17(3):73-76

The liver trapping index (LTI) which is the ratio of radionuclide uptake by the liver to that of a reference organ away from the liver was determined in 45 subjects with normal livers, 14 cirrhotics who were all decompensated and 29 hepatocellular carcinoma (HCC) patients who were also cirrhotics. The mean LTI was statistically higher in normals than in cirrhotics and HCCs. However, the mean LTI of HCCs with compensated cirrhosis or cirrhotics alone and was similar to that of normals. A cut off LTI value of 2.3 showed 89% of normals were above this while 87.5% (7 out of 8) of HCCs with severe cirrhosis and all decompensated cirrhotics were below this. Based on the results, it is concluded that the LTI can discriminate between normal and decompensated cirrhotic livers. Furthermore in HCC with cirrhosis, it reflects more the cirrhosis rather the malignancy. (Author's summary)

Medicine.

- 0527 Minimum Inhibitory concentrations of aminoglycoside, β -lactam and Quinolone antimicrobials for nosocomial isolates of acinetobacter calcoaceticus-Acinetobacter baumannii complex from the Philippine General Hospital. Cabrera, Esperanza C., Rodriguez, Roslyn DM., Cantiller, Patricio L., Lee, Anthony C.. **Philippine Journal of Science**, , 129(1):1-6

Acinetobacter calcoaceticus-Acinetobacter baumannii complex isolates from patients of the Philippine General Hospital with hospital-acquired (nosocomial) infections were analyzed for their response to amikacin, gentamicin, netilmicin, tobramycin, ceftazidime, cefotaxime, piperacillin, ciprofloxacin and cefoperazone. The minimum inhibitory concentrations of the antimicrobial agents for the isolates were determined using the agar dilution method. Of the 98 isolates studied, 97 (98.98%) were resistant to at least one of the antimicrobials, with 17 of these 97 isolates (17.53%) being resistant to all of the nine tested. The aminoglycosides netilmicin and amikacin were

shown to be the most effective against the isolates, with 61.22% and 56.12% being sensitive to the antimicrobials, respectively. This was followed by the β -lactam ceftazidime, to which 40.82% of the isolates were sensitive. Cefoperazone was the least effective, with 91.83% being resistant to it. The aminoglycosides were shown to be generally more effective than the β -lactam and quinolone antimicrobials. **(Author's abstract)**

Antibiotic resistance. Hospital-acquired infections. Drug resistance. Medicine.

- 0528 A modification of the quantitative thick smear method for schistosoma japonicum. Valencia, Cynthia I., Abear, Roger F.. **Acta Medica Philippina**, , 17(3):91-94

A modification of the stool thick smear method of Kato and Katz for *Schistosoma japonicum* is described. The technique utilizes 1% eosin solution overlaid on cellophane-covered fecal smear in which the cellophane strip had been previously immersed in 0.3% methylene blue in 25% glycerine solution. The eosin stain provided a good contrast for *S. japonicum* eggs against the other helminths and fecal debris. The increase in accurate detection of schistosome eggs was statistically significant. **(Author's summary)**

Medicine.

- 0529 A modified procedure for the preparation of mitoxantrone. De Leoz, Maria Lorna A., Endoma-Arias, Mary Ann A., Concepcion, Gisela P., Cruz, Lourdes J.. **Philippine Journal of Science**, , 135(2):83-92

The anticancer drug mitoxantrone is commercially prepared in four synthetic steps starting from readily available chrysazin. A new and modified procedure for a similar process of mitoxantrone preparation has been successfully applied in small-scale preparation of mitoxantrone in our laboratories. This new process was designed to be practicable under Philippine setting. Success of the synthesis was established by full physico-chemical and spectral characterization of all intermediates and of the final mitoxantrone product. The cytotoxic activity of the synthesized mitoxantrone was tested against MCF-7 breast cancer cell lines and was found to be similar to commercially available mitoxantrone. **(Author's abstract)**

Anticancer
compound. Synthesis. Anthraquinone. Chemotherapy. Chrysazin. Cytotoxicity. Medicine.

- 0530 Musculo-skeletal complications in seizure disorders. Montalban, Antonio M., Recto, Jr., Rafael S., Soriano, Ramon M.G.. **Acta Medica Philippina**, , 21(3):103-104

Eight cases of musculo-skeletal injuries secondary to seizures of various causes treated between 1979 and 1983 are presented. A comprehensive review of the literature shows that these injuries are quite common occurrences in the convulsive therapy of psychiatric patients. These seizures have since,

been prevented by the use of general anesthesia, muscle depolarizing agents and newer drugs introduced in psychiatric therapy. Physical restraint may in fact produce these injuries during seizure and avoidance may be more beneficial to the patient. The musculo-skeletal complications are quite varied and orthopedic management is individualized. **(Author's summary)**

Medicine.

- 0531 A new approach to the posterolateral region of the proximal tibia. Libarnes, Roseller L.. **Acta Medica Philippina**, , 21(3):87-89

In summary a new operative approach to the tibia is herein described with definite advantages.

1. It affords maximum exposure to the posterolateral region of proximal tibia without resecting the fibular head and the lateral collateral ligament.
2. There is very little interference with the anatomic structure of the knee.
3. The operative procedure is ideal for traumatic and tumorous conditions involving this region.
4. Closure of the wound is simple.

The only disadvantage of this procedure, as also encountered by Kaplan, is the relative depth of the operative field created by the fibula laterally. However, this does not really interfere with the proper exposure of the field. **(Author's summary)**

Medicine.

- 0532 Nonimmune hydrops fetalis. Gamutan, Kathleen Grace C., Lucero-Tan, Florida. **Philippine Scientific Journal**, , 35(1):15-24

Objective: To review the incidence and neonatal outcome of nonimmune hydrops fetalis in our local setting over the past 5 years (1997-2001).

Study Design: Descriptive, analytical.

Setting: Department of Obstetrics & Gynecology, MCU FDTMF Hospital

Method: We reviewed maternal and neonatal charts of 22 cases of nonimmune hydrops fetalis diagnosed after 20 weeks age of gestation over a 5-year period. Neonatal survival was correlated with the etiology and the use of intrauterine fetal therapy. The Fisher Exact test was applied to determine the statistical significance of both correlations.

Results: The incidence of nonimmune hydrops fetalis in our center was 1:348 births per year. Overall perinatal mortality was 84.2%. Toxoplasmosis, rubella, cytomegalovirus, herpes simplex, or TORCH infection were the most common

cause of nonimmune hydrops fetalis in our study. There were 5 etiologies identified - TORCH (50%), thalassemia (13.6%), cardiomegaly (13.6%), congenital anomalies (4.5%), and idiopathic (18.2%). There was a good correlation between neonatal survival and those who were diagnosed with CMV alone ($p < 0.05$). However, there was no significant correlation between neonatal survival and the other etiologies as mentioned. ($p > 0.05$). The application of intrauterine fetal therapy was not significantly associated with survival of the newborn. ($p > 0.05$).

Conclusion: This study showed a high incidence of nonimmune hydrops fetalis in our center. Therapeutic management of hydrops fetalis is dependent on etiology. Neonatal survival appears to increase with nonimmune fetal hydrops caused by CMV infection alone. With the use of intrauterine fetal therapy, neonatal survival may or may not be increased. **(Author's abstract)**

- 0533 Patterns of infection among renal transplant recipients on mycophenolate mofetil at the National Kidney and Transplant Institute. Mendoza, Myrna T., Coquia, Abraham T.. **Philippine Journal of Internal Medicine**, , 43(5):249-252

BACKGROUND:

In order to improve renal transplant outcome, several new immunosuppressive agents have been introduced. However, because of their potent immunosuppressive effects, the incidence of complications particularly infection, is also increased. The frequency and types of infections in renal allograft recipients on triple immunosuppression with cyclosporine (CYA), prednisone and mycophenolate mofetil (MMF) are described. We determined whether the frequency and type of infection was related to the dose and duration of mycophenolate mofetil and if the incidence of acute rejection was increased during the first year after renal transplantation while on the MMF protocol.

METHODS:

A retrospective review was conducted on renal transplants performed between January, 1996 to June, 1999 who received the MMF protocol (cyclosporine, prednisone and MMF). A total of 125 kidney graft recipients on the MMF protocol were followed for one year for hospital admissions due to infections. All patients were free of active infection before transplantation. Criteria for the diagnosis of infection after transplantation, including fever work-up, were provided in transplant protocols.

RESULTS:

Infection rate was 42.4% during the first year following transplantation in 125 patients. Infection was highest during the first 3 months. Pneumonia and UTI were the most common bacterial infections observed. Bacterial and viral infections were of equal frequency during this time. More cytomegalovirus (CMV) disease was observed with an MMF dose of at least 2 grams per day. Fungal infections also occurred during the first 3 months after transplantation. TB occurred late in the first year. The acute rejection rate at 12 months was

25.6%, most of which occurred during the first 3 months after transplantation.

CONCLUSION:

More viral infections were observed in patients using mycophenolate mofetil (MMF) of at least 2 gms/day. The incidence of acute rejection was lower than the rate observed using an azathioprine (AZA) protocol (25.6% vs 30%). Anti-rejection therapy influenced the outcome of post-transplant infection. **(Author's abstract)**

Infection. Mycophenolate mofetil. Renal transplant. Medicine.

- 0534 Persistent common atrioventricular canal. Mendoza-Wi, Jennifer Ann. **Acta Medica Philippina**, , 17(3):95-105

A case of persistent common atrioventricular canal in a 21-year-old male is described, together with pathologic findings. The difficulties encountered in diagnosis were pointed out. However, with the advent of new technics in the diagnosis and treatment of congenital heart malformation, e.g. echocardiography, this lesion has been a pathologic curiosity for many years, recognized primarily at the autopsy table until the above reported studies have been made. Moreover, it is pointed out that with improved and modern surgical technics, prognosis of these patients have also improved. **(Author's summary)**

Medicine.

- 0535 Phencyclidine poisoning report of a case and review of the literature. Chua, Rogelio H., Lim, Jane V.. **Acta Medica Philippina**, , 18(4):147-149

The case presented may be just one of the many cases of Phencyclidine poisoning that may have penetrated into our country's drug scene. Its vague, bizarre, and unusual presentations may often result in misdiagnosis and incorrect approach to therapy leading to inevitable morbidity and perhaps, mortality. Thru this paper therefore, we hope to make people be aware of the manifestations of Phencyclidine overdose and therefrom, institute early therapy to minimize its odious side effects. **(Author's summary)**

Medicine.

- 0536 Prevalence of strongyloides stercoralis infection in selected areas in the Philippines using a modified harada-mori culture technique. Cabrera, Benjamin D.. **Acta Medica Philippina**, , 17(3):84-90

A prevalence survey of *Strongyloides stercoralis* infection was done on the general population in 6 provinces in the Philippines using a modified

Harada-Mori culture technique. Because the distribution of strongyloidiasis parallels that of hookworm infection, the selected areas are those with high hookworm prevalence rate. Out of 4208 stool cultures examined only 50 or 1.18% were found positive for *Strongyloides stercoralis* larvae. Strongyloidiasis appears to be more common in children than in adults and more frequent in males than in females. The prevalence is highest among children 7-14 years group, 1.72%. Out of the 50 positive cases 43 or 86% belong to this age group. The use of culture technique rather than direct fecal smear method did not change significantly the prevalence of strongyloidiasis in the Philippines. The concept of misdiagnosis of *Strongyloides stercoralis* larvae for hookworm larvae does not seem to hold true. **(Author's summary)**

Medicine.

- 0537 Production of crude insecticidal sucrose esters from palm kernel oil. Acda, Reynaldo L., Conde, Desiree G.. **Transactions of the National Academy of Science and Technology Philippines**, , :361

Crude insecticidal sucrose esters were produced from palm kernel oil through saponification, acidification, fatty acid chloride formation and acid chloride-sucrose reaction. The effect of varying the amount of concentrated HCl (2 ml, 4 ml, 6 ml, 8 ml, 10 ml, and 12 ml) per 10 g of palm kernel oil soap sample at 95°C on the fatty acid yield, the effect of increasing the amount of thionyl chloride (using 0.025 mol, 0.07 mol, 0.05 mol, 0.1 mol, and 0.125 mol) per 10 g fatty acid or 0.05 mole fatty acid (as lauric acid) on the acid chloride formation, the fatty acid (as lauric acid) on the acid chloride formation; and the efficacy of crude insecticidal sucrose esters on whitefly were determined.

