UBC will seek public reaction to erosion plan

Public reaction and suggestions will soon be sought by the University of British Columbia to a proposed new master plan to control erosion on the Point Grey cliffs below the University campus.

The plan, which would cost an estimated $12 million to implement over four to five years, is the first full proposal designed to control erosion along the entire 3.8-mile Point Grey headland from Spanish Banks on the north shore to the UBC campus boundary on the south shore of the peninsula.

A joint committee composed of representatives from the Park Board and the UBC Board of Governors property committee has been struck to determine how best to get useful public reaction to the proposal.

The committee will also set up a timetable and program for widespread release of the detailed report. That should occur early in October after the full Board of Governors discusses the report at its Oct. 2 meeting.

"Full public discussion of the plan by beach users and other interested parties is one of the next steps," said C.J. Connaghan, the University's vice-president for administrative services.

"We may be looking at a review by a citizens' committee composed of beach users and other members of the public."

WHITE-PAPER PROCEDURE

Mr. Connaghan emphasized that the report is not a "hard-nosed, take-it-or-leave-it plan. We are hoping to follow the procedure known in legislative circles as the 'white-paper procedure,' where a technical proposal is widely publicized and modified through public airing and debate."

He said the objective of the UBC committee was to halt the cliff erosion while maintaining the integrity of the beach without causing irreparable damage to the local ecological environment.

The plan was prepared over the past three years by Swan Wooster Engineering Co. for UBC's marine foreshore development committee chaired by Mr. Connaghan.

(For details of the erosion-control plans, see story on page 3.)

"The proposals," Mr. Connaghan said, "are the result of the collective wisdom of UBC experts who have made intensive studies of the factors causing the cliff erosion, the experience of three international specialists who came to UBC in 1977 to advise the committee preparing the report, and the expertise of the Swan Wooster engineering firm."

CONCERN VOICED

Some concern about the plan has been voiced by beach users, Mr. Connaghan continued. "Without wishing to encroach on the jurisdiction of the Vancouver Park Board, the proposals envisage very little interference with Wreck Beach on the southwest shore of Point Grey, which has been the traditional area used by sun bathers.

"Apart from steps to control water seepage from the cliff face above Wreck Beach, very little modification would be carried out in this area."

"It must be recognized," Mr. Connaghan said, "that there is a very serious and continuing problem on the 4,000-foot stretch of Tower Beach on the north shore of Point Grey."

The immediate threat, he said, is to Cecil Green Park, a private home built in 1912, purchased with funds provided by UBC benefactor Dr. Cecil Green. The building houses the UBC Alumni Association and serves as a centre to promote "town-gown" relations.

CLIFF FACE RECEDES

"In the past three years," Mr. Connaghan said, "the cliff face in this area has receded about 10 feet, and since 1935 some 1.29 acres of sand have been lost off the cliff face above Tower Beach, which represents 360,000 cubic yards of material or one city block 35 feet deep."

UBC's new Museum of Anthropology near Cecil Green Park is relatively safe in the near future. Mr. Con-

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UBC reports

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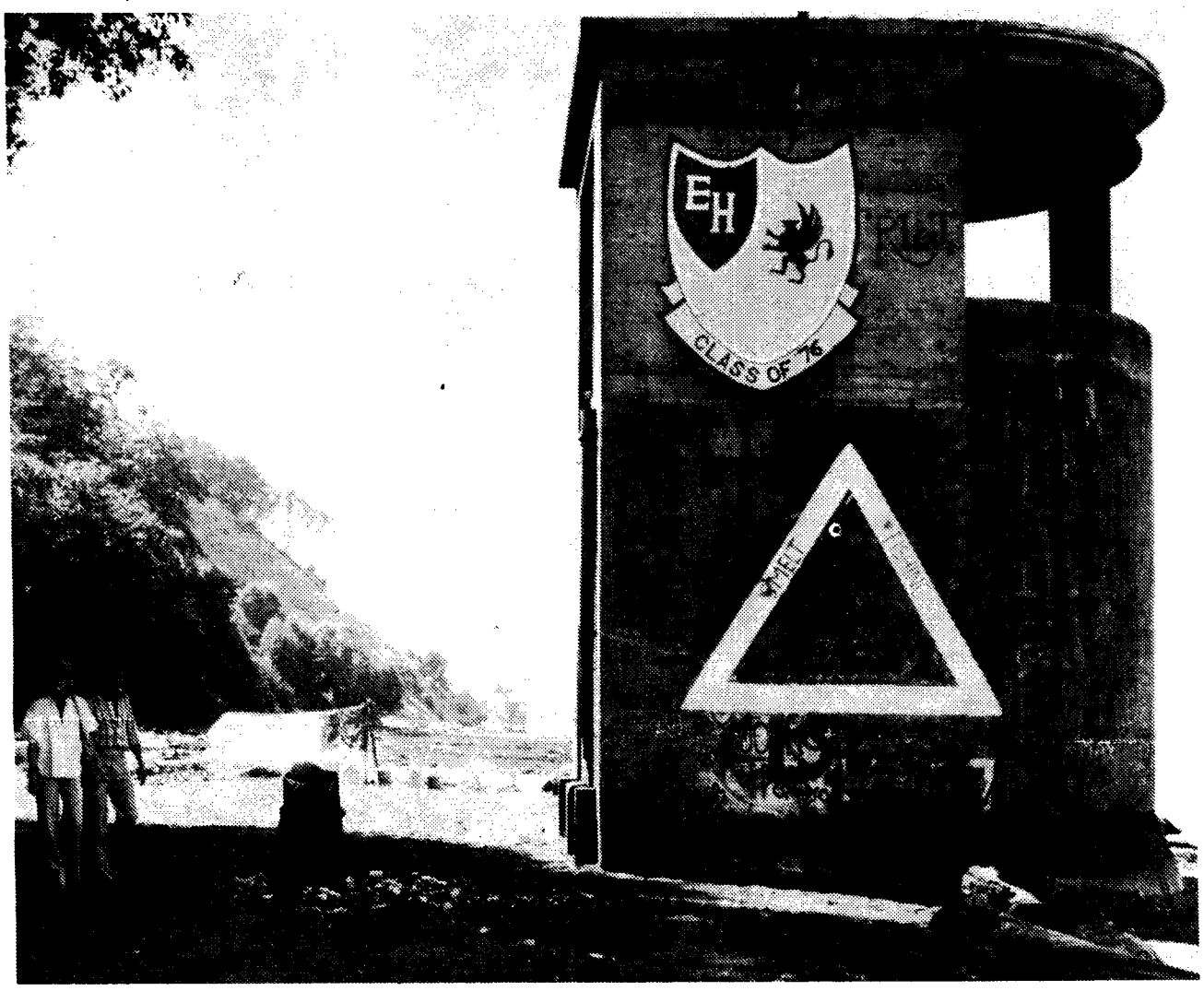


