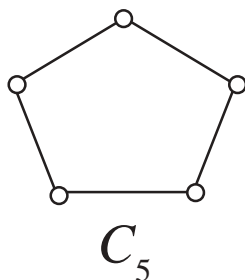
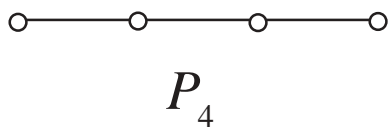
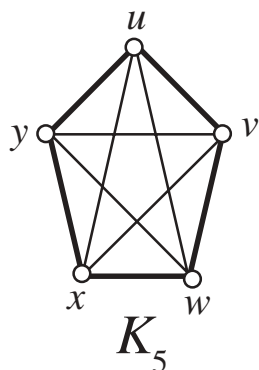




UNFOLDING COMPLETE GRAPHS, PATHS, AND CYCLES

If two nonadjacent vertices of a graph G having a common neighbor are identified to obtain the graph H , we say that H is a 1-fold of G . We also say that G is a 1-unfold of H . For convenience, any graph G is regarded as a 0-fold of G . If k is any positive integer, we say that H is a k -fold of G if H can be obtained from G by folding G iteratively k times. Thus, a k -fold of G is a 1-fold of a $(k-1)$ -fold of G . If H is a k -fold of G , we call G a k -unfold of H . The symbol $F^{-1}(G)$ denotes the set of all k -unfolds of G for $k \geq 0$. In this paper, we investigate the sets $F^{-1}(G)$, where G is a complete graph, a path, or a cycle.



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LEAD, CADMIUM, AND ZINC CONCENTRATIONS IN SELECTED SPECIES OF MACROBENTHIC ALGAE, SEAWATER, AND SEDIMENTS IN BRGY. BAGONG SILANG, CALATAGAN, BATANGAS PROVINCE

Laurencia papillosa (C. Agardh) Greville, *Ulva reticulata* Forsskal, *Halimeda opuntia* (Linn.) Lamouroux, *Gracilaria manilaensis* Yamamoto and Trono and *Padina minor* Yamada, seawater and sediments collected from Brgy. Bagong Silang, Calatagan, Batangas Province in September 2001 to July 2002 were analyzed for their lead, cadmium, and zinc content by atomic absorption spectrophotometry.

The highest mean concentration for lead was observed in sediments (38.59 mg/kg) compared to those in the algae (0.38–28.76 ug/mL) and in seawater (0.30 mg/L). For cadmium, the mean values were 3.53 mg/kg for sediment, 0.28–2.51ug/mL for algae, and 0.07 mg/L for seawater. For zinc, the mean values were 4.94–7.31 ug/mL for algae, 5.50 mg/kg for sediment, and 0.01 mg/L for water.

A significant linear relationship of the level of lead, cadmium, and zinc in water and sediments was observed. There was also a significant difference ($p < .0001$) in the concentration of lead, cadmium, and zinc in *L. papillosa* (C. Agardh) Greville and *U. reticulata* Forsskal using one-way analysis of

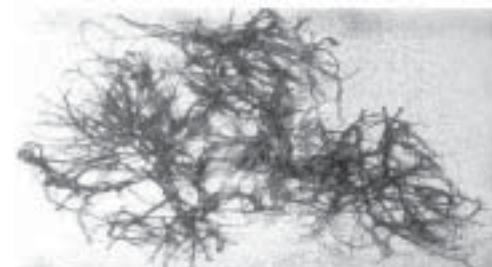
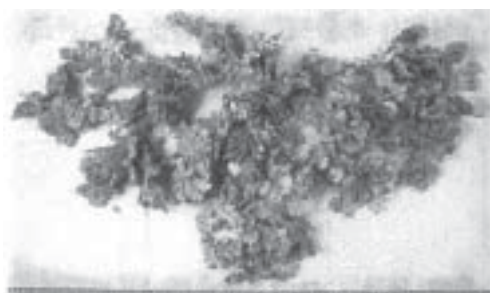
variance (ANOVA). The mean metal concentrations in seawater decreased in the order: Pb > Cd > Zn using Duncan's Multiple Range Test. The mean lead concentration in sediment was significantly different ($p < .0001$) from those of cadmium and zinc.

The mean lead concentrations in the algae and seawater were higher than the standards set by Codex alimentarius for food (0.2 mg/kg) and by the Environmental Management Bureau for marine water (0.05 mg/L).

The mean cadmium concentrations in *H. opuntia* (Linn.) Lamouroux (2.51 ug/mL), *P. minor* (0.72 ug/mL), and seawater (0.07 mg/L) were higher than the standards set by Codex alimentarius for food (0.5 mg/kg) and by the Environmental Management Bureau for marine water (0.01 mg/L).