The results showed that palm kernel oil saponified with 35° Be caustic soda (soap 1) yielded 16.84% free fatty acid and caustic potash (soap 2) with similar concentration in ethanol yielded 17.64% free fatty acid using 10 ml of concentrated HCl. Using various amount of thionyl chloride (1:2 fatty acid-thionyl chloride molar ratio) giving 11.2 g and 15.3 g fatty acid chloride from soap 1 and 2, respectively. Sucrose ester yield presented a high conversion of 72.91% and 76.32% based from the sucrose and acid chloride reaction.

Whitefly bioassay results showed that an average of 122 minutes, 100% mortality of whiteflies occurred. There was a significant difference between methanol, crude sucrose esters from soap 1 (ISE I) and crude sucrose esters from soap 2 (ISE II). No significant difference between ISE I and ISE ii as the results were subjected to a 5% level of significance (á). **(Author's abstract)**

Palm kernel oil. Insecticidal sucrose esters. Whitefly bioassay.

- 0538 Profile of pelvic fractures in PGH 1979-1983. Jaen, Marcelo N.. **Acta Medica Philippina**, , 21(3):91-93

Fifty-six cases with pelvic fractures were reviewed. More than two-thirds of these were due to vehicular accidents, mostly pedestrians. More than a third of these cases are associated with variety of fractures and injuries to soft tissues, with bladder laceration as the most common soft tissue injury associated. Classification of pelvic fractures is of great help to anticipate complications. Lower urinary tract injury and mortality is most common in Type II pelvic fracture. Hematuria is not indicative of major lower urinary tract injury. Hemorrhage is the most common cause of death and best managed by direct surgical intervention if intraperitoneal; while extraperitoneal hemorrhage is best managed by continuous blood transfusion and stabilization of the pelvic fractures. **(Author's abstract)**

Medicine.

0539 Progress in the control of tuberculosis. Tupasi-Ramos, Thelma E.. **Transactions of the National Academy of Science and Technology Philippines**, , :149-153

Tuberculosis from time immemorial has disproportionately caused misery to the poor. Malnutrition, environmental factors such as crowding and poor living conditions, unemployment and lack of access to health care are social factors, which are responsible for making tuberculosis the outcome of social misery. In the Philippines, death due to tuberculosis occurs 75 persons per day and exerts a significant adverse socioeconomic impact as it affects young adults which make up the work force of the population. It remains to be the most significant problem in the Philippines at the close of the century.

However, majority of patients with symptoms of TB either do nothing or self medicate and only a quarter seek medical help. Among those that consult, only 30% go to the public health clinics and 46% consult private practitioners, 17% seek help in the hospitals, while 7% go to traditional healers. Previous studies in India have shown that far from providing superior health care, private practitioners may in fact hinder the progress of the control program as they do not adhere to the standard regimen nor do they have subsidized medications to provide and no system of supervision and monitoring response. To ensure a more effective implementation of DOTS in the country, the private health sector, which is utilized more frequently than the public health sector, should therefore be harnessed into the TB control program. Private practitioners could assist in case finding by referring their patients to the appropriate public health center where subsidized medications under the DOTS strategy could be provided. Alternatively, they could themselves actively participate in the DOTS program of government providing a wider scope of the drug distribution system presently available.

There are a number of models in the Philippines of this private-public collaboration in the TB control. The Makati Medical Center (MMC) DOTS clinic is just one of them. Established in February 1999, it has enrolled approximately 400 patients by this time with 86.3% treatment success for new cases and 35.4% for retreatment cases. The dismal result in the latter is due to multi-drug resistant TB (MDR-TB) among retreatment cases as a consequence of the inadequate previous treatment received by these patients. The control of MDR-TB is a far more complicated and expensive undertaking and its generation by inadequate TB treatment underscores the urgent need for a more rigorous implementation of DOTS as it is most effective measure it

prevent the emergence of MDR-TB.

The Philippine Coalition Against Tuberculosis is embarking on developing programs whereby private physicians can be enlisted in the national TB Control Program through a system of accreditation following a training program on DOTS. This strategy would provide the patients viable choices of health care while still adhering to the DOTS strategy of government. **(Author's abstract)**

Medicine. Tuberculosis. TB. MDR-TB. Control of tuberculosis.

- 0540 Radioprotection of intestinal crypt cells by cox-inhibitors. Bisnar, Paul O., Dones, Rosa Angela S.A., Serna, Paulene-Ver A., Deocarís, Chester C., Gutierrez, Kalangitan V., Deocarís, Custer C.. **Philippine Journal of Science**, , 135(2):73-81

The regulation of tissue homeostasis in the gastrointestinal epithelium after epithelial injury focuses on the prostaglandins (PGs) as its major mediators. The two cyclooxygenase isoforms, Cox-1 and Cox-2, catalyze synthesis of PGs. Cox-1 is the predominant cyclooxygenase isoform found in the normal intestine. In contrast, Cox-2 is present at low levels in normal intestine but is elevated at sites of inflammation, and in adenomas and carcinomas. To study the effects of various commercially-available cox-inhibitors (Ketorolac: Cox-1 selective; Celecoxib: Cox-2 selective; and Indocid: Cox-1/2 non-selective), we determine mouse crypt epithelial cell fate after genotoxic injury with whole-body gamma-ray exposure at 15 Gy. Intestinal tissues of mice treated with Cox-2 inhibitors that showed invariable apoptotic event, however, have increased occurrence of regenerating cells. Our results suggest a potential application of Cox-2 selective inhibitors as radioprotective agent for normal cells after radiotherapy. **(Author's abstract)**

Radiation. Intestinal crypt. Microcolony. Cyclooxygenase inhibitors. COX. Prostaglandins. Apoptosis. Medicine.

- 0541 Renal transplantation 5 years experience at the UPCM-PGH medical center. Daquioag, Eleanor P.. **Acta Medica Philippina**, , 21(2):43-49

From May 1976 to March 1982 a total of 23 renal transplant using living related and non-related donors was performed by UPCM-PGH Medical Center dialysis-transplant program. There were 16 males and 7 females, of which 15 were 34 years old and under, only 3 patients were over the age of 45. A mean age of 32.8 years for all. Most of the deaths occurred during the first 6 months post-transplantation (7/23). Patient survival appeared to be better among patient who were well matched (or mismatches) for the HLA – A and – B antigen loci. **(Author's summary)**

Medicine.

- 0542 Re-structuring of the out-patient medical services. Montalban, Cecilia, Baltazar, Aida. **Acta Medica Philippina**, , 17(4):152-159

Several methods have been envolved to restructure the medical OPD in order to utilize the OPD not only as a service arm but as well as teaching/training and research arm of the Department of Medicine. The first is the appointment of a coordinator and Chief of Medical OPD. Secondly, appointment of a clerk to do statistical compilation of diagnosis; thirdly, patient appointment system with the specialty clinics and fourthly the proposal of a 5-year development plan involving personnel, equipment and physical plant improvement. **(Author's summary)**

Medicine.

- 0543 Serological survey of toxoplasma gondii in human and rodents in Manila. Jueco Nonette L., Garcia, Edito G., Manahan, Laura, Cross, John H.. **Acta Medica Philippina**, , 17(1):1-5

Serological survey using indirect hemagglutination test was done on 2,276 individuals coming from different provinces in the Philippines. Toxoplasma antibody titers ranging from 1:4 to 1:1024 were found in 81% of the males, 80.4% of the females and 80.6% of the total population. Titers of 1:64 and above were detected in 11.79% of the males, 7.8% of the females and 9.0% of the total subjects. No clinical manifestations of toxoplasmosis were seen in those humans with titers of 1:64 or higher.

A total of 124 rats sera were also examined IHA and titers of 1:64 and above were obtained from 8.1% of the rats. Smears of brains of 344 rats examined were all negative for cysts of *T. gondii*. Fecal examinations of kittens fed with rat brains were all negative for oocysts. **(Author's summary)**

Medicine.

- 0544 A single dose double-blind study comparing the relative analgesic efficacy of orally-administered zomepirac sodium versus mefenamic acid in the treatment of post-operative pain. Gonzales, Cecile P., Melendres, Fernando A., Valdez, Ernesto V.. **Acta Medica Philippina**, , 18(4):141-146

This single-dose study demonstrate the analgesic efficacy of zomepirac sodium in post-operative pain. Total Pain Relief afforded by zomepirac sodium 100 mg was significantly better than mefenamic acid 500 mg. Pain Intensity Difference scores likewise showed that the zomepirac sodium 100 mg was significantly better than zomepirac sodium 50 mg, zomepirac sodium 25 mg and placebo treatments.

These results further support previous reports that zomepirac sodium is a safe and effective analgesic in the treatment of moderate to severe post-operative pain. **(Author's summary)**

Medicine.

- 0545 Sleepiness and sleeping patterns among internal medicine residents in tertiary care hospitals. Jorge, II, Manuel C., Ledesma-Gamba, Marie Angeline, Chavez, Joselito R., Refre, Glenford R.. **Philippine Journal of Internal Medicine**, , 43(5):235-240

BACKGROUND:

Sleep is a necessary and vital biological function. Physician's ability to provide quality care to patients can be adversely affected by many factors, including sleep deprivation. Long work hours, altered schedules and on-call periods are common practice for most physicians in residency and throughout their careers. They are cited as necessary for adequate learning and professional development. But these can also result in sleep loss, disruption of circadian rhythm and fatigue among medical personnel.

OBJECTIVES:

- 1) To determine the prevalence of excessive daytime sleepiness among Internal Medicine resident in several hospitals in Quezon City.
- 2) To describe the characteristics of the residents who experienced excessive daytime sleepiness
- 3) To determine the factors that contributed to occurrence of excessive daytime sleepiness

STUDY DESIGN:

Multi-institutional, Cross-Sectional, Cohort

METHODOLOGY:

Residents-in-training in Internal Medicine in five Quezon City - Based Hospitals (National Kidney and Transplant Institute, East Avenue Medical Center, V. Luna Hospital, Far Eastern University Hospital and Capitol Medical Center) and a cohort of thirty (30) age-matched office workers who worked during daytime only (8 AM to 5 PM) were given a self-administered questionnaire. The questionnaire included the Epworth Sleepiness Scale (ESS) and questions on sleeping habits and patterns.

ANALYSIS:

Statistics done were mostly descriptive to elucidate the general characteristics of the subjects. T-test and ANOVA with p value <0.05, were used to correlate for differences between groups with their mean ESS scores.

RESULTS:

Seventy four residents and 30 controls (87%, 100% response rates respectively) responded. Prevalence of excessive daytime sleepiness (EDS), i.e. mean ESS score greater than 10, among residents was 82.4% compared with control, 30% (p=0.0002). Mean ESS score was 12.3 compared to control with mean ESS of 8.5. Sleepiness was most noticeable among lower year

level residents and those with prolonged duties($p=0.000$). No statistical difference was noted across departments, age and sex. Mean sleep duration among residents was 6.1 hours while that of office workers was 7.4 hours. Majority had 1-3 awakenings per night mostly due to emergency room/ward calls. Residents significantly felt sleepier compared to office workers (79.7% vs 40%, $p=0.000$). Majority (85.2%) of residents felt unrefreshed after a night's sleep. Most (75.7%) had at least 2 cups of methylxanthine containing beverages in a 24 hour period. Majority of the subjects (99%) did not need any method to aid them to sleep and about 92% need to do things to help them go to sleep. The most common methods used were watching TV, reading books, and listening to music. Only one subject reported to have used medications to aid him to sleep. None of the subjects took any medications to keep them awake.

CONCLUSIONS:

EDS is common among medical residents. This is primarily brought about by prolonged working hours and sleep fragmentation leading to inadequate sleep. Fatigue and other stresses however, could not be discounted. Further studies are needed to evaluate current working practices in the different training institutions and objectively measure its effects on cognitive function, psychomotor performance and personal health variables. **(Author's abstract)**

Sleepiness. Sleeping pattern. Sleepless. Internal medicine. Residents. Fatigue. Medicine.