Photo by Jim Banham

Lonely sentinels on Tower Beach below Point Grey cliffs are these Second World War artillery observation towers. Recently released report prepared for UBC committee provides first detailed plan for controlling cliff erosion along entire 3.8-mile Point Grey headland, with major work proposed between observation towers. For more details see story at right and summary of proposals on page 3.

UBC electric car wins two awards

Bad luck dogged the tread tracks of UBC's electric automobile, which nevertheless managed to carry off two major awards in an international competition in Detroit in mid-August.

More than 100 UBC mechanical and electrical engineering students have been involved in the electric car project over the past three years, preparing it for the competition sponsored by SCORE (Student Competitions on Relevant Engineering) that began on Aug. 12.

Photo by Jim Banham

Four of the more than 100 UBC engineers who built classy electric car that took two first prizes in recent international competition are, left to right, Jaime Chiang, Alex Ratajac, Frank Peabody, and Bobby Ratayats. Peabody, who was project co-ordinator, holds plaque denoting first prize for innovation in contest.

The truck that transported the electric car broke down twice while en route to Detroit and one member of the project team accidentally put the innovative vehicle out of commission for a day and a half when he inadvertantly drilled a hole through an inductor coil while fixing an underbody panel to the car.

As a result, the UBC entry was unable to go through all the tests in the competition and could not be considered for the top overall award, which went to a diesel-engine entry from the University of Manitoba.

Some 35 North American colleges and universities entered the energy-efficient vehicle competition.

The UBC team came away with a plaque and first prize in the student-innovation section of the competition. This was an award that took the entire vehicle into account, including drive train, transmission and body.

The UBC entry also topped the

Please turn to page 2
See ELECTRIC CAR

Parking changes yield net increase in spaces

UBC students returning to the campus after a summer away will have noticed some changes in roads and parking. The road changes will eventually give better and faster access to the campus. The parking changes will make it easier to park your car once you've arrived.

Over the summer the people in the UBC Physical Plant department have been busy creating more than 1,100 new parking spaces on campus for students, faculty and visitors. The new spaces range from some additional 450 as a result of an extension to B lot through to 14 spaces being added by allowing parking on Wesbrook Mall in front of the General Services Administration Building for the convenience of visitors.