The mean zinc concentration in algae was higher than the standard set by Codex alimentarius for food (0.15 mg/L).

Seawater temperature ranged from 25° to 30°C, while pH ranged from 7.1 to 8.0. Salinity ranged from 18 to 38 ppt. The substrate was of sandy-rocky-coral type.



(L-R) *Halimeda opuntia* (Linn.) Lamouroux, *Laurencia papillosa* (C. Agardh) Greville, *Gracilaria manilaensis* Yamamoto & Trono



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ISOLATION, STRUCTURE ELUCIDATION, AND ANTIMICROBIAL ASSAY OF SECONDARY METABOLITES FROM FIVE PHILIPPINE MEDICINAL PLANTS

The following are the abstracts of five papers which resulted from studies on five medicinal plants.

The leaves of *Blumea balsamifera* afforded ichthyothereol acetate (**1**) and cryptomeridiol (**2**), lutein, and β -carotene. The structures of **1** and **2** were elucidated by extensive 1D- and 2D-NMR spectroscopy, while those of lutein and β -carotene were identified in comparison with literature data. Antimicrobial tests indicated that **1** has moderate activity against the fungi *Aspergillus niger*, *Trichophyton mentagrophytes*, and *Candida albicans*, against which sample **2** has low activity against these organisms. Both compounds have no activity against *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus subtilis*, and *Escherichia coli*.

The rhizomes of *Curcuma domestica* afforded curcumin (**1**), bisacurone (**2**), a mixture of ar-turmerone (**3**), b-turmerone (**4**), a-turmerone (**5**), and ar-curcumyl alcohol (**6**). These compounds were identified through NMR spectroscopy and by comparing their spectroscopic data with those reported in the literature. Antimicrobial tests on samples **1** to **6** indicated that **2** to **6** have moderate antifungal activity against *A. niger*, while **3** to **6** have moderate antibacterial activity against *P. aeruginosa*.

The freeze-dried unripe fruit of *Achras zapota* afforded a mixture of β -amyrin pentanoate (**1a**) and

α -amyrin pentanoate (**1b**) in a 2:1 ratio, a mixture of spinasterol (**2a**) and taraxerol (**2b**) in a 2.4:1 ratio, and a fatty acid ester of oleanolic acid (**3**). Their structures were identified through NMR spectroscopy. Samples **1** and **3** were tested for antimicrobial activity by the agar-cup method. Sample **1** showed moderate activity against the fungus *C. albicans* and low activity against the fungi *A. niger* and *T. mentagrophytes*. Sample **3** which gave low activity against *C. albicans* and *A. niger*, was inactive against *T. mentagrophytes*. The samples were inactive against the bacteria *E. coli*, *P. aeruginosa*, *S. aureus*, and *B. subtilis*.

The aerial parts of *Centella asiatica* afforded b-farnesene (**1**) and neophytadiene (**2**). Their structures were elucidated by extensive 1D- and 2D-NMR spectroscopy. Sample **2** exhibited moderate antifungal activity against *C. albicans* and *A. niger* and low activity against *T. mentagrophytes*. Sample **2**, which also showed low antibacterial activity against *E. coli* and *P. aeruginosa*, was inactive against *S. aureus* and *B. subtilis*.

The flowers of *Brugmansia suaveolens* afforded β -carotene, β -sitosterol, β -stingmasterol, 3β -hydroxyoncera-8(26), 14-dien-21-one, an lansiolic acid by silica gel chromatography. Their structures were identified by comparing their ^1H NMR spectral data with those reported in the literature.



(L-R) *Blumea balsamifera*, *Curcuma domestica*, *Achras zapota*, *Centella asiatica*, and *Brugmansia suaveolens*



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THE DIFFERENCES IN THE PERFORMANCE OF DLSU PE STUDENTS (SY2001-2002) IN A 1000-M WALK/RUN AND 400-M WATER WALK/RUN

Movement is an essential factor in one's life. However, movement often causes injuries, especially if the individual lacks the ability to live an active lifestyle (i.e., active in sports), which leads to a decreased functional capacity.

In order to address one's lack of active lifestyle, exercise programs are designed. Running, for example, is the most natural and common way of exercise that would improve a person's fitness and improve his/her performance and functional capabilities.

Because of this principle, the De La Salle University-Manila PE Department requires PE students to carry out a 1000-M walk/run and to fulfill the battery test for cardio-respiratory endurance fitness test. However, since some people cannot tolerate running because of certain injuries, an alternative exercise program called water running or 400-M/walk-water run has been developed.