- 0546 Sleepiness and sleeping patterns among residents in training at the University of the Philippines - Philippine General Hospitals. Refre, Glenford R., Jorge, II, Manuel C., Capalongan, Therese C.. **Philippine Journal of Internal Medicine**, , 43(5):241-248

BACKGROUND:

Sleep is an important aspect of human life. It is an important component of mammalian homeostasis and vital for the survival of self and species. Excessive daytime sleepiness (EDS) and consequently a reflection of sleep deprivation in the general community is a newly recognize problem, about which there is little standardized information. Prevalence of EDS is common among several occupations including medical students and medical trainees.

OBJECTIVES:

- 1) To determine the prevalence of excessive daytime sleepiness among residents-in-training
- 2) To describe the characteristics of the residents who experienced excessive daytime sleepiness, and
- 3) To determine the factors that contributed to the occurrence of excessive daytime sleepiness.

STUDY DESIGN:

Cross-Sectional, Cohort

METHODOLOGY:

Residents-in-training in the following departments: Medicine, Family and Community Medicine, Surgery, Obstetrics-Gynecology, Pediatrics, Emergency Medicine, and neurosciences; and a cohort of forty five (45) age-matched office workers who worked during daytime only (8 AM to 5 PM) were given a self-administered questionnaire. The questionnaire included the Epworth Sleepiness Scale (ESS) and questions on sleeping habits and patterns.

ANALYSIS:

Statistics done were mostly descriptive to elucidate the general characteristics of the subjects. T-test and ANOVA with p value <0.05 , were used to correlate for differences between groups with their mean ESS scores.

RESULTS:

277 residents and 45 controls (68.8%, 100% response rates respectively) responded. Prevalence of EDS, i.e. mean ESS score greater than 10, among residents was 90.5% compared with control, 26.7% ($p=0.000$). Mean ESS score was 12.3 among residents compared to control who had a mean ESS of 8.3 ($p=0.000$). Sleepiness was most noticeable among lower year level residents ($p=0.007$) and those with prolonged duties ($p=0.000$). No statistical difference was noted across departments, age and sex. 73.6% had sleep duration of less than or equal to 6 hours. 57% had 1-3 awakenings per night mostly secondary to emergency room/ward calls. 87.9% of the residents felt sleepy during the day and 87.2% still feel unrefreshed after a night's sleep. 45.7% took naps while 67.2% had at least 2 cups of methylxanthine containing beverages within the 24-hr period. 61% did not need any methods to help them fall asleep; however, 1.4% reported use of sleep aid medications. None took any medications to keep them awake.

CONCLUSIONS:

EDS among the residents was highly prevalent. EDS was primarily brought about by sleep loss secondary to prolonged working hours and sleep fragmentation leading to circadian rhythm disturbances. Further studies are recommended to test for cognitive function, psychomotor performance and other work related learning and personal health variables to further address the sleep deficiency experienced by our residents. **(Author's abstract)**

Sleepiness. Sleeping pattern. Sleepless. Residents. Fatigue. Medicine.

- 0547 Species determination of human hookworm using the polyethylene-tube culture technique in selected areas in the Philippines. Cabrera, Benjamin D.. **Acta Medica Philippina**, , 17(1):6-9

A total of 4,208 stool specimens from individuals coming from six selected municipalities in the Philippines were cultured and examined. Approximately 47% were found positive for hookworm larvae. Of the positive cases, 97% were *Necator americanus*, 1% *Ancylostoma duodenale* and 2-3% mixed infection. The prevalence rate was highest in the Bicol Region (Sorsogon and Camarines Sur) and lowest in Cavite. Hookworm infection is consistently higher in adults than in children in the six areas and slightly higher in males

than in females. Culture technique for determination of hookworm species is ideal because the drug of choice in the treatment of each species is different. **(Author's summary)**

Medicine.

- 0548 A study of immunologic host response factors in chronic/recurrent staphylococcal infection. Velmonte, Melecia A., Agbayani, Benigno F., Guzman, Ma. Fita P., Estrella, Lillian. **Acta Medica Philippina**, , 21(4):132-138

Immunologic studies with chronic/recurrent *S. aureus* infections of the skin were done in 32 subjects. Nine served as controls. The study revealed that 11 subjects have various degrees of malnutrition as well. The ages of subjects ranged from one month to 20 years with the same number of females to males. Majority of subjects who had hyperimmunoglobulinemia. A. have other immunodeficiencies as well. Three subjects have each low IgG and IgA.

Rebuck's skin window to demonstrate inflammatory cells response showed a definite increase of inflammatory cells during the 4th and 24th hour, but it is not sustained when further observed up to the 48th hour, in the patient group compared to the control group.

Delayed hypersensitivity reaction using skin test with PPD, PHA, and histoplasmin revealed that anergy or hyponergy was noted to be present in about 1/2 of subjects. More so, with the malnutrition group. In general, leukocytosis was noted in the patient group but absolute lymphocytes remain normal in count.

The study purports to show that lymphocytes and B-cell (plasma cell) are intact and respond to *Staphylococcus* infection. Malnutrition is a contributing factor but the major immune defect is most likely attributed to neutrophil-phagocytic dysfunction. The possibility of complement-antibody-phagocytic malfunction could not be discounted. This remains to be investigated. **(Author's summary)**

Medicine.

- 0549 A study of the conservative management of TB of the spine in UP-PGH center. Leagogo, Jr., Liberato Antonio. **Acta Medica Philippina**, , 21(1):3-8

Ninety eight patients with spinal tuberculosis were conservatively treated in the out-patient section of the Department of Orthopedics, UP-PGH from Jan. 1980 to Sept. 1983. Their clinical features and status are reported. Their response was erratic. Only fifteen came back for regular treatment. **(Author's summary)**

Medicine.

- 0550 Supracondylar humeral fractures in PGH. CoruÃ±a, Jose Maria R.. **Acta Medica Philippina**, , 21(1):27-30

Treatment of supracondylar fractures of the humerus must be individualized as to type of fracture, degree of displacement of fracture fragments, and condition of the patient at the time of treatment. In our center, both close methods and open reduction have equally good results. The occurrence of cubitus varus is not a function of the mode of therapy (close or open) per se but rather due to other factors. These factors are: the displacement of the fragments and the initial reduction by whatever means, the position of immobilization, the periosteal hinge and other soft tissue support, as well as the vigilance of the attending surgeon. Neither pathway of treatment resulted in limitation of motion. No patient presented with joint pains. **(Author's summary)**

Medicine.

- 0551 The tongue. Magboo, Arthur T.. **Philippine Scientific Journal**, , 35(1):39-44

Objective: This case report aims to present a rare site of extrapulmonary tuberculosis in the oral cavity and its improvement after therapy.

Design: Case report

Setting: Out-Patient Clinic, Department of Otolaryngology, MCU-FDTMF Hospital

Case Summary: A 65-year old male consulted at the out-patient clinic because of an ulcerating mass in the tongue of 3 years duration. Clinical features would suggest a malignancy but after incisional biopsy, histopathologic findings revealed caseation necrosis which was compatible with tuberculosis. Radiographic examination of the chest revealed a far advanced disease with cavitations. After a few weeks of anti-Koch's therapy, a remarkable improvement was observed.

Conclusion: Tuberculosis of the tongue is a rare clinical presentation of extrapulmonary tuberculosis which may be overlooked by physicians. By maintaining a high index of suspicion and awareness of its prevalence. TB of the head & neck can be managed successfully such as in this case. **(Author's abstract)**

- 0552 Tuberculous brain abscess. Chua, Rogelio H.C., Horrilleno, Evelyn, Ong, Danilo. **Acta Medica Philippina**, , 17(3):106-108

The first case of tuberculous brain abscess of the right frontal is being

reported in local literature. The evolution of the disease, the mode of treatment and the post-operative outcome are discussed. The pathogenesis of tuberculous brain abscess is briefly described. **(Author's summary)**

Medicine.

- 0553 Variations in size and shape of schistosoma japonicum eggs. Jueco, Nonette L.. **Acta Medica Philippina**, , 17(1):10-15

Schistosoma japonicum eggs were measured and the size compared with those of ascaris and hookworm eggs. The egg measurement of *S. japonicum* ranged from 46 to 110.4 microns in length by 36.8 to 89.7 microns in width and an average size of 75.3 by 54 microns. Knobs were seen in 10% of the eggs while 6.6% of the eggs seen in the faces were immature. Fifty-two percent of the eggs overlap with the measurements of hookworm eggs. The measurements of schistosome eggs from feces of patients obtained in Sorsogon showed larger range of variability when compared with those reported from other countries: **(Author's summary)**

Medicine.

NUTRITION

- 0554 Technical feasibility of developing an instant tube feeding formula. Tanchoco, C.C., Villadolid, M.F., Natividad, A.S., Rodriguez, M.P., Martin, A.B., Santos, R.L., Udarbe, M.A., Lainez, W.N.. **Philippine Journal of Science**, , 129(2):77-83

A study was undertaken to determine the feasibility of developing a low cost, instant tube feeding formula from indigenous food sources. These includes shelf-life studies, quality control, nutrient content determination and assessment of the microbiological safety of the product. As a result, a dehydrated instant tube feeding formula with a nutrient density of 1 kcal/ml was developed from a mixture of flour prepared from a 70:30 combination of germinated rice and mungbean (GRM), squash powder, skimmed milk, corn oil and sugar (53:5:12:20:10). The rice mungbean flour was packed in plain polyethylene bags for storage studies for a period of six months at room temperature conditions. Microbiological evaluation undertaken during storage showed the sample to be safe. Proximate composition, vitamin, and mineral analyses showed the formula to be more than 50% adequate in energy, protein, calcium, iron, retinol, thiamine and riboflavin recommended daily allowance (RDA) of a 20-39 year old reference man. Protein quality evaluation revealed that the amino acid values approximated the FAO reference pattern except for lysine and is comparable to casein in terms of weight gain per day. The formula was found to be comparable to the commercial formula in terms of nutrient density and is twelve and a half (12.5) times cheaper. The potential of the dehydrated tube feeding formula developed holds promise in contributing to the nutritional care of enterally-fed patients and will be a significant development in the food industry. **(Author's abstract)**

Enteral nutrition. Enteral feeding. Nutrition support. Nutrition.

PHYSICS

- 0555 Digital controller for stepping motor-driven x-ray diffractometer. Naval, Jr., P.C., Saligan, P.P., Soriano-Calix, V.B.. **Philippine Engineering Journal**, , 6(2):23-34

Presented is a stepping motor controller for the Philips PW 1050 Vertical Goniometer featuring crystal-controlled scan rates of 4, 2, 1, 1/2, 1/4, and 1/8 degrees per minute in the continuous scan mode, and step sizes of 0.005, 0.01, 0.02, 0.025, 0.05, 0.1, 0.2, and 0.5 degree when operated in the step scan mode. A slew rate of 96 degrees per minute is provided for positioning purposes. The TTL-implemented design accommodates upgrading to higher levels of automation by a simple substitution of the control logic section.

Physics. Digital controller. Stepping motor-driven x-ray diffractometer.

- 0556 Emission and excitation spectra of $\text{ZnSe}_x\text{S}_{1-x}$ single crystals. Tiong-Palisoc, Shirley. **Philippine Journal of Science**, , 129(2):61-75

$\text{ZnSe}_x\text{S}_{1-x}$ single crystals which can be used in blue luminescent devices are prepared by sublimation method and their crystal structure is confirmed to be zincblende from x-ray diffraction analysis and the crystal composition x is determined from the lattice constant assuming Vegard's law holds for the $\text{ZnSe}_x\text{S}_{1-x}$ crystal system.

The photoluminescence spectra of the crystals are measured. Free exciton luminescence is detected. Bound exciton emissions are very pronounced indicating the presence of substitutional impurities in the form of neutral donors and acceptors. The incorporation of Na or Li is observed to enhance donor-acceptor pair transitions where the DAP band of the Na-doped sample is at 13 meV higher energy than the DAP band of the Li-doped sample. The energies of the luminescence transitions decrease curvilinearly with increasing ZnSe composition. **(Author's abstract)**

Sublimation. Photoluminescence. Excitation. DAP band. Zn vacancy. Optoelectronic. Physics.