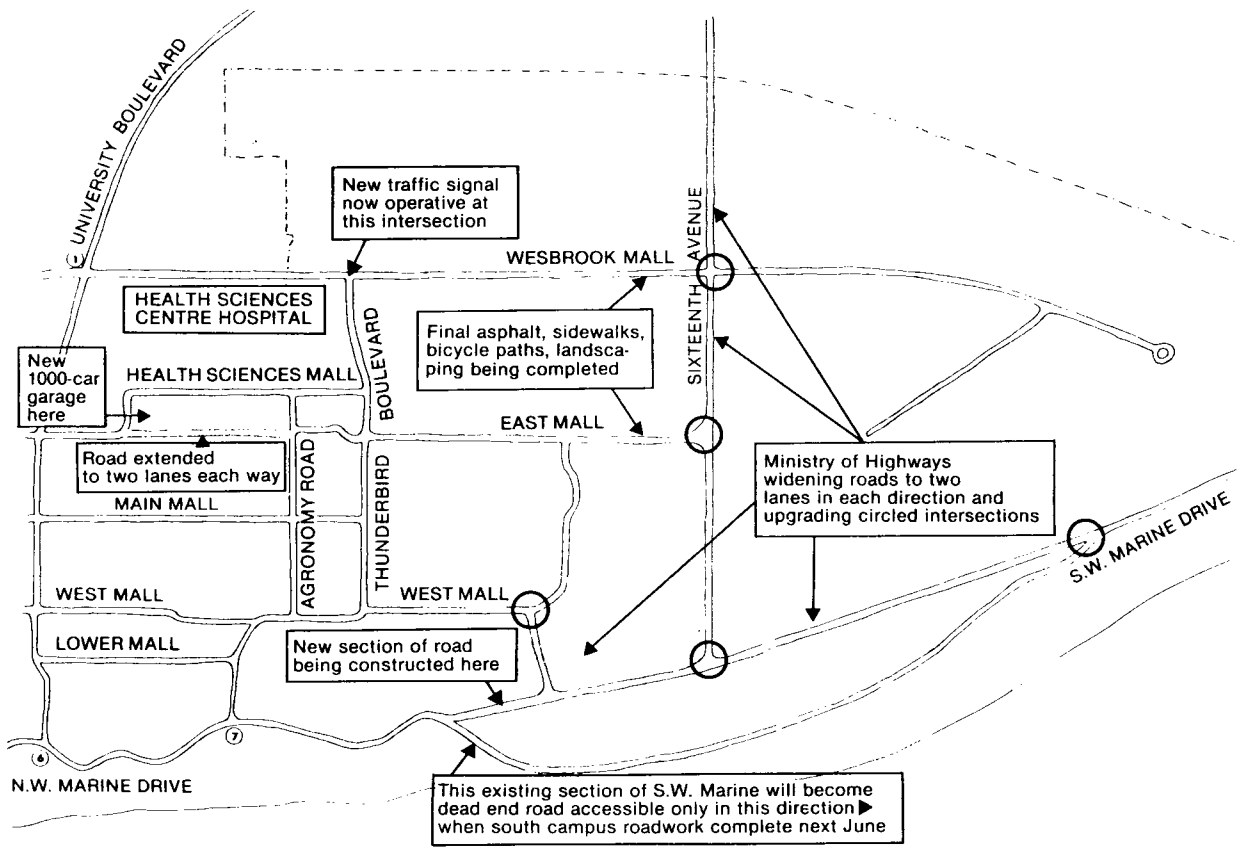
New construction on the campus would normally have meant the loss of parking space, but the new work has given UBC drivers a net gain of more than 1,100 spaces. New construction includes the erection by next spring of a four-level car parking structure to serve the new Acute Care Unit of the Health Sciences Centre Hospital; the new Home Economics Building near the corner of University Boulevard and East Mall; access roads to the Acute Care Unit; and landscaping near the Aquatic Centre.

Throughout the campus, new parking spaces have been gained either through creating new lots or making existing spaces more clearly defined.

The new road construction currently being completed along 16th Avenue leading to the campus is the work of the provincial Department of Highways. Upgrading of the intersection at 16th Avenue and Wesbrook Mall by the highways department will connect with work already completed this summer along Wesbrook Mall by UBC's Physical Plant. Better access to the campus from Southwest Marine Drive is also under way. (See map this page.)

Several changes to campus roadways were completed this summer by Physical Plant, including work on East Mall, Wesbrook Mall and Health Sciences Road. (See map.)

In addition to improvements for getting to campus by car, some improvements are also in store for bus users. B.C. Hydro this week, at UBC's request, initiated several improvements in service for the morning rush hour during the fall and spring terms. The improvements, including better service from Richmond Centre, the Sea-Bus terminal, and along East Broadway to UBC, should help UBC-goers get to the campus in the mornings.



Map shows changes designed to improve access to UBC campus

Philosopher awarded $1,000 Biely research prize

The University of B.C.'s leading annual research prize has been awarded to Prof. Jonathan Bennett, a former member of the Department of Philosophy.

The $1,000 Prof. Jacob Biely Faculty Research Prize is awarded for distinguished research recently accomplished and published. Prof. Bennett taught at UBC from 1970 until June 30 this year, when he left Vancouver to accept a research professorship at the University of Syracuse, a private university in New York State.

A native of New Zealand, Prof. Bennett was educated in that country and at Oxford University. He taught at Cambridge University from 1956 to 1968, when he came to Canada to join the philosophy department at Simon Fraser University. He taught there for two years before joining the UBC faculty.

Prof. Bennett is the 11th recipient of the award, which was established in 1969 by Mr. and Mrs. George Biely in honor of Prof. Biely, a noted Canadian poultry scientist and a former member of the UBC faculty and the brother of Mr. Biely.

Prof. Erich Vogt, UBC's vice-president for faculty and student affairs said the committee which screened nominations for the 1979 Biely Prize was not influenced by the knowledge that Prof. Bennett would be leaving UBC when they met to consider candidates.

"UBC has had the benefit of his scholarship for the past nine years," Prof. Vogt said. "The distinguished research for which he has been honored was accomplished during that time.

"Both the University and committee wish Prof. Bennett continued success as he takes up the challenge of building a new graduate program as a research professor at Syracuse."

Prof. Bennett has become widely known in the world of philosophy in recent years for his research and writing in the field of the philosophy of language.

His book *Linguistic Behaviour,* published by Cambridge University Press in 1976, has been widely praised by reviewers, one of whom described Prof. Bennett as "one of the two or three most versatile, resourceful and prolific philosophers of his generation." The same reviewer said the book was "a major contribution to the issues of most central concern to mainstream Anglo-American philosophy of the moment."

Prof. Bennett has also been praised for two books on the work of German philosopher Immanuel Kant (1724-1804), one of the most influential writers in the history of philosophy. Prof. Bennett's book entitled *Kant's Dialectic,* also published by Cambridge University Press, was described by one reviewer as "unique, and one which will scarcely be bettered for a long time in any language."

Prof. Bennett is also the author of a large number of articles on various philosophical topics, including logic and ethics.

ELECTRIC CAR
Continued from page one

cost-to-consumer category, which means that if it were mass produced its unit cost would have been the lowest of all the entries in the competition.