This study presents a quantitative research on the differences in the performance of DLSU PE students (SY 2001-2002) in a 1000-M/walk-run and 400-M/walk-water run. Different measures are considered such as heart rates of the participant while resting, training heart rates, recovery heart rate and time of completion, gender, and age.

Data were collected from 80 participants who underwent both the 1000-M/walk-run and 400-M/walk-water run during the first and second week, respectively, of their PE classes. Results showed that there were significant differences between the 1000-M/walk-run and 400-M/walk-water run based on recovery heart rate, training heart rate and time of completion. The 400-M/walk-water run followed the same range of motion as running on land but the presence of water eliminated the impact present during land-based running, thus helping lower the heart rate. The results, based on the time of completion, showed that water running significantly



different from running on land. An individual running on land for 12 minutes can cover approximately double the distance hurdled by another who is running in water for the same period of time. However, there were no significant differences between the two exercises based on the age and gender of the students.

The findings imply that since water running is a non-impact activity, it can be an alternative exercise program for students who are recovering from impact-related injuries. Water also serves as venue for measuring cardio-respiratory endurance.



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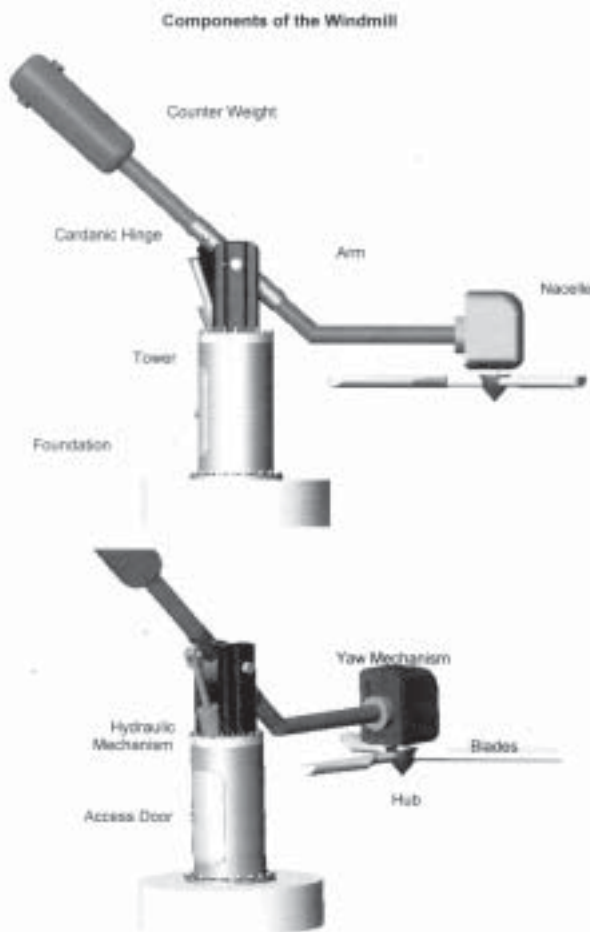
Acting, coaching, facilitating, officiating,
organizing, sports, swimming, teaching,
typing, fitness, and social recreation

AN ENVIRONMENTAL LIFE-CYCLE ASSESSMENT OF A LOCALLY DESIGNED AND FABRICATED AUTOMATED WINDMILL FOR POWER GENERATION

This study presents a life-cycle assessment (LCA) study of a wind energy system developed at the Sustainable Technology Laboratory of De La Salle University-Manila. The current system has been designed to improve the stability and reliability of conventional bladed designs. It incorporates an automated control mechanism to maximize wind energy conversion and a hydraulic mechanism that facilitates control of structure stability during bad weather conditions. This modification translates to an actual power output of 2.5 kW based on overall turbine efficiency of 45%.

The evaluation of the environmental impacts was done on the system's life cycle starting from covering production, operation and maintenance, to disposal. An Excel program was developed to determine the effect of the design parameters, materials used, fabrication processes, operational changes, and parts replacement on the overall environmental impact. Disposal of the system was also considered but eventually found to be negligible since most of the system components used are recyclable. The environmental outputs considered were categorized according to their contribution to resource depletion, greenhouse effect, ozone depletion, toxicity, photochemical oxidation, acidification, nitrification, and energy consumption.

Results showed high impact values in the areas of greenhouse effect and toxicity due to the popular use of metal parts and significant oil usage for lubrication. Two scenarios were developed to demonstrate that changes in the materials used in fabricating the system could have a significant impact on the environment.