- 0557 High pressure properties of $\text{ZnSe}_x\text{S}_{1-x}$ single crystals. Tiong-Palisoc, Shirley. **Philippine Journal of Science**, , 129(1):41-46

The static phase transition points of ZnSe and $\text{ZnSe}_x\text{S}_{1-x}$ ($0.40 \leq x \leq 1$) single crystals in the high pressure region are determined based on the transformation pressures of Bi I-II, Bi III-V and ZnS using the cubic anvil

method where the pressure-induced variation of resistance is measured. The transition pressures of the samples vary linearly with the composition of ZnS in the $\text{ZnSe}_x\text{S}_{1-x}$. The shock compression curves of $\text{ZnSe}_{0.85}\text{S}_{0.15}$ single crystals are also investigated. The pressure-particle velocity Hugoniot is found to agree with the corresponding Hugoniots of ZnS and ZnSe up to the phase transition point. The P-V isotherm of $\text{ZnSe}_{0.85}\text{S}_{0.15}$ derived from the U_s - u_p Hugoniot is consistent with the calculated P-V curve based on Bridgman's static data of ZnS and ZnSe. **(Author's abstract)**

Physics.

- 0558 Short-period ZnTe-Zn(S, Te) superlattices. Tiong-Palisoc, S., Korn, M., Faschinger, W.. **Philippine Journal of Science**, , 129(1):37-40

ZnTe-Zn(S,Te) short-period superlattices were grown on (001) GaAs substrates with very good structural quality. The growth conditions were found to be quite reproducible, leading to a series of samples with periods between 12 Å and 29 Å. Characterization of the samples with high resolution x-ray diffraction confirmed high structural quality showing that all samples were pseudomorphically grown. The relaxation behavior was strongly influenced by the ZnTe well-width with two critical observed ZnTe-thicknesses. **(Author's abstract)**

MBE. High resolution x-ray diffraction. GaAs. Relaxation. Substrate. Barrier. Physics.

SCIENCE AND TECHNOLOGY

- 0559 Electrochemically synthesized polymer-based pH sensors. Binag, Christina A., Bartolome, Amelita J., Tongol, Bernard John V., Santiago, Karen S.. **Philippine Journal of Science**, , 128(3):247-252

A polymer-coated wire electrode was fabricated by galvanostatic electrochemical polymerization of monomer and this was evaluated for pH response. Four different monomers were investigated namely, pyrrole (py), 3-(2,5-dihydroxybenzyl)pyrrole (pyQH), aniline (An) and o-phenylenediamine (oPD). The polymers were synthesized with perchlorate or bovine serum albumin (BSA) dopants in a propylene carbonate or universal buffer electrolytes, respectively. The potentiometric characteristics of the resulting films show sub- to nearly Nernstian responses. The range of electrode sensitivities (25°C) for the four polymers used are -43.2 mV/pH for PPy, -46.0 mV/pH for PPyQH, -42.1 mV/pH for PAn and -50.7 mV/pH for PoPD. All has linear working range of pH 3 to 10 and average response time of 3 to 5 min. Electrode stability was maintained without the need of pre-treatment prior to use or immersion in solution when not in use. X-ray photoelectron spectroscopy (XPS) was used to probe the composition and surface characteristics of the electrodes. Conducting polymers are ideally suited for sensor applications because they not only exhibit high conductivity and electroactivity but they could also be used as general matrix and further

modified with other compounds in order to change selectivity. The conducting polymers studied offer potential for pH sensor devices and could find wide applications. **(Author's abstract)**

Conducting polymers. Polypyrrole. Polyaniline. Poly (o-phenylenediamine). pH electrode. Polymer-modified sensor. Science and technology.

- 0560 Gearing national S&T capability for global competitiveness in the 21st century. Umpa, Camar A.. **Transactions of the National Academy of Science and Technology Philippines**, , :247-265

Although many explanations have been offered about why some nations, but not others, are able to industrialize and attain rapid and sustained economic growth, the role of the development of technological capability appears to be the most compelling. This paper initially presents some historical and theoretical arguments about the vital role of the adoption of new technologies in the industrialization and economic success of the rich nations of the world. It then examines the technological capability appears to be the most compelling. This paper initially presents some historical and theoretical arguments about the vital role of the adoption of new technologies in the industrialization and economic success of the rich nations of the world. It then examines the empirical relationship between (1) economic success, measured by per capita GNP of nations, and (2) technological capability, measured by: (a) size of R&D manpower, and (b) level of expenditure on R&D activities. Results of the analysis of both worldwide (70 nations, World Bank and UNESCO) and time series (Japan, South Korea and Taiwan) data support the contention that indeed economic success is a function of technological capability. On the basis of consistent historical, theoretical and empirical evidence, it is proposed that the Philippines, or any country for that matter, may only attain global competitiveness in the 21st century for the matter, may only attain global competitiveness in the 21st century by adequately improving its national technological capability. This can be done by increasing its number and quality of R&D personnel and spending a bigger proportion of GNP and R&D activities. **(Author's abstract)**

Science and technology. Industrialization. Economic success. Global competitiveness.

- 0561 High grade salt through geothermal steam. Protacio, Alfredo C. **Scientia Filipinas**, , 1(1):11-17

The advent of geothermal energy in the Philippines introduced a new heat source for salt making. At a pilot plant in Tiwi, Albay, heat from the earth's interior is being harnessed to recover dissolved salt in seawater, attain greater productivity and higher purity while salvaging valuable by-products such as magnesium, bromine and calcium sulfate.

Science and technology. Salt making. Geothermal steam.

- 0562 Lead and cadmium contents in *Ipomoea aquatica* forsk.. Baysa, Marieta C., Anuncio, Rachelle Rose S., Chiombon, Maryann Louise G., Dela Cruz, Julius Paul R., Ramelb, Jean Rochelle O.. **Philippine Journal of Science**, , 135(2):139-143

Ipomoea aquatica Forsk. (water spinach) which grows luxuriantly in Laguna de Bay may contain metals that are within the toxic levels for humans. This study was conducted to determine the concentrations of lead (Pb) and cadmium (Cd) in the top, middle, and bottom of the edible portions, and in the different organs of *I. aquatica* grown in Laguna de Bay. Also, to assess if the Pb and Cd concentrations in the plants are within the safe levels for humans. Pb concentrations in the plants were 0.259 to 8.72 mg/kg DW, with decreasing trend from roots to leaves, and from bottom to top subsections of the upper 36cm from the shoot apex. Water spinach had Cd concentrations which were 0.0058 to 0.0466 mg/kg DW. Pb and Cd concentrations in the edible portions (leaves and stems) of the upper 36cm of the shoot were far below the maximum tolerable daily intake for man set by World Health Organization (WHO). The bottom of the edible portion of the plant should be removed to minimize Pb intake. **(Author's abstract)**

Heavy metal. Water spinach. Aquatic macrophyte. Maximum tolerable daily intake. Science and technology.

- 0563 A local isolate of non-cellulolytic, xylanolytic, and pectinolytic thermophilic fungus *Thermomyces lanuginosus* C_{la}. Mendoza, Natividad S., Caliwara, Maria Trisette E., Unciano, Noel M.. **Philippine Journal of Science**, , 135(2):113-119

Twenty strains of thermophilic fungi were screened for their production of xylanolytic and cellulolytic enzymes in liquid medium containing birchwood xylan as substrate. All strains were found to be xylanolytic but only 3 strains were proven to be non-cellulolytic. One of the strain C_{la} was finally selected based on the highest xylanase production and absence of cellulolytic activity in culture filtrates. The selected thermophilic fungus, identified as a strain of *Thermomyces lanuginosus* has optimum temperature and pH for growth at 55°C and pH 6.0, respectively. It grew well on both Potato Dextrose Agar and Mandels & Sternberg medium in which cellulose was substituted with xylan. Among various cellulosic, sugars and xylan-based substrates as carbon sources, xylan and corn cob induced simultaneous production of high levels of xylanase and pectinase. Maximum enzyme activities of 5,846 and 840 IU/mL xylanase and pectinase, respectively, were obtained in liquid Mandels and Reese medium with 3% corn cob at pH 6.0 after 7 d incubation at 50°C and 150 rpm. **(Author's abstract)**

Thermophilic. *Thermomyces lanuginosus*. Cellulase-free. Xylanolytic. Pectinolytic. Science and technology.

- 0564 A molecular basis for the onset of turbulence. Muriel, Amador C.. **Transactions of the National Academy of Science and Technology Philippines**, , :21-29

We analyze existing data on the onset of turbulence for pipe flow in the light of a molecular theory for the onset of turbulence. In contrast to the use of derived quantities for characterizing the onset of turbulence, such as the Reynolds number, we restrict our data and analysis using observable quantities such as molecular properties and critical velocities. We find a rationale for the molecular origin of turbulence, in contrast to the exclusive use of continuum theory. **(Author's abstract)**

Science and technology. Molecular theory. Molecular.

- 0565 Preparation and mechanical properties of the CIP and HIP fabricated alumina ceramics. Dela Cuesta, Lina, Bernardo, Severino T., Mena, Manolo, Sison, Girlie Naomi, Cho, Seong Jai, Uematsu, Keizo. **Philippine Journal of Science**, , 135(2):105-112

The starting alumina powders were prepared by chemical synthesis at pH 6.5 and pH 8.5. Powders made at pH 8.5 exhibited finer particle size, high surface area and crystalline structure. These powders were fabricated by (1) cold isostatic press (CIP) and (2) hot isostatic press (HIP) at 1550°C and 1650°C sintering temperatures. The microstructure of both compacts showed abnormal grain growth but to a greater extent in those prepared by CIP. This was attributed to the presence of Ca in the starting alumina powders. The HIP fabricated alumina compacts at pH 8.5 and sintered at 1650°C, gave high flexural strength and fracture toughness due to the formation of fine-needlelike grains in between the fine-grains of alumina. The CIP fabricated alumina compacts at pH 8.5 and sintered at 1650°C showed relatively low values of flexural strength due to growth of large alumina grains. **(Author's abstract)**

Coprecipitation technique. Surface area. Microstructure. Flexural strength. Fracture toughness. Science and technology.

- 0566 Science and technology planning:. Roque, Celso R.. **Scientia Filipinas**, , 2(1):54-61

Science policy as the embodiment of the national scientific technological development plan must constitute an integral part of the national development policy. It must be concerned with the development of the country's resources and the promotion of technological innovation for the benefit of the nation. As such, it has to be sensitive to the people's needs and demands, and it ought to be aimed at the application of science and technology for the improvement of the social and economic conditions of all sectors of the population.

Science and technology. Mission-oriented approach. Science policy.

- 0567 The scientist as human and statesman. Davide, Jr., Hilario G.. **Transactions of the National Academy of Science and Technology Philippines**, , 26(2):173-179

Science has become a part of everyday experience. Man, in his complete reliance on tools sometimes loses sight of what he is building; thus, such tools have stunted or confused the search for meaning and purpose. The tools of law in its traditions and stability must be coupled with scientific innovations. While scientist strive to unify the sciences, so also must the sciences be unified with the law. However, scientists should never tire in urging the law to catch up with them. What law and policy ask of scientist is no small feat. Not only do scientists have to convince government leaders, but their advocacy must stretch to every sector of society. Our nation's dedication to science and technology and the purpose behind it is an explicit State policy. Section 17, Article II (Declaration of Principles and State Policies) of the 1987 Constitution provides that the State shall give priority to education, science and technology, arts, culture and sports to foster patriotism and nationalism, accelerate social progress, and promote total human liberation and development." Scientists are urged to propagate the traditions of science that teaches individuals and, ultimately, nations, the power to dream, to create, to act, to reason, and if it fails, to try again. This is not only within the power of science to do, but the power of science in a democracy. **(Author's abstract)**

Science. Law. Democracy. Humanist. Science and technology.