The UBC car also drew the interest of officials from General Motors, which is considering production of an electric car in the mid-1980s for general use.

The UBC car is powered by a series of lead-acid batteries housed in a tunnel that runs down the centre of the vehicle. They give the car a range of 72 to 80 kilometres if driven at speeds of up to 95 kilometres an hour.

The car's batteries can be recharged overnight simply by plugging into a standard household electrical outlet. They can be recharged to 85 to 90 per cent of their maximum capacity in as little as four hours.

The brains of the vehicle is a computer system that monitors the engine and the actions of the driver to provide the most efficient operation of the car.

Other innovations include a direct current motor that turns the front wheels of the car and a braking system that produces some electrical power to recharge its own power cells.

Funding for the three-year project was provided by various government agencies, private industry and interested individuals. The salaries of the team of eight engineers who put the finishing touches on the vehicle this summer for the Detroit competition were provided by the B.C. ministry of labor through their annual Youth Employment Program.

Institute program set

Sir Fitzroy Maclean, the famed Scottish soldier, adventurer and writer, will be one of 12 speakers during the fall series of free, Saturday-night lectures at the University of B.C. sponsored by the Vancouver Institute.

The institute's fall program begins Sept. 15 with the Dal Grauer Memorial Lecture by British energy and resource expert Amory Lovins and concludes with Sir Fitzroy Maclean's talk entitled "Holy Russia" on Dec. 1.

All institute lectures are held in Lecture Hall 2 of the Woodward Building on the UBC campus beginning at 8:15 p.m. A brochure listing all the lecturers in the fall series is available from UBC's Information Office, telephone 228-3131.

The institute's fall series covers a wide range of topics, including the arts, astronomy, philosophy, medicine and economics.

Included in the list of speakers is Jean Erdman, a long-time associate of famed American dancer Martha Graham and currently artistic director of New York's Theatre of the Open Eye; noted American philosopher Prof. Robert Solomon of the University of Texas, who speaks on "Emotions and Human Nature" on Oct. 13; UBC medical geneticist Dr. Patricia Baird, whose Nov. 3 talk is entitled "Heredity and Your Family"; Nobel Laureate and physicist Prof. Eugene Wigner of Princeton University, who will discuss the work of Albert Einstein on Nov. 10; and Canadian economist and former dean of Arts at UBC Prof. John Young, now with the International Monetary Fund in Washington, D.C., who speaks on Nov. 24.

Erosion causes and remedies subject of report

Concern about erosion of the Point Grey cliffs below the University of B.C. has been voiced in many quarters since 1935.

In that year, following higher-than-average rainfall, roughly a third of a million cubic feet of sand and earth collapsed into Burrard Inlet to create Graham's Gully, so-called because it lies adjacent to the former home of F. Ronald Graham, which now houses UBC's School of Social Work.

A pathway beginning at the intersection of Northwest Marine Drive and Chancellor Boulevard now leads down through the gully to Tower Beach at the base of the Point Grey cliffs.

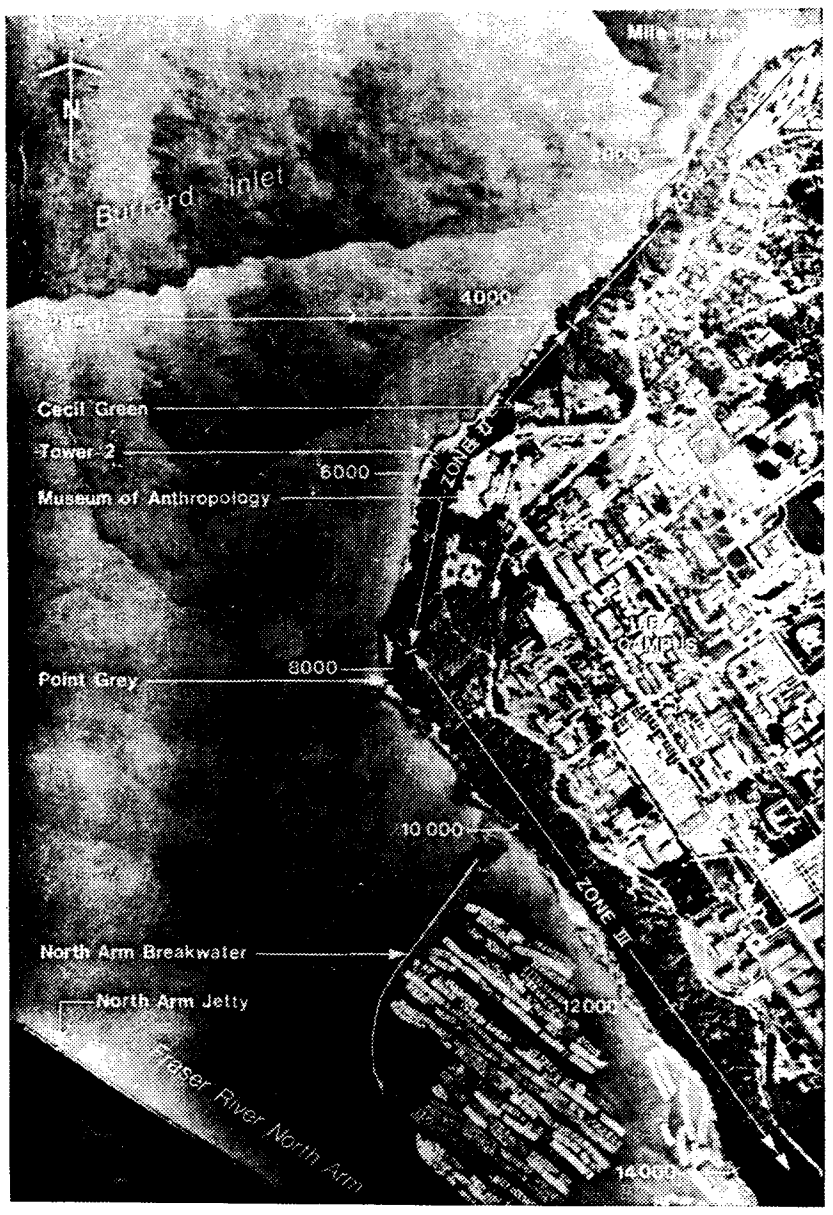
In the ensuing years, the provincial government was forced to relocate Northwest Marine Drive. The only vestige of the original road remaining is the spur off Northwest Marine called Cecil Green Park Road, which dead ends in the area in front of the new Museum of Anthropology.