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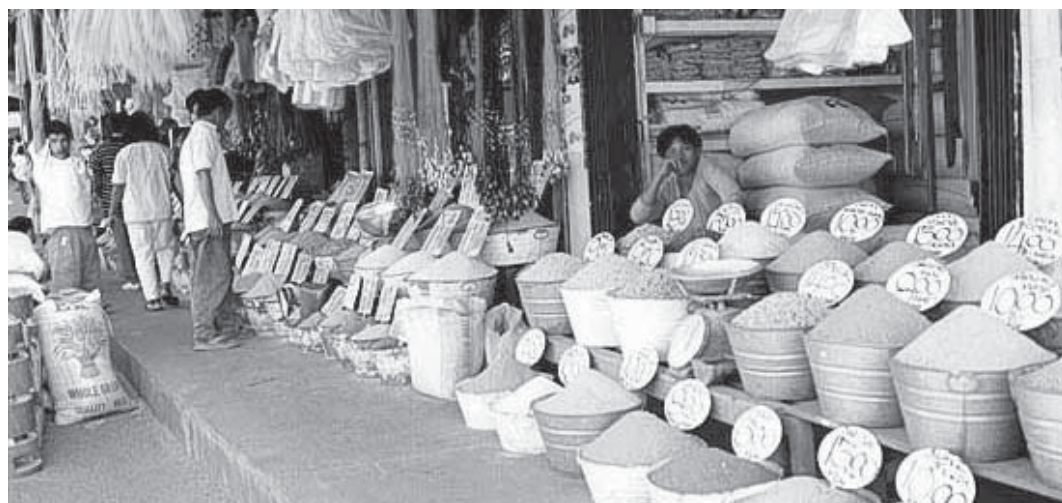
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AN ANALYSIS OF THE PHILIPPINE INTERREGIONAL MARKET INTEGRATION FOR RICE

This study examines the existence of the spatial market integration of the different pairs of regional rice markets in the Philippines. By employing modern time-series econometric techniques, the research uncovered compelling pieces of evidence of strong steady-state linkages among the various pair-wise combinations of regional rice markets, with only an insignificant segregated route. The main conclusion drawn from various inference procedures undertaken in the study is that despite the geographic segregation of regional rice markets and the fragmented and often inefficient rice distribution system, price signals and other market information are being transmitted efficiently across markets, thus, negating the potential occurrence of unexploited arbitrage opportunities.



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ESTIMATION OF THE NATURAL PERIOD AT AMBIENT CONDITIONS OF MOMENT-RESISTING FRAME (MRF) BUILDINGS USING NEURAL NETWORKS

The natural period of vibration is an important dynamic property of a building since it characterizes the behavior and performance of the structure to external forces. An estimate of the fundamental period of a building is useful to a structural engineer, civil engineer, or urban disaster manager. This study illustrates the use of neural networks in estimating the period of reinforced-concrete (RC) buildings. Data from ambient vibration measurements conducted on medium- and high-rise buildings in Metro Manila were used to train a neural network. A model for estimating the period of RC moment-resisting space-frame buildings and RC dual buildings that use global building parameters (i.e., the type of structural system and the height of the building) was developed and its performance was evaluated and compared with existing empirical formulas.



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THEORIZING FILIPINA FEMINISM

In reviewing theorizing efforts on Filipina feminism by Filipino scholars published locally, the nationalist feminism stands out as a dominant theme as reflected in the works of Aguilar (1994-95; 1998) and Mananzan (1987). Other Filipino feminists have written about the nature of feminism from their own political standpoints (Aquino, 1990; Quintos-Deles 1990) but there has not been any empirical attention given to examining the Filipina perspectives existing in the Philippines.

This paper attempts to explain what makes Filipina feminism distinct from its Western and other Third World counterparts, and to examine as well feminist visions and strategies for social change. It also traces the foundation and progressive development of the feminist movement and explores how feminists/activists grapple with gender issues in everyday life and intimate relationships.

To draw empirical data, this study utilizes tape-recorded and transcribed "conversations" (later analyzed using the NUD*UST) with 20 feminists/activists in metropolitan Manila, Cebu and Davao. The informants' ages range from late twenties to mid-sixties while their educational backgrounds vary. Half of them are married and all, except four, belong to the middle class.

One notable finding of this research is the strong conviction of the feminists to make a difference not only in themselves but also in the lives of the Filipino women. As a result of a cohesive feminist consciousness, these Filipinas espouse the elimination of patriarchy which is viewed as a form of gender oppression rooted in class, ethnicity and sexuality. Women's liberation, they assert, becomes truly realized only when the sources of oppression are obliterated.



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