- 0568 Talent and innovativeness to meet the challenge of global standards in scientific productivity. Saloma, Caesar A.. **Transactions of the National Academy of Science and Technology Philippines**, , 26(2):277-288

Universities particularly their science and engineering graduate programs, are primary producers of precious intellectual capital in the Philippines in terms of the number of PhD and MS graduates produced in the natural sciences and the number of scientific papers authored by scientists with Philippine-based affiliations. We utilized the 21 year-graduation data (from school year 1983-84 to 2003-2004) of the College of Science, University of the Philippines and the 11-year publication output (1993-2003) of the Philippine-based scientists in peer-reviewed journals that are indexed by the Institute of Scientific Information. The Philippine performance is compared with those of other ASEAN countries for the same period of time. The findings are discussed from the perspective of Schumpeter's theory of business cycles. Our analysis reveals that the most serious challenge facing capital generation in the Philippines is the lack of quality graduate programs for producing competent PhD graduates in the sciences and engineering. Local graduate programs are vital in retaining young talented BS graduates who are likely to go to foreign universities for lack of other viable options. **(Author's abstract)**

Scientific productivity. Innovativeness. Intellectual capital. Science and technology.

- 0569 Virtual reality at virtuous reality. De Castro, Leonardo D.. **Transactions of the National Academy of Science and Technology Philippines**, , :269-276

Ibat-iba ang maaaring maging karakterisasyon sa kapanahunang dinadaan natin ngayon. Depende sa perspektibo ng komentaristang

pumupuna, ang ating kapanahunan ay madalas mabigyan ng bansag na kumakatawan sa isang uri ng teknolohiyang nangingibabaw at gumagabay sa pag-unlad. Halimbawa, mayroong nagsasabi na tayo ay nasa age of information sapagkat ang teknolohiya ng impormasyon ang nagsisilbing layag para sa landas na tinatahak ng sibilisasyon. Mayroon namang nagsasabi na tayo ay nasa age of biotechnology sapagkat, para sa kanila, ang mga makabagong tuklas at imbensiya sa larangang ito ang kumakatawan sa direksiyon ng ating pag-unlad. Nagkakaiba ang dalawang ito at ang iba pang karakterisasyon dahil sa kanilang pinagmumulang perspektibo. Gayunpaman, nagkakapareho sila sa palagay na ang takbo ng sibilisasyon ay nakasalalay sa pagtutulak ng dominanteng teknolohiya.

Hindi maipagkakaila ang malaking impluwensiya ng ibat-ibang teknolohiya sa pag-unlad dahil ang mga ito ang nakapagdikit ng mga pamamaraang nagagamit para matugunan ang mga pangangailangan ng tao – sa pagpapalago ng agrikultura, pagsugpo sa sakit, pagbibigay ng kasiyahan, pagpapahaba ng buhay, at iba pa. Sa harap ng mga pagbabagong ating naranasan kinakailangan nating maging mapagmasid at mapanuri at nang mapanatili natin ang pangingibabaw ng tao sa direksiyong ating tinatahak bilang isang lipunan o sibilisasyon.

Oo nga at ang teknolohiya ay umaandar lamang nang dahil sa pagtuklas at imbensiya ng tao. Subalit, ang mga tuklas at imbensiya na ito ay tila may kakayahang magkaroon ng sariling lohika kapag napakawalan na sa lipunan. Ang marami sa kanila ay nagkakaroon ng mga katangiang mapang-akit at mahirap tanggiin kahit nagiging salungat na sa orihinal na pakay ng paglikhang nagbunga sa kanila. Dahil dito, kinakailangang maging matatag ang tao sa kanilang pagmamaisip, at pagsusuri sa mga makabagong ugnayan, kapangyarihan at pagpapahalaga na namumuo sa lipunan. Sa ika-dalawampung-isan siglo, ito ang papel na patuloy na gagampanan ng mga agham panlipunan at pilosopiya. Nasa pagpapalaganap ng papel na ito nakasalalay ang pagpapalaganap sa kapanahunan ng tao.

Tama – sa kabila ng mabilis na pagbulusok ng siyensiya at teknolohiya ang kapanahunang kasalukuyan ay kapanahunan ng pagbabalik-loob ng tao.
(Author's abstract)

Virtuous reality. Science and technology. Age of information. Teknolohiya. Virtual reality.

SOCIAL SCIENCES

- 0570 An antimicrobial alkaloid from *Catharanthus roseus*. Ragasa, Consolacion Y., Inte, Vic Marie L., Rideout, John A.. **The Manila Journal of Science**, , 1(2):19-27

The chloroform extract of the air-dried leaves of *Catharanthus roseus* Linn. afforded perivine (1). The structure of 1 was elucidated by 1D and 2D NMR, UV and FT-IR spectroscopy and mass spectrometry. Results of the antimicrobial tests on 1 showed that at a concentration of 20 mg, 1 is active against *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Candida albicans* and *T. mentagrophytes*. It was found inactive against *Aspergillus niger*, *Escherichia coli* and *Staphylococcus aureus*. (Author's abstract)

- 0571 Antimicrobial compounds from *Spondias purpurea*. Ragasa, Consolacion Y., Poblete, Asteria T., Navida, Eugenio C.. **The Manila Journal of Science**, , 4(1):24-28

The dichloromethane, ethyl acetate, ethanol and water extracts of the freeze-dried bark of *Spondias purpurea* were tested for antimicrobial activities against seven microorganisms. Results of the study indicated that all the extracts at 30 µg have low antimicrobial activities against *E. coli*, *P. aeruginosa* and *T. mentagrophytes*. The water and ethanol extracts showed low activity against *C. Albicans*, while the ethyl acetate extract gave low activity against *A. niger*. All the extracts were inactive against *S. Aureus* and *B. subtilis*. The dichloromethane extract was fractionated by silica gel chromatography. It afforded 1, 2 and a mixture of hydrocarbons. Compounds 1 and 2 were identified by comparison of their ¹H NMR spectral data with those of lutein and sitosterol, respectively. Sitosterol and the mixture of hydrocarbons were tested against the same microorganisms. Result of the study indicated that both compounds had low activity against *E. Coli* and *P. aeruginosa* at 30 µg and inactive against *S. Aureus*, *B. subtilis*, *T. mentagrophytes* and *A. niger*. Sitosterol gave low activity against *C. albicans*. **(Author's abstract)**

Spondias purpurea. Anacardaceae. Lutein. Sitosterol. Hydrocarbons. Antimicrobial.

- 0572 The bandwidth of the cartesian product of a double star and a path. Fajardo-Lim, Yvette. **The Manila Journal of Science**, , 4(1):29-37

The cartesian product of two graphs *G* and *H*, written *G* x *H*, is the graph with vertex set *V* (*G*) x *V* (*H*) and with (*u*₁, *v*₁) adjacent to (*u*₂, *v*₂) if *u*₁ is adjacent to *u*₂ in *G* and *v*₁ = *v*₂ or *u*₁ = *u*₂ and *v*₁ is adjacent to *v*₂ in *H*. This paper establishes the bandwidth of the cartesian product of a double star and a path. **(Author's abstract)**

Graph. Cartesian product. Bandwidth.

- 0573 Beyond Manila:. Castillo, Gelia T. **Scientia Filipinas**, , 1(1):37-57

Beyond Manila is a treasure trove of interesting inferences drawn from available research information painstakingly compiled, organized and analyzed to present a coherent picture of rural Philippines and its problems. Written by a noted Filipino social scientist, the volume is a vigorous response to the challenge posed by the unhealthy situation wherein Philippine society had to be interpreted to Filipinos by non-Filipinos. It is objective yet unmistakably involved in the subject: it articulates the real, unblemished needs of the millions who thrive behind the hub of development that is Manila. "Manila is our image to the world, our crown jewel, and the dreamland of many rural

youth, but is is not the Philippines,\" the author reflects. \"We are a nation of villages and villagers, Manila's skyline notwithstanding ... no matter how hard we try, we cannot wish away the existence of a rural majority most of whom are poor.\"

Social sciences. Faces of inequality. Quality of life. Rural-urban differentials. General farm situation.

- 0574 On complete 14-arcs in semifield planes of order 16. O'Keefe, Christine M., Pascasio, Arlene A.. **The Manila Journal of Science**, , 1(2):29-32

Examples of complete 14-arcs have been given in all, except two, non-desarguesian translation planes of order 16. In this paper we give examples of complete 14-arcs in the two remaining planes namely the semifield plane with kernel GF(2) and the semifield plane with kernel GF(4).
(Author's abstract)

- 0575 Critical aspects of family and reproductive health among middle and lower middle income mothers in Metro Manila. Cabigon, Josefina V.. **Transactions of the National Academy of Science and Technology Philippines**, , :383-384

The Rapid Appraisal for Friendly Care Foundation Inc. (FCFI) provided information on critical aspects of family and reproductive health in the surrounding areas of the corporate clinic of FCFI located in Shaw Boulevard, Mandaluyong City. These information are vital in attaining a more effective planning and implementation of FCFI health project aimed at providing high quality, easily accessible and affordable health care services to middle and lower income families nationwide. One of the methods of data collection used is a survey of 254 mothers 15-49 years old sampled by following a two-stage cluster sampling design in barangays contiguous to FCFI main location. In the survey, the questionnaire was structured in such a way that vital information on marketing opportunities, clinic operations, affiliation, family planning, adolescent health and other reproductive health problems and quality of health care could be obtained. The survey took place in June to July 2000. Results show that: (1) marketing prospects for FCFI are large, varied and encouraging; (2) most potential clients indicate ability to pay; (3) most common amount affordable for private consultations is P100; (4) distance is one though not the most major consideration for availing services; (5) medical person-to-client was perceived as the most effective way of advertising clinic services; (6) doctors and midwives emerged as the best sources of information of family planning; (7) doctors, parents and TV are the first three ranking important sources of information for adolescents about sexuality and reproductive health; (8) while contraceptive prevalence was higher in the study areas than the whole nation and the whole of Metro Manila, a higher level of unmet need (24%) especially for limiting the number of children existed; (9) pill, sterilization and calendar rhythm were the most popular methods currently used and preferred to used in the future; (10) early marriage and unwanted pregnancy where the most pressing problems for women as a whole and adolescents in

the study barangays; (11) adequate provisions of services, technical competence, accessibility, affordability and interpersonal relations are qualities mothers are looking for in the health facility they usually go for health services. **(Author's abstract)**

Social sciences.

- 0576 Detection of paralytic shellfish poisoning (PSP) toxins in Philippine Mussel Samples by electrospray mass spectrometry. Floresca, Ma. Christina Grace Z., Abad, Barbara Michelle, Amora, Tabitha, Lim, Mary Angelica, Marquez, John Paulo. **The Manila Journal of Science**, , 4(1):38-44

The occurrence of toxic red tide outbreaks is an environmental and public health hazard in the Philippines. Thus, it is necessary to develop monitoring programs to protect the shellfish industry and the general public. Previous methods for the detection of paralytic shellfish poisoning (PSP) toxins make use of mouse bioassays and /or fluorescence detection through High Performance Liquid Chromatography (HPLC). The mouse bioassay, while cheap and rapid, requires a large amount of sample, and is capable of detection of toxin concentrations that are already near the regulatory limit. Fluorescence HPLC analysis of derivatized PSP samples is destructive and is not sufficiently reproducible. We report a new procedure for the rapid detection of components of samples contaminated by Pyrodinium bahamense var compressum using a combination of reverse-phase HPLC and electrospray mass spectrometry. The procedure is fast and requires minimal amounts of sample, so that purified toxins need not be derivatized as a prerequisite for its detection. In addition, results from this study complement earlier findings that the main toxic components of Philippine toxic red tide are neosaxitoxin, decarbamoylsaxitoxin, and gonyautoxin. **(Author's abstract)**

Saxitoxin (STX). Paralytic shellfish poisoning (PSP). Red tide monitoring.

- 0577 The doctor-patient-bantay relationship. Sana, Erlyn A.. **Transactions of the National Academy of Science and Technology Philippines**, , :385

In moder societies, patient depend on physicians on matters related to health. In the Philippines, a patient who is hospitalized also relies on a non-medical person, usually a relative who stays with him/her during confinement: the Bantay.