The matter was one of concern to former UBC president Dr. Norman MacKenzie, who devoted a section of his 1962 farewell Congregation address to the erosion problem.

Attempts to control erosion in recent years have included construction of a spiral storm drain, which carries runoff from the major part of the built up area occupied by UBC buildings, and construction in 1974 of a sand and gravel berm on Tower Beach.

This latter project was only partially successful owing to wave action. However, some of the berm material remains in place and has been successful in preventing the loss of a considerable quantity of sand from the base of the cliffs.

A foreshore sand berm on the southwest face of Point Grey in the area known as Wreck Beach was created in 1977 when a suction dredge deposited more than a quarter of a million cubic yards of sand on the foreshore while deepening a barge basin near the breakwater for the north arm of the Fraser River.



Plan view of Point Grey peninsula shows three zones where erosion control measures should be taken to control cliff erosion. Report prepared for UBC committee proposes only minor work in Zones I and III. Major work is proposed for Zone II between Tower One and geographic point called Point Grey.

THE MAJOR CAUSES OF EROSION

1. The most serious cause of erosion on Point Grey is the eating away of sand at the base of the cliffs by wave action. Quite simply, waves beating at the foot of the cliffs undercut the face and carry away the eroded sand. Much of it is deposited on beaches to the east, carried there by the tidal currents that sweep around the Point Grey headland.

2. Ground water discharged through the cliff face and surface water diverted over the top of the cliff are also major causes of erosion. The ground-water problem would be less serious if the geological formation at Point Grey was universally porous. However, the ground water now sinks through sandy layers until it reaches an impervious layer of clay, which causes it to flow horizontally until it reaches the cliff face, where it causes erosion.

Another major cause of cliff face failure is frost. During the winter months the cliff face freezes and prevents the discharge of ground water. As a result, the water table rises until the head of water behind the frozen face develops enough force to literally blast the frozen sand layer off the face.

Surface water flowing over the top of the cliff also contributes to cliff-face erosion.

3. Human activity is also a major cause of erosion. Throughout the year, young people and adults alike reach the beach by climbing down the cliff face or climb up the face from the beaches below. Some have even hollowed out caves on exposed areas of the cliff. The effect of all this is to dislodge large quantities of loose sand which tumbles to the bottom of the cliff and is swept away by high tides.

There is a sort of chain reaction resulting from the three major causes of erosion outlined above.

If there were no toe erosion at the base of the cliff, the cliff face would eventually stabilize as the eroding sand built up to reach what engineers call the "natural angle of repose."

However, at locations where the slope bottom is subject to toe erosion — notably on Tower Beach — the eroded sand is carried away by waves, preventing stabilization. This instability travels up the slope preventing revegetation and worsening the effects of ground water and weathering.

The result is an ongoing retreat of the clifftop at rates averaging 2,400 square feet per year in front of Cecil Green Park and the Museum of Anthropology.

Thus, as long as toe erosion is permitted to continue the process is not self-healing since there is insufficient cobble rock in the cliff to form a natural protective barrier, or berm, at the cliff base.

PROPOSALS FOR STOPPING THE EROSION

The report prepared over the past three years to deal with erosion of the Point Grey cliffs encompasses a 3.8 mile stretch extending from Spanish Banks on the north face of the headland to the boundary of UBC land on the south face.

Those who prepared the plan have divided the 3.8-mile stretch into three distinct zones, related to the need for erosion control in each area.

Zone I is a 4,000-foot stretch extending from Spanish Banks to the first of two Second World War towers erected as observation posts for artillary emplacements that were constructed atop the Point Grey cliffs to protect Vancouver harbor. Almost 2,000 feet to the west is a second observation tower. The area between these two landmarks is commonly known as Tower Beach.

Zone II is a second stretch of 4,000 feet from the first observation tower, past the second observation tower to the geographic position known as Point Grey. It is in this area that the need for measures to control erosion is greatest. Atop the cliffs in this area are Cecil Green Park, the Museum of Anthropology and the headquarters of the UBC Botanical Garden.

Zone III, which includes Wreck Beach, stretches from Point Grey to the southern boundary of the campus.

The report proposes only minor work in Zones I and III.

In Zone I, drainage pipes would be installed to carry away water seeping through the cliff face. Areas that have been eroded would be replanted with native trees and shrubs to retain its appearance as a natural coastal forest.