This paper investigated how the doctors, patients, and bantays relate to each other, the norms that they practice and the social implications they reveal in the process of their interactions.

The researcher did a participant observation of daily activities in all clinical settings at the Philippine General Hospital Medical Center. Interviews of key informants, review of secondary data and accomplishment of questionnaire were done.

The patterns of interaction among doctors, bantays and patient include the

stages of helplessness, critical surrender, independence and resignation. Both patient and bantay are helpless when the former is critical. As the patient gets well, he/she and the bantay get more actively involved in the treatment until they are ready to go home and declare independence from physicians. In cases where the patient expires, resignation ensues. The whole pattern shows that having someone who continuously shows concern not only contributes to easy recovery but also to reduced dependence on doctors. The relationship also mirrors the condition of the poor and the unwell to depend on the rational authority of physicians and that the relationships make a totally social structure. **(Author's abstract)**

Social sciences.

- 0578 Hydrothermal synthesis and characterization of an akaganeite-type iron oxide octahedral molecular sieves. Nicolas-Tolentino, Elaine, Alforon, Pamela. **The Manila Journal of Science**, , 4(1):1-10

Iron oxide octahedral molecular sieve with 2x2 tunnel, designated as FeOx-OMS (2x2) was successfully synthesized by hydrothermal method. FeOx-OMS (2x2) has high degree of purity and higher thermal stability than those of previously reported akaganeite type materials. The X-ray powder diffraction (XRD) pattern shows peaks that are characteristic of pure akaganeite-system. Based on its TGA profile, its thermal stability is reported up to 255°C, and beyond 402°C, new phases are formed which is a mixture of hematite and magnetite based on its XRD pattern. The SEM result shows needle-like morphology that is typical of a tunnel structure. **(Author's abstract)**

Hydrothermal. Akaganeite. Octahedral molecular.

- 0579 Lead uptake and growth responses in *Pistia Stratiotes* Linn. (Quiapo)
 . Espinosa, Rosario S.. **The Manila Journal of Science**, , 4(1):16-22

Pistia stratiotes was cultured in hydroponics solutions amended with three different lead (Pb) levels - 2ppm, 4ppm and 8ppm [Pb in the form of Pb (No)]. AAS analysis revealed that Pb accumulation in the plant tissue (BCF) increased with increasing Pb levels in the culture solutions. Pb accumulation had caused the development of chlorotic leaves and decreases in the fresh biomass of the plants. However, there was no interference of the Pb accumulation on the growth responses of *Pistia* in terms of moisture, chlorophyll, and protein contents. These findings imply that *P. stratiotes* might be useful in heavy metal decontamination process in industrial and domestic wastewaters. These responses also indicate the potential of *Pistia* as a lead scavenger and bioremediation tool in the aquatic environment. **(Author's abstract)**

Pistia stratiotes. Lead (Pb). Lead uptake. Growth responses. Heavy metal

accumulation. Lead pollution. Lead toxicity. Lead scavenger. Bioremediation tool.

- 0580 Notes on fruit consumption of the Philippine Bulbul (*Hypsipetes philippinus*) and its quality as a seed disperser. Schabacker, Jens, Curio, Eberhard **Silliman Journal**, , 43(1):59-82

The Philippine Bulbul (*Hypsipetes philippinus*, *Pycnonotidae*) is, by virtue of its relative abundance, the most common frugivorous bird in primary and secondary forests in the West Visayas, Philippines. This paper compiles data on 49 tree species used for their fleshy fruits by the Philippine Bulbul. Additional more detailed observations were made on one tree each of four fig (*Ficus* sp.) species as well as a number of other fruit-eating forest birds.

Bulbuls feed in general on small fruits of up to 20 mm in diameter. Depending on tree species, they eat 66-82% of the fruits which they pluck from the source tree and drop only a minor proportion into the ground. Only less than 9-22% of fruits harvested are carried away from the source tree in the bird's beak. Since birds stay in the near vicinity of an exploited tree, the fraction of fruits carried over long distances seems to be small. However, of those many seeds ingested on and near a source tree, a substantial fraction may be dispersed over longer distances upon passing the gut. The bulbul benefits a fruiting tree through seed dispersal since it ingests all seeds by swallowing the fruits whole. Both this species and other frugivorous birds handle (eat, drop, carry) fruits in distinct ways irrespective of the tree species on which they feed. Thus, birds of up to eight species, including the bulbul, exploiting the same fig species differ significantly from each other in the manner of handling mentioned. This translates into quality differences among those birds as seed dispersal agents. Being a generalist frugivore, and because of its abundance, the Philippine Bulbul may be among the most important seed dispersers in this region. Other forest birds, through being in part more specialized on fruits, appear to rank lower as seed dispersers for a number of reasons. **(Author's abstract)**

- 0581 On orbitals of a class of permutation groups. Ponsones, Rigor B.. **The Manila Journal of Science**, , 1(2):33-35

In this article, the author determines the number of distinct orbitals of a known subgroup of the wreath product of the symmetric groups S_m and S_r acting on $W = \{1, 2, \dots, mr\}$, where $m, r > 1$. Furthermore, he shows that every non-trivial orbital of this group is symmetric. This article is intended for graduate students who are doing group theory. **(Author's abstract)**

- 0582 Profile of selected Filipino scientists:. Torres, Elizabeth M.. **Research Journal**, , :2-9

This study looked into the personality, family background, education and training, special qualities, and the process of research conceptualization and production of forty-two outstanding Filipino scientists. Using an auto-biographical technique, the researcher found out that most were males, of middle class origin, with at least one parent who was a strong influence in their lives. They were bright if not superior in intellectual abilities. Among the factors that influenced their choice of a science career-a parent or member of the family, scholarships, interest in and or abilities in science and mathematics, community, the most profound was a teacher or a mentor: Among the common qualities of Filipino scientists were strong inclinations for order and discipline, a desire for closure, and habits of personal leadership and management. They had a strong desire for intellectual adventure, and along with a patriotic spirit, a strong sense of mission. The processes of association, imagination, and

Social sciences. Filipino scientists. Scientific personality.

- 0583 Solstices in the tropics. Roleda, Robert C.. **The Manila Journal of Science**, , 1(2):43-48

This paper shows geometrically the diurnal motion of the sun in the tropics, especially during solstices. It is shown that while daytime is longest during summer solstice, in the tropics the sun is not found at its highest point on the same day. Unlike other regions, the noontime tropical sun shifts between north and south in the course of a year. This paper also presents a method for calculating the lengths of daytime and nighttime, and for calculating when a tropical sun would be at the zenith. **(Author's abstract)**

- 0584 Synodic periods of moons and planets. Roleda, Robert C.. **The Manila Journal of Science**, , 1(2):37-42

Periods of moons and planets are often expressed relative to stars. Called the sidereal periods, these offer the advantage of expressing the quantities in common units, allowing for easy comparison. There are instances, however, when one might want to know the periods of moons and planets as seen from the planets themselves. For example, the Pathfinder mission to Mars require solar power for its various activities. Hence observations are taken only during Martian day time. This paper presents ways of translating sidereal periods to synodic periods. **(Author's abstract)**

- 0585 Teacher motivation, student motivation and achievement in high school mathematics and science education. Liwag, Ma. Emma Concepcion D., Enriquez, Ma. Cristina H.. **Transactions of the National Academy of Science and Technology Philippines**, , :384-385

Basic education in the Philippines is currently viewed as a system in crisis. Mathematics and Science education in particular have received much critical scrutiny of late in the wake of Filipino students' dismal performance on both local norms and international benchmarks such as the Third International Math and Science Study.

The present study is an attempt to take a closer look into the state of Math and Science education in the Philippines, and in particular, the motivation of teachers and students. Four main variables were the focus of this study, namely, teacher motivation, teacher perception of student motivation, student motivation, and student achievement. The study sought to establish the interrelationships among these four variables. In all, 2,666 high school students across the four year levels and 37 of their teachers were purposively sampled from 76 Science and Math classes in two public secondary schools in Metro Manila. The teachers responded to a research-constructed instrument, the Teacher Motivational Questionnaire (TMQ), which assessed their feelings and motivation attitudes towards teaching Math or Science, and their perception of their students' attitudes towards these subjects. The students answered the Student Motivational Questionnaire (SMQ) where they reported their own motivational attitudes towards Math or Science, and their motivation-related behaviors in these two subjects (e.g., engagement in the classroom, academic effort, study habits). Math and Science achievement was measured using Third Grading Period grades.

Results showed that teachers had moderately high levels of motivation, with no significant differences across subject (Math versus Science) and other demographic variables (e.g., educational background, years of teaching). In contrast, teacher perception of student motivation in Math and Science was not high – in general, teachers do not perceive their students as having very positive attitudes and academic behaviors was also found to be non-significant, implying that teacher perceptions are not congruent with actual behaviors reported by the students. Students had more favorable attitudes towards Math than Science, claiming to enjoy the subject and seeing it as important, while they perceive Science as very challenging. But these positive attitudes did not predict behaviors: student-reported classroom behaviors and study habits in these two subjects were not efficacious. Lastly, highly motivated Science teachers were found to have highly motivated Science students, but this relationship was not found for Math. More importantly, in both Science and Math, highly motivated teachers did not produce students with better academic achievement. Overall, the findings suggest that other teacher and student factors in the public school system influence student achievement, and that sometimes, motivation is not enough. **(Author's abstract)**

Social sciences. Science and Math secondary education. Student motivation. Teacher motivation. Student achievement.

0586 Varanus mabitang, a rare monitor lizard from Panay Island and a new conservation target. Gaulke, Maren, Curio, Eberhard, Demegillo, Arnold, Paulino, Narciso **Silliman**

Despite its huge size (minimal total length of 175 cm), the *Varanus mabitang* became known to science only in 2001. According to present knowledge, this blackish, arboreal lizard is confined to forested areas of NW and W Panay. It has a vegetarian diet, consisting of fruits and leaves of different forest plants. Due to the restricted range and its specialized habits, the Mabitang is a threatened species. Its protection is directly correlated to the protection of its habitat. **(Author's abstract)**

- 0587 Visual fruit preferences of Visayan Tarictic Hornbills, *Penelopides panini panini* (Bucerotiformes: Bucerotidae), and musky fruit bats, *Ptenochirus jagori* (Megachiroptera: Pteropodidae), in cafeteria experiments. Luft, Stefan, Tacud, Benjamin, Urbina, Henry, Geronimo, Felimon **Silliman Journal**, , 43(1):42-58

Cafeteria-choice experiments revealed preferences of Visayan Tarictic Hornbills (*Penelopides panini panini*) and Musky fruit Bats (*Ptenochirus jagori*) for test fruits with different wavelength reflection characteristics. Preferences for certain colors were assessed by offering artificially colored fresh fruit cubes of banana pulp ('test fruit'). Findings indicate that white hornbills preferred red and blue test fruits, fruit bats showed a preference for yellow and red test fruits. Although fruit bats are color blind, reflection properties of fruits might support visual guidance for foraging bats under dim light conditions. Samples of reflectance measurements of 'typical' bat and bird fruits in the wild are given. **(Author's abstract)**

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	0477	Enriquez, Ma. Luisa D.	0330
Detera-Wadleigh, Sevilla D.	0368	Enriquez, Marileth U.	0176
Dhar, Dolly Wattal	0078	Epistola, Elmer	0298
Diaz, C.	0378	Ero, Lyzeil P.	0439
Diaz, Siegfred H.	0007	Escano, C.	0440
Diesmos, Arvin C.	0152	Escano, Crisanto R.	0037
Digal, Larry N.	0483	Escobido, Encarnacion O.	0009
Digsay, Charmaine Florabel A.	0293	Escobin, Ramiro P.	0472
Dimaguila, L.S.	0221	Escoto, A.	0227
	0222	Escoto, Angela D.	0295
	0226	Escoto, Jr., Miguel T.	0277
Dimapilis, Leonida L.	0473		0365
Dioneda, Mary Ann A.	0083	Esguerra, James Paul H.	0207
Diongzon, Maria Lima D.	0206	Espino, T.M.	0191
Divinagracia, Ma. Christine A.	0228	Espinosa, Rosario S.	0579
Dizon, Romeo M.	0490	Espiritu, Emilyn Q.	0386
Dolino, Cynthia N.	0152	Esquierdo, Cristeta	0158
Dolores, Lolita M.	0125	Esteban, Janalezza Morvenna A.	0207

Estrella, Lillian	0548	Gabriel, Elizabeth P.	0454
Estrella, R.R.	0500	Galam, Dominique	0034
Estrella, Romulo R.	0198	Galang, Jr., Bienvenido H.	0418
Eusebio, Artemus F.	0276	Gallardo, Ma. Victoria G.	0408
Eusebio, E.C.	0134	Gamutan, Kathleen Grace C.	0532
Exile, Jr., Amado M.	0431	Gapasin, Ruben M.	0206
Fajardo, A.M.	0055		0440
Fajardo, Ferdinand F.	0404	Gapud, Victor P.	0094
Fajardo-Lim, Yvette	0572	Garcia, Beatriz R.	0013
Faschinger, W.	0558	Garcia, E.S.	0189
Fegan, Mark	0187	Garcia, Edito G.	0543
Fenoy, Rudy C.	0210	Garcia, Mercedes U.	0433
	0428	Garcia, Merlita C.	0319
Fermo, Hanagrace F.	0221	Garcia, Roberta N.	0102
Fernandez, Eduardo C.	0131		0489
Fernandez, Elvira C.	0108	Gargantiel, F.T.	0049
Fernandez, Pilar Nieman	0216		0053
Fernandez, Virgilio A.	0455		0056
Fernando, E.S.	0048		0107
Ferraren, Dilberto	0368	Gaulke, Maren	0586
Festin, Cedric Angelo M.	0230	Gayao, Louie Leonides M.	0317
Fidel, Mildred M.	0464	Gergon, Evelyn B.	0034
Figarola, D.B.	0104		0440
Filo, J.M.	0502	Gergon, Henry S.	0155
Fish Genetics Breeding Group	0400	Geromo, Francisco B.	0085
Flasinski, Stanislaw	0033	Geronimo, Felimon	0587
Flavier, Maxima E.	0162	Ghosal, Ashitava	0316
Flojo, Leterito	0113	Ghouse Basha, M.	0204
Flor, Ma. Carmela Grace T.	0159	Go, Lourdes A.	0422
Flores, Virgilio R.	0148		0445
Floresca, Ma. Christina Grace Z.	0576	Go, T.G	0507
Floresca, Maria Cristina Grace Z.	0404	Gomez, Madelaine V.	0124
Fontanilla, Ian Kendrick C.	0398	Gonzaga, Rolando T.	0417
Fordan, Estrella M.	0026	Gonzales, Billy Martin V.	0386
Fortes, Norma R.	0390	Gonzales, Cecile P.	0544
Fortes, Romeo D.	0405	Gonzales, Joanna	0412
Franco, Samuel S.	0157	Gonzales, John Ivan J.	0327
Fuentes, Frances Rossanne C.	0073	Gonzales, M.Y.	0041
Fujii, Keisuke	0320		0045
Gabertan, Herminigilda A.	0030		0050
	0039	Gonzales, Manuel Y.	0020

Gonzalez, Juan Carlos T.	0338		0402
Gonzalez-Paso, Maria Victoria SG.	0436	Hien, Phan Hieu	0271
Gooc, Hermogenes C.	0320	Hipolito-Nancho, Rosa Ma	0427
Gopez, Adolfo Jesus R.	0093	Hizon, John Richard E.	0353
	0341	Honda, Hiroshi	0493
	0343	Horrilleno, Evelyn	0552
	0361	Hughes, J.F.	0323
Gorospe, Vanessa Eve M.	0112	Hui-Lan, Zhong	0195
Gragasin, R.P.	0135	Ibañez, Vinzon C.	0338
Green, Sylvia K.	0125	Ichikawa, Tomotake	0492
Gregorio, Enrico G.	0231	Ignacio, Shalimar I.	0073
Gregorio, Glenn	0100	Ilar, Glen	0110
Grey Craig, A.	0183	Imbao, Roselle	0338
Guevara, R.C.L.	0289	Inson, Rodolfo T.	0115
Guevara, Rowena Cristina L.	0267	Inte, Vic Marie L.	0570
Guinsatao, Lucrecia G.	0082	Ishizaki, K.	0363
Guirnela Edwin	0499	Islam, Md. N.	0451
Gutierrez, Marte	0307	Jacaine, Domingo V.	0425
Gutierrez, Kalangitan V.	0540	Jaen, Marcelo N.	0538
Guzman, Ma. Fita P.	0548	Jalando-on, R.R.	0147
Guzon, S.	0064	Jamil, Ferdinand P.	0258
	0065	Jamito, Copernico O.	0417
Halos, Ponciano S.M.	0178	Javier, Emil Q.	0002
	0179	Jensen, Jens R.	0121
Halos, Saturnina C.	0344	Jorge, II, Manuel C.	0545
	0374		0546
Hamoy, Geohana L.	0330	Jorillo Jr., Pablo A.	0249
Harborne, Alistaire R.	0495		0328
Harding, Simon P.	0494		0347
	0495	Jose, Wilfredo I.	0174
Hautea, R.A.	0116		0332
Haycock, Simon	0494	Joshi, Ravindra C.	0171
Hayin, Jovita A.	0484		0219
Hedreyda, C.T.	0197	Jover, Edna M.	0082
Hedreyda, Cynthia T.	0338	Jueco Nonette L.	0543
Hernandez, Jr., Jaime Y.	0318	Jueco, Nonette L.	0553
Hernandez, Jr., Manuel V.	0316	Julaton, Maria Corazon N.	0001
	0331		0058
Hernandez, Princess C.	0162	Juliano, Bienvenido O.	0038
Herrera, A.B.	0363	Junio, Gobleth D.	0389
Herrera, Annabelle A.	0400	Kapoor, K.K.	0087

Kawashima, Takashi	0247	Ledesma, Gerardo L.	0495
Khandelwal, Ramesh Chand	0224	Ledesma, Jose-Maria	0235
Kilat, Kemmons S.	0498	Ledesma, Ragnar	0362
Kitajima, Mariko	0492	Ledesma-Gamba, Marie Angeline	0545
Kobayashi, Takao	0447	Lee, Anthony C.	0527
Koh, MLJ	0420	Lian-Yin, He	0195
Kohli, D.	0316	Libarnes, Roseller L.	0517
Korn, M.	0558		0531
Krause, D.C.	0197	Lidasan, Hussein S.	0379
Kuehn, D.W.	0066	Liguit, Michael	0412
Kunwar, I.K.	0199	Lim, Jane V.	0535
Kuppusamy, Thangavelu	0297	Lim, Mary Angelica	0576
Lacerna, Indira D.	0007	Lim, Sheila T.	0178
Lacsamana, Marivic S.	0243	Liongson, Leonardo Q.	0217
Lagman, Angel	0338		0310
Lagman, Anneli S.	0312	Lirazan, Marcelina B.	0183
Lainez, W.N.	0554	Lit, Jr., Ireneo L.	0031
Lambio, Ivy Amor F.	0013		0177
Lantican, C.B.	0323	Liwag, Ma. Emma Concepcion D.	0585
Lantican, Celso B.	0446	Lizaris, Juny	0495
Lantican, Celso B.	0470	Logroño, Manuel L.	0131
Lantin, Reynaldo M.	0351	Lontok, N.	0333
Lanto, E.A.	0500	Lopez Jr., Romeo G.	0249
Lanto, Eduardo A.	0198		0373
Lao, Judy Y.	0526	Lopez, Daisy	0492
Lapitan, Delinia G.	0276	Lopez, Epifanio D.	0264
Lapitan, Francisco G.	0461	Lopez, Nellie C.	0106
	0462		0112
Lapuz, Rebecca B.	0464	Lopez, Perla L.	0067
Lasmarias, Victoria T.	0150	Lopez, P.J.S.	0194
Laude, Rita P.	0434	Lu, Chien-an	0176
Laurena, Antonio C.	0489	Lu, Juan L.	0200
Laurena, Antonio S.	0102	Lucero-Tan, Florida	0532
Lawas, Irineo L.	0512	Luft, Stefan	0587
Lawas, Noel D.	0512	Luis, E.S.	0101
Layno, Renilda S.	0283		0181
Leach, J.E.	0190	Lukban, Marissa B.	0469
Leagogo, Jr., Liberato Antonio	0549	Macabale, Sharon S.	0001
Leagogo, Liberato C.	0523		0202
Leano, Jr., Julius L.	0228		0477
	0428	Macalinao, Patrocinio O.	0119

Macaranas, Federico M.	0486	Masagca, Jimmy T.	0022
Machenbaum, Roland	0337	Mateo, Lun G.	0077
Mackill, David	0100	Mateo, Zenaida F.	0282
Mactal, Marlon A.	0138	Matias, Aura C.	0349
Madamba, Ma. Luisa A.	0497	Matias, Ronald R.	0254
Madatu, Sitti Nur-en R.	0409		0398
Madlangbayan, Marish	0273	Matsuda, Kazuhiko	0493
Magallanes, Jingle B.	0320	Matsuo, Masfumi	0306
Magat, S.S.	0242	Matsuyama, Shigeru	0493
Magat, Severino S.	0156	Maunder, Louisa	0235
Magboo, Arthur T.	0551	Medalla, Angelita P.	0119
Magboo, Ma. Shiela A.	0193	Medina, Julieta F.	0516
Magdalita, Pablito M.	0201	Melendres, Fernando A.	0544
Maglinao, Amado R.	0004	Melodia, F.	0161
Maglonzo-De Jesus, M.S.	0263	Mena, M.	0350
Magnaye, Lydia V.	0009	Mena, Manolo	0565
Magno, Michelle Music F.	0344	Mena, Manolo G.	0248
Magpantay, C.G.	0363		0274
Magtubo, Erville D.	0309		0278
Mainimtim, Eva Marie T.	0239		0298
Mair, Graham C.	0387		0327
Makiuchi, Katsuhiko	0307		0367
Malaluan, Roberto M.	0391		0371
Mamhot, Alice A.	0498	Mendioro, Merlyn S.	0276
Mamhot, Millard R.	0498	Mendoza, Doris	0506
Manahan, Laura	0543	Mendoza, Guillermo	0288
Manalac, S.	0227	Mendoza, Myrna T.	0533
Manalaysay, Gladys	0466	Mendoza, Natividad S.	0563
Manegdeg, Ferdinand G.	0259	Mendoza-Salonga, Aida S.	0516
	0299	Mendoza-Wi, Jennifer Ann	0534
	0334	Merca, Anna E.	0434
	0356	Merca, Florinia A.	0518
Mangahas, Paulo Miguel F.	0304	Merca, Florinia E.	0243
Mangubat, Emmanuel	0241	Mercado, Alfonso	0028
Manoharachary, C.	0199	Mercado, Candy C.	0305
Manzanero-Galvan, Noemie M.	0097	Mercado, M.A.	0191
Marave, Miguel D.	0446	Metcalf, Peter	0329
Marquez, John Paulo	0576	Miller, Susan A.	0440
Marquez, Raquel B.	0146	Minje, Virginia D.	0368
Martin, A.B.	0554	Miole, Dennis	0497
Martin, Juan F.	0265	Miranda, Jasmin Jiji	0169