It's also proposed to use logs now on the beach in Zone I to create a series of barriers that would stop the movement of sand to Spanish Banks.

It's estimated that the work in Zone I would cost $1,172,000.

Proposals for erosion control in Zone III are almost identical with those in Zone I — installation of drain pipes to carry off water now seeping out of the cliff face and replanting of native trees and shrubs where erosion has destroyed vegetation. Swan Wooster estimates that the Zone III work would cost $1,024,000.

It is in Zone II that most extensive cosmetic work is proposed.

To halt erosion at the base of the cliff, the report proposes raising the height of the beach by depositing a sloping layer of heavy rock along a 1.2-mile stretch. The top of the rock "protector" would be five feet above the high tide mark. Acting as a barrier, the rock would receive the impact of wave energy and prevent the toe of the cliff from being undercut by wave action. It would also act as a retaining wall for falling sand as the cliff face approaches its natural angle of repose.

In order to stabilize the cliff face in Zone II, the report makes proposals for ground water control, for contouring the unstable slopes to their natural angle of repose and for revegetation of the slope.

To control ground water in Zone II it's proposed that 8 inch diameter vertical holes be drilled along the cliff top to a depth of 175 feet. There would be a total of 34 wells, each 100 feet apart. The purpose of the wells is to gather the water that would normally flow out of the cliff face. The water collected by the wells would be drained off at sea level.

To bring the cliff face to its natural angle of repose — an angle of 32 degrees with the horizontal — the report proposes that heavy earth-moving equipment be used to push the top sand over the cliff.

The slope would be relatively gentle near the top of the cliff face in the vicinity of Cecil Green Park and the anthropology museum. The 32-degree angle of natural repose would be achieved farther down the contoured slope.

Once the slope has been established it would be seeded with tough, native grasses and planted with shrubs that would stabilize the newly created cliff face.

Bicycle and pedestrian pathways have been suggested along the top part of the cliff face.

The concept also provides for construction of a major viewpoint at the top of the slope between Cecil Green Park and the Museum of Anthropology. This would afford visitors a panoramic view of the Gulf of Georgia, Burrard Inlet and Howe Sound.

The report also proposes an upgrading of the existing pathway that leads down through Graham's Gully to Tower Beach in Zone II.

The report estimates that the total cost of the work to be carried out in Zone II would be $8,286,000.

MASTER PLAN
Continued from page one

naghan said Swan Wooster engineers estimate that it would be approximately 100 years before the building would be endangered if erosion is allowed to continue unchecked.

"The University and the Park Board are very conscious of the special ecological and environmental aspects of the Point Grey beaches," Mr. Connaghan said, "and our basic aim is to cause as little damage or interference as possible in the area."

UBCalendar

UBC CALENDAR DEADLINES

Events in the week of
Sept. 23-29 Deadline is 5:00 p.m. Sept. 13
Sept. 30-Oct. 6 Deadline is 5:00 p.m. Sept. 20
Send notices to Information Services, 6328 Memorial Road (Old Administration Building), Campus. Further information is available at 228-3131.

THE VANCOUVER INSTITUTE

SATURDAY, SEPT. 15
Amory Lovins, London, England, on **Soft Energy Paths.**
SATURDAY, SEPT. 22
Prof. Joseph Campbell, Sarah Lawrence College, New York, on **Psyche and Symbol.**
Both lectures at 8:15 p.m. in Lecture Hall 2, Woodward Instructional Resources Centre. A brochure listing all pre-Christmas Institute lectures is available from Information Services, UBC, telephone 228-3131.

SUNDAY, SEPT. 16

7:00 p.m. **SUBFILMS** presents *The Cheap Detective* by Neil Simon, with Peter Falk. Auditorium, Student Union Building. Admission, 50 cents, with proceeds going toward the United Way campaign.
8:00 p.m. **GRAUER LECTURER.** Amory Lovins discusses **Ethics and Energy.** Lutheran Campus Centre.

MONDAY, SEPT. 17

3:30 p.m. **APPLIED MATHEMATICS SEMINAR.** Prof. Simon A. Levin, Ecology and Systematics, Division of Biological Sciences, Cornell University, and Mathematics, UBC, on **Some Models of Pattern Formation in Ecological and Evolutionary Contexts.** Room 203, Mathematics Building.
4:00 p.m. **ASTRONOMY SEMINAR.** Dr. N.J. Holloway, University of Sussex, England, on **Gamma Ray Emission From Pulsars.** Room 318, Hennings Building.
4:30 p.m. **BIOMEMBRANE/ANATOMY LECTURE.** Dr. Alison F. Brading, Pharmacology, University of Oxford, England, on **Regulation of Calcium in Smooth Muscle.** Lecture Hall 4, Woodward Instructional Resources Centre.
7:00 p.m. **INTERNATIONAL HOUSE COFFEE PLACE** held Monday, Tuesday and Thursday until 11 p.m. All welcome.

TUESDAY, SEPT. 18

12:30 p.m. **HILLEL HOUSE** presents Sharon Disend in a discussion on **The Adopt-A-Family Program.** Hillel House.
4:30 p.m. **CHEMISTRY SEMINAR.** Dr. David Walker, Chemistry, UBC, on **Polarized Elementary Particles as a Possible Origin of Optical Activity in Nature.** Room 250, Chemistry Building.