	0175	Odulio, Carl F.	0340
Miranda, Marisa B.	0125	Ojeda, Lourdes O.	0302
Miyamori, Tateki	0307	Ojeda, Ma. Concepcion O.	0287
Miyamoto, Akiya	0320	Olesco, Richard O.	0372
Miyata, Hitoshi	0346	Olivera, Baldomero M.	0165
Molina, Isidore Ma. M.	0214		0183
Monje, Virginia D.	0073	Ong, Danilo	0552
	0165	Ong, Johann L.	0348
Monroyo, Evangeline C.	0198	Ong, Victoria D.	0303
Montaño, Marco Nemesio E.	0518	Onoda, Norihiko	0247
Montalban, Antonio M.	0522	Oracion, Enrique G.	0393
	0530	Ordoñez, Il, Jose A.	0022
Montalban, Cecilia	0542	Orejana, F.M.	0385
Montebon, A. Rex F.	0490	Orense, Rolando P.	0357
Montecillo, Lupo A.	0458	Oreta, Andres W.C.	0256
Montoya, Jaime C.	0263	Osterrieder, S.	0314
Morada, Fiel Ethel A.	0092	Oteyza, Edgar N.	0513
Movillon, Jovita L.	0124	Otsuki, Nobuaki	0273
Muriel, Amador C.	0564	Pabalan, Karmina	0466
Murleigh, James R.	0138	Pabilonia, Teresa	0239
Nancho, Rosa Ma	0444	Pableo, Fe B.	0025
Natividad, A.S.	0554	Pacatang, L.	0333
Natividad, Filipinas F.	0330	Pacheco, Edgardo S.	0257
	0389		0272
Naval, Jr., P.C.	0555	Pacoli, Cecily Q.	0389
Navarro, A.A.	0046	Padilla, Carlos L.	0035
Navida, Eugenio C.	0571		0184
Navidad, Suzeth V.	0391	Padilla, Carmencita D.	0306
Nayudu, Murali	0090	Padlan, Eduardo A.	0520
Nequin, Merlyn N.	0044	Padolina, William G.	0003
Niño, Milady R.	0465	Padua, Florecita, R.	0515
Nicdao, Amelia M.	0030	Padua, R.	0333
Nicdao, Jose Leonardo V.	0404	Pagador, Emily	0412
Nicolas-Tolentino, Elaine	0081	Pagaduan, Rolando V.	0138
	0578	Pagbilao, Dominador S.	0373
Nishida, Takahiro	0273	Pahm, Kundo E.	0154
Nishiyama, Kaoru	0306	Paite, Bernabe L.	0251
Nitollama, Rodolfo L.	0523	Pakingan, Joan T.	0404
Nonato, Maribel G.	0492	Palasol, H.V.	0040
Ochotorena, Zenaida Legaspi	0205	Palaypayon, William R.	0457
Oconer, Edna P.	0402	Palisoc, Josefina G.	0432

Palmes-Saloma, Cynthia	0304	Peralta, Milagros M.	0488
Pamplona, P.	0116	Pereira, Rosalyn A.	0264
Panaligan, Dante R.	0145	Perez, M.T.M.	0190
Pangilinan, Ma. Lourdes D.	0287	Perez, Pierriden A.	0033
Paningbatan, Eduardo P.	0004	Pham, Chay B.	0092
Panol. Francisco Y.	0148		0146
Paraguison, Rubigilda	0169	Pilar, Anna Victoria C.	0254
	0175	Pilongo, Jasper	0466
Paran, Alexander P.	0270	Pitargue, Jr., Fernando C.	0472
Parreno, Charmaine	0466	Platon, Petrocelli O.	0317
Pasamba, Reynald	0512	Poblete, Asteria T.	0571
Pascasio, Arlene A.	0574	Pobre, Thomas Elias Y.	0510
Pascasio, Flora M.	0526	Pollisco, Filiberto S.	0421
Pascua, A.	0116		0423
Pascual, Charisse G.	0466	Ponsones, Rigor B.	0581
Pascual, Cherrie B.	0370	Porquez, P.H.	0055
Pascual, L.I.	0135	Portal, Marisol G.	0356
Pasikatan, Melchor C.	0352	Portilla, Ma. Cristina B.	0370
Pasternak, Charles A.	0180	Postor, Irene Q.	0330
Pasuelo, Marites J.	0465	Poungsuk, Pukkapong	0521
Pateña, Lilian F.	0083	Prasanna, Radha	0078
	0125	Presto, Romulo S.	0059
	0139	Prometila, Michael Angelo B.	0124
Paterno, E.S.	0189	Protacio, Alfredo C.	0561
Paterno, Erlinda S.	0188	Pucyutan, Billy S.	0418
Patnugot, Mila M.	0407	Pugal, D.L.	0363
Patricio, Anne Marie	0466	Pugat, Coronalyne	0158
Patricio, Marilyn G.	0138	Puno, Recto H.	0023
Paulino, Narciso	0586	Punzal, Belen S.	0094
Payawan, Norma Aurora A.	0052	Puyaoan, Alma	0158
	0113	Quano, Ely Anthony R.	0232
Peñaalba, Fredelino P.	0035	Que, Jr., Samson O.	0496
Pedrasa, Jhoanna Rhodette I.	0230	Que, Norbert S.	0366
Pedrasa, Michael Angelo A.	0339	Qui, Zeyuan	0326
Pei-Zhi, Gao	0195	Quick, Graeme R.	0271
Penalba, Francisco F.	0085		0351
Penaranda, M.	0169		0352
Penecilla, Gerard L.	0200	Quilao, T.A.	0363
Pepito, E.A.	0011	Quimbo, L.L.	0104
Peralta, Aubrey	0466	Quimbo, Lucio L.	0438
Peralta, Jose P.	0385	Quimio, Tricita H.	0185

Quinto, May Faye	0466	Resurreccion, Augustus C.	0335
Quinton, Suzette	0412	Resurreccion, Joanna Z.	0335
Quintos, M.M.	0294	Resurreccion, Jr., Alejandro N.	0342
Quintos, Mutya Ma.	0447	Revilla, Jr., Adolfo V.	0473
Quiros, Edwin N.	0268	Revilleza, Ma. Jamela R.	0162
Quitain, Grace Ann B.	0504		0488
Rabe, Rannie R.	0276	Reyes, Edgardo S.	0223
Ragasa, Consolacion Y.	0570	Reyes, Erlinda T.	0516
	0571		0519
Raines, Peter	0235	Reyes, Gloria D.	0368
Raines, Peter S.	0494	Reyes, J.P.	0502
	0495	Reyes, Joseph Gerard T.	0340
Rajeshwar Rao, B.R.	0199	Reyes, Maureen	0466
Rajotte, E.	0094	Reyes, Pauline T.	0167
Ramelb, Jean Rochelle O.	0562	Reyes, T.T.	0151
Ramirez, Bernadette L.	0475	Reymundo, Avelino D.	0091
Ramos, Adelisa C.	0334	Rideout, John A.	0570
Ramos, Henry J.	0223	Rivera Virtudazo, Raymond V.	0012
Ramos, Jaime R.	0411		0158
Ramos, Mario DR.	0472	Rodelas, Abigail Joy D.	0243
Raneses, Nestor O.	0303	Roderos, Remedios R.	0167
	0321	Rodriguez, Evelyn B.	0209
	0334	Rodriguez, M.P.	0554
Rasco, Jr., E.T.	0194	Rodriguez, Roslyn DM.	0527
Ravago, Reuben J.	0308	Rodriguez, S.V.	0289
Raymundo, A.K.	0190	Roferos, Leslie T.	0038
Raymundo, Asuncion K.	0185	Rojo, Justo P.	0448
	0187		0467
	0265	Roleda, Robert C.	0583
	0474		0584
Reclusado, G.	0263	Rom, Nyvi Lou	0466
Recto, Jr., Rafael S.	0530	Romano, Lenie P.	0001
Recto, Rafael S.	0508		0058
Recuenco, Julieta D.	0208	Romero, Ellen S.	0028
Redoble, Yvonne	0444	Romero, Gabriel O.	0168
Refre, Glenford R.	0545	Romero, Jumelita B.	0518
	0546	Romero, Karen	0466
Regachuelo, Dulce	0466	Romero, Marissa V.	0388
Regidor, Jose Regin F.	0250	Rondilla, C.S.	0413
	0255	Roque, Celso R.	0566
Remoroza, Alvin I.	0047	Roque, Rolando G.	0261

Rosales, Marc D.	0353	Santiago-Mendoza, Jasmine S.	0253
Rosario, Marischelle M.	0034	Santos, A.	0333
	0110	Santos, Alberto B.	0114
Roxas, Aurea C.	0138	Santos, Ameurfina D.	0073
Roxas, Jerry	0505	Santos, Arturo Martin B.	0300
	0509		0315
Rozonfeld, Anatoly	0329	Santos, Doris R.	0330
Rubio, Y.O.	0226	Santos, G.A.	0419
Rubite, Caesar P.	0284	Santos, Izy T.	0072
Ruiz, Erwin	0412	Santos, Jose H.	0162
Rumbaoa, Rowena Grace O.	0518	Santos, Melchor A.	0015
Rundquist, Lorene	0453	Santos, R.B.	0116
Rundquist, Vaughn M.	0453	Santos, R.L.	0554
Rzsaque, M.A.	0451	Santos, T.S.	0194
Sabido IX, Delfin Jay	0353	Sapin, A.B.	0101
Sabido, IX, Delfin Jay M.	0324		0181
Saito, Michihiko	0388	Saquiring, Carl D.	0047
Sajise, Percy E.	0233		0160
Sajise, Sheila C.	0304	Sarcauga, R.	0161
Salang, Eriberto	0051	Sargento, Jose O.	0471
	0132	Sarmiento, Chona Q.	0196
Salavaria-Imperial, Ma. Lourdes A.	0416	Schabacker, Jens	0580
Salces, Agapita H.	0013	Schaller, G.	0314
Saldaña, Rafael D.	0285	Scheffer, Sonja J.	0171
Saligan, P.P.	0555	Semitara, Andrade C.	0203
Saloma, Caesar A.	0568	Senador, Jr., A.	0227
Salud, Erlinda C.	0414	Sering, Gheleene O.	0207
Salunga, Thycudides L.	0247	Serna, Paulene-Ver A.	0540
Salvador, Rene Mari	0466	Serra, R.J.	0043
Samoy, Elmer P.	0239		0055
San Juan, Christian B.	0229		0064
San Nicolas, Jr., Nicanor P.	0469		0065
Sana, Erlyn A.	0577		0118
Sanchez, Allister Levi C.	0320		0149
Sanchez, Nilda S.	0222		0151
Sandor, G.N.	0316	Sevilleja, Ruben C.	0387
Sandoval, L.D.	0294	Shetty, Reshma	0183
Sangalang-Tacata, Ida	0508	Shirikawa, Taku	0306
Saniel, Jr., M.F.	0011	Shukla, H.M.	0078
Santiago, Karen S.	0122	Si, Willie C.	0270
	0559		0331

Sibugan, Rachel Anne T.	0207	Tabbada, Kristina A.	0344
Sievanen, Leila	0153	Tacud, Benjamin	0587
Silao, Jose V.	0508	Tahimic, Candice Ginn T.	0338
Silao, Jr., Jose V.	0523	Takayama, Hiromitsu	0492
Sims, Bruce D.	0042	Takeda, S.	0363
Singh Chouhan, Mahaveer	0224	Talaman, N.T.	0064
Singh, P.K.	0078	Talekar, N.S.	0094
Singh, Sadhana	0224	Talihar, N.S.	0138
Singh, Satpal	0087	Tamayo, Bernie	0158
Siriban-Manalang, Anna Bella	0376	Tamblyn, Alexia	0235
	0377	Tamse, Armando F.	0390
Sison, F.	0500	Tanbonliong, Severino L.	0508
Sison, G.N.	0350	Tanchoco, C.C.	0554
Sison, Girlie Naomi	0565	Tandang, Rosalina N.	0276
Sison, Luis G.	0380		0434
Sison, M.L.Q.	0189	Tandoc, Erlito	0400
Sison, Ma. Lourdes Q.	0188	Tandug, Eustaquito T.	0426
Sison, Maria Luz J.	0220	Tanduyan, Serapion N.	0130
Slade, Eleanor M.	0234	Tanner, Gregory J.	0090
Solandt, Jean-Luc	0494	Tanzo, William	0318
	0495	Tarro, Juanita A.	0213
Solis, Chester D.	0013	Tavita, Yolanda L.	0432
Solis, Renando O.	0168	Taylor, Jessica	0494
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Soria, Juan A.	0059	Tecson-Mendoza, Evelyn Mae	0102
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Acta Medica Philippina
CMU Journal of Science and Technology
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Journal of Graduate Research
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The Manila Journal of Science
Nucleus
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Philippine Journal of Biotechnology
The Philippine Journal of Coconut Studies
Philippine Journal of Development
Philippine Journal of ICT & Microelectronics
Philippine Journal of Internal Medicine
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Samay
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