WEDNESDAY, SEPT. 19

12 noon **PHARMACOLOGY SEMINAR.** Dr. Alison Brading, Pharmacology, University of Oxford, England, on **The Effect of Muscarinic Receptor Activation on the Smooth Muscle of Guinea-Pig** *taenia coli.* Room 114, Block C, Medical Sciences Building.
12:15 p.m. **SIGMA XI CLUB OF UBC MEETING.** Salon A, Faculty Club.
12:30 p.m. **AMS CONCERT MINI-SERIES** presents **Blue Northern.** Auditorium, Student Union Building. Admission $1; proceeds to CFOX Children's Hospital Fund. Tickets available at AMS Business Office, Student Union Building.
HILLEL HOUSE presents **Shefa Vegetarian Restaurant.** Hillel House.
HABITAT FALL LECTURE SERIES on Urban Design and Settlement Policies: The Case for Implementation in Three Selected Cities. Prof. Wilhelm Viggo von Moltke, 1979 Scholar-in-Residence at the Centre for Human Settlements, UBC, and professor emeritus of Urban Design, Harvard Graduate School of Design, opens the lecture series with **Philadelphia in the 1950s.** Room 102, Lasserre Building.
WEDNESDAY NOON-HOUR CONCERT. The CBC Chamber Orchestra performs **Music by Handel and Mozart.** Recital Hall, Music Building.
3:30 p.m. **APPLIED PROBABILITY AND STATISTICS Workshop.** Dr. S. Weerahandi, Mathematics, University of Sri Lanka, on **Multi-Bayesian Statistical Decision Theory.** Room 214, Angus Building.
ASIAN RESEARCH LECTURE SERIES on **Developmental Problems in Southeast Asia.** Dr. Baldev Singh, director, Centre for Research in Economic Change, Punjabi University, India, on **Regional Planning Goals: Employment or Income — A Case Study of an Arid Region in India.** Room A201, Asian Research Institute, 2042 West Mall.
4:00 p.m. **GRAUER LECTURER.** Amory Lovins presents **General Remarks on Energy Policy,** with Commerce graduate students. Penthouse, Angus Building.
4:30 p.m. **ECOLOGY SEMINAR.** Dr. Norman Owen-Smith, Applied Mathematics, University of Witwatersrand, on **An Optimal Foraging Model for Large Herbivores.** Room 2449, Biological Sciences Building.
7:00 p.m. **SPANISH LANGUAGE EVENING** at International House.
7:30 p.m. **FOLK DANCING** at International House every Wednesday. A varied program of beginning and intermediate dances from many countries and ethnic regions wil be taught. Open to anyone on or off campus. Yearly membership fee, $10; $5, students. First two sessions free. For further information, call M. Snider, 224-0226, or R. Spratley, 228-8415.
8:00 p.m. **FRONTIERS IN MEDICINE.** Prof. Lorne Kirby, Pathology, UBC, on **Biochemical Screening of Newborns Can Prevent Mental Retardation,** one of a series of lectures videotaped during UBC's Open House last March. Channel 10, Vancouver Cablevision.

THURSDAY, SEPT. 20

12:30 p.m. **HILLEL HOUSE.** Classes begin today in Beginners Hebrew and Intermediate Hebrew. There will also be a seminar on **The Holocaust.** Limited enrolment. Hillel House.
GREEN VISITING PROFESSOR. Joseph Campbell, mythologist, author and professor emeritus of literature, Sarah Lawrence College in New York, on **Symbolism of the Kundalini (A Highly Psychological Form of Yoga).** Room 106, Buchanan Building.
2:00 p.m. **ANIMAL SCIENCE SEMINAR.** Dr. W.R. Carr, ARC, Animal Breeding Research Organization, Edinburgh, Scotland, on **Physiological Criteria of Merit in Lactation and Reproduction.** Room 348, MacMillan Building.
4:00 p.m. **PHYSICS COLLOQUIUM.** Jearl Walker, Cleveland State University and *Scientific American,* on **The Flying Circus of Physics.** Room 200, Hennings Building.
4:00 p.m. **GENERAL SYSTEMS FORUM.** An interdisciplinary seminar on **General Systems Theory and Its Applications to the Social, Behavioral, Biological, and Physical Sciences.** Room 228, Angus Building. New members welcome.
4:30 p.m. **BIOMEMBRANE/ANATOMY LECTURE.** Dr. E.E. Daniel, Neurosciences, McMaster University, on **Studies on Membranes Isolated From Smooth Muscle.** Lecture Hall 3, Woodward Instructional Resources Centre.
7:00 p.m. **SUBFILMS** presents John Travolta and Olivia Newton-John in **Grease.** Auditorium, Student Union Building. Admission with AMS card, $1. Repeated Friday and Saturday at 7:00 and 9:30 p.m., and Sunday at 7:00 p.m.
8:00 p.m. **IMMUNOLOGY SEMINAR.** Dr. Marilyn Hamilton, Surgery, Massachusetts General Hospital, Boston, on **The Influence of Immunization of Female Mice with F9 Teratocarcinoma Cells on Their Reproductive Performance.** Salons B and C, Faculty Club.
SYDNEY ISRAELS MEMORIAL SEMINAR. Dr. Kenneth Holt, Institute of Child Health, London, England, on **Handicapped Children.** Lecture Hall 6, Woodward Instructional Resources Centre.

FRIDAY, SEPT. 21

9:30 a.m. **GRAUER LECTURE.** Amory Lovins on **Energy-Conscious Design** with students in Architecture 455.
12 noon **DENTAL RESEARCH SEMINAR.** Dr. D.C. Smith, professor, Faculty of Dentistry, University of Toronto, on **Recent Advances in Dental Material.** Room 164, Macdonald Building.
12:30 p.m. **GRAUER LECTURE.** Amory Lovins on **Energy Policy: How to Enjoy the Inevitable.** Room 106, Buchanan Building.
8:00 p.m. **SQUARE DANCE** at International House with a professional caller. Admission, $1.

LIBRARY TOURS

If you're perplexed by the thought of a library with 13 locations on campus, 2 million books, a microcatalogue and a card catalogue, come to a tour. Orientation tours of Main and Sedgewick libraries are being given during the first 2 weeks of classes — Monday through Friday, Sept. 10 through Sept. 14, and Sept. 17 through Sept. 21; 10:30 a.m. and 12:30 p.m. every day. Tours begin in the entrance hall of the Main Library.

FACULTY LIBRARY GUIDE

The 1979/80 edition of the Faculty Library Guide is available from the Circulation Division, Main Library. Ask for a copy when you renew your library card, or phone Information and Orientation Division, 2076, to have a copy mailed.

SKATE UBC FALL PROGRAM

A 10-week program begins on Saturday, Sept. 15. Children and adults are put into groups according to age and skill. Skating lessons, $20; power skating (designed to develop stamina, balance and speed for hockey players), $36; dance session (figure skating experience necessary), $18; advanced free style (8 C.F.S.A. National Test badges necessary), $36. For further information, call Skate UBC, 9 a.m. to 1 p.m., 228-5995.

MUSEUM EXHIBITS

The Museum of Anthropology presents **The Gallery Collection: 10 New Northwest Coast Indian Silkscreen Prints.** Display continues in the museum rotunda until Sept. 30.
The Four Seasons: Food Getting in British Columbia Prehistory is an exhibition showing the livelihood and living patterns of the prehistoric peoples of southern B.C., and the scientific techniques used to study their past. It continues at the Museum of Anthropology until Nov. 4.
Four student exhibits are on display in the museum — **Design Elements in Northwest Coast Indian Art; The Evolution of Bill Reid's Beaver Print; Design Variations in Guatemalan Textiles;** and **Kwagiutl Masks.**
The Theatre Gallery in the museum features two multi-screen slide-sound presentations which can be operated by visitors.
Museum is open Tuesdays, noon to 9 p.m.; Wednesdays through Sundays, noon to 5 p.m.

COMPUTING CENTRE OPEN HOUSE

A self-guided tour through the machine room is open to all students, staff and faculty from 12:30 until 4:00 p.m. on Thursday, Sept. 20. Starting point in Room 100, Computer Sciences Building.

FREE LEGAL ADVICE

The UBC Law Students Legal Advice Program offers free legal advice to people with low incomes through 19 clinics in the Lower Mainland. For information about the clinic nearest you, please telephone 228-5791 or 872-0271. Advice is also available on sponsoring Vietnamese refugees.

'CEREMONY OF CAROLS' CHORALE

The Chorale will be held on Thursdays, 2:30-3:40 p.m., Music Education Hut 0-16, 6388 Old Orchard Rd., beginning on Thursday, Sept. 13. Open to all S.A.T.B. students and faculty who enjoy singing. The objectives are enjoyment, rehearsal and performance in the first week of December of Benjamin Britten's "Ceremony of Carols" with harp accompaniment. Further information 228-5206, 228-5367.

DRAMA

Rosencrantz and Guildenstern Are Dead by Tom Stoppard and directed by Robert Graham begins Wednesday, Sept. 19, and continues until Saturday, Sept. 29, excluding Sunday. All performances at 8 p.m. at the Frederic Wood Theatre. Admission, $5; students, $3. For reservations call 228-2678 or drop by Room 207 of the Frederic Wood Theatre.

FINAL ORAL EXAMINATIONS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Listed below are scheduled final examinations for the degree of Doctor of Philosophy at the University. Unless otherwise noted, all examinations are held in the Faculty of Graduate Studies Examination Room, General Services Administration Building. Members of the University community are encouraged to attend the examinations, provided they do not arrive after the examination has commenced.
Monday, Sept. 17, 2:00 p.m.: YEH MOON CHAE, Soil Science; **The Distribution of Lipid Sulphur in Soils in British Columbia.**
Thursday, Sept. 20, 1:00 p.m.: RICHARD SCOTT, Economics; **Schooling, Experience, Hours of Work, and Earnings in Canada.**
Friday, Sept. 21, 9:30 a.m.: ARISTOTLE AZAD, Anatomy; **Isolation and Partial Characterization of Vesicles Derived From the Plasma Membrane of the Chicken Gizzard Muscle.**

BAGPIPERS

Any pipers among faculty, staff or students who are interested in getting together to play are asked to contact Edward Mornin, Germanic Studies, 228-5140.

FITNESS APPRAISAL

The School of Physical Education and Recreation offers comprehensive physical fitness assessment through the new John M. Buchanan Fitness and Research Centre in the Aquatic Centre. A complete assessment takes about an hour and encompasses various fitness tests, interpretation of results, detailed counselling and an exercise prescription. The assessment costs $15 for students and $20 for all others. To arrange an appointment, call 228-4521.

FINE ARTS EXHIBIT

An exhibition entitled **Degikup, Washoe Fancy Basketry, 1895-1935** continues until Sept. 20. Fine Arts Gallery, basement, Main Library. Tuesday to Saturday, 10:30 a.m. to 5:00 p.m.

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