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Zoologist David Suzuki Talks About 'Science- You and Me'

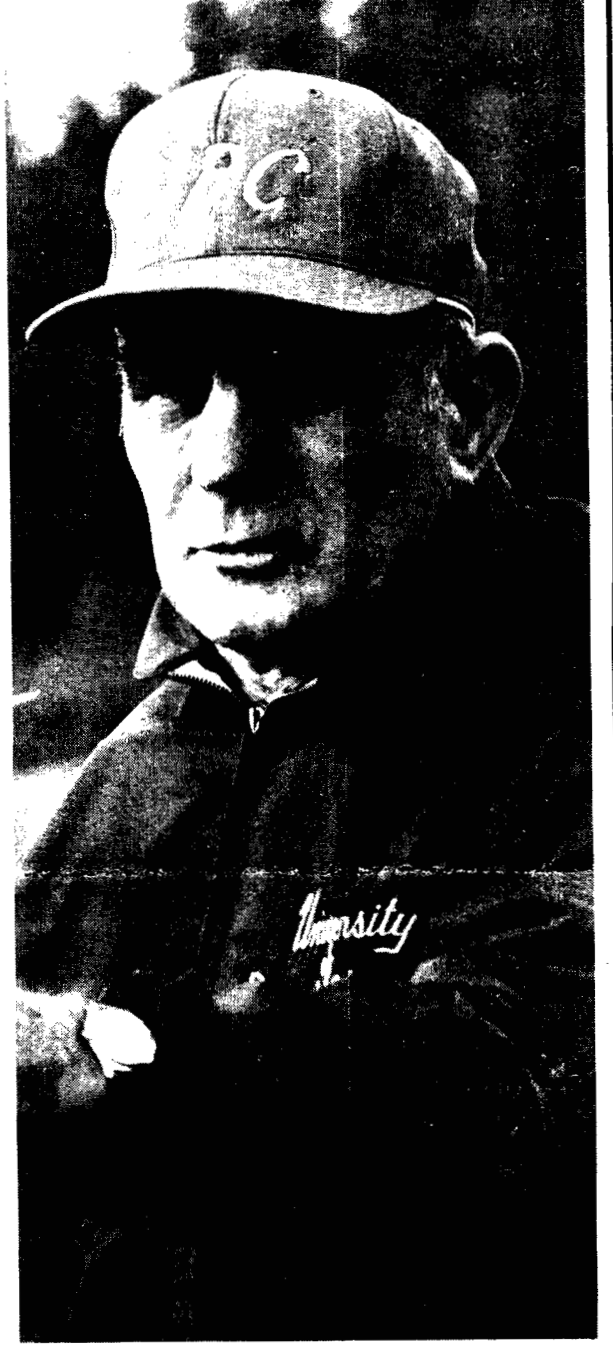
-See Pages Six
and Seven



Pictures by UBC Photo Department

At UBC's Research Forest They Drop Trees From Planes

-See Pages Two
and Three



Frank Gnup- UBC's Long- Suffering Football Coach

-See Pages Ten
and Eleven

'Best-Use' Forestry

By PETER THOMPSON
Assistant Information Officer, UBC

irritated with you if their camper gets stuck or they crack their oil pan because there's no gravel in the car park. Roads will have to be maintained to certain standards acceptable for private vehicles."

"Multiple-use forestry" is the management practice currently in force in the province, Mr. Walters said. This has tended to mean that foresters have recognized forest uses other than timber production, but mostly secondary to timber production.

Forest companies have allowed the public to use their logging roads at most times in areas where company activities weren't in progress — except during the forest fire season — and during weekends and on holidays where the companies were active.

Co-indicent with changing social values are technological changes shaping the forest industry.

In the not too distant future, almost the only crops available to the public will be those that can be sown, cultivated and harvested mechanically. This is already accepted in the agricultural industry.

Total mechanization is coming to the forest industry. Site preparation for seedling planting, the planting operation itself, and protection and harvesting will all be done mechanically.

Seedlings can now be sown mechanically thanks to the pioneering work of Mr. Walters in developing a tree planting gun. And in many parts of the world harvesting is done with huge machines which hold the tree and snip it at its base with two shears as if it were a flower.

Shear harvesting is common in Europe, Eastern Canada and the interior of B.C. Nearly all the trees harvested in the interior are cut by shears. Three years ago this type of mechanical harvesting was almost unknown there.

"The reason why shears aren't used on the coast of B.C. is because the terrain is too rugged; it isn't rolling country like the B.C. interior or the southern pine forests of the United States or the softwood forests of eastern Canada," said Mr. Walters.

"But the economics of forestry will force us to totally mechanize timber management. This means timber production will be limited to the parts of the coast that aren't so steep that machinery can't move on it.

RUGGED TERRAIN

"Nowhere in the world does forestry operate on such a large scale in such rugged terrain as coastal B.C. So the impact of total mechanization will be greater here than anywhere else."

This, says Mr. Walters, is where best-use forestry comes in. The University's Research Forest has been divided into different zones and each zone has its own list of forest products arranged in a certain priority.

UBC's OTHER CAMPUSES

For most UBC students and faculty members, the "campus" of the University of British Columbia is the 1,000 acres of land at the tip of Point Grey on the outskirts of Vancouver.

For many students and faculty members, however, the term campus has a wider meaning. It encompasses a 12,000-acre research forest north of Haney, a 1,500-acre research farm on Vancouver Island, a 90-acre geology camp near Oliver, a 180-acre ecological reserve near Hope, as well as other miscellaneous properties.

Most of the other "campuses" to which UBC holds title are the result of grants from the provincial government or gifts from individuals who have willed property to UBC for specific purposes.

In the article beginning at right on this page, UBC's assistant information officer Peter Thompson describes some of the research being carried out at UBC's Research Forest in the Fraser Valley, where a new concept in management, called best-use forestry, is being planned.

The Oyster River Research Farm operated by the Faculty of Agricultural Sciences on Vancouver Island is described in an article on the page opposite.

And on Page Four of this issue of *UBC Reports* are brief descriptions of seven other properties scattered throughout the province and owned outright by UBC.

University of B.C. foresters are trying to cushion the impact of an irresistible force meeting an immovable object.

The collision has already begun. But its greatest impact, due perhaps in 10 to 20 years, may be softened if a proposed Faculty of Forestry experiment is successful.

The irresistible force is the growing public demand for access to our forests.

The immovable object is the bundle of social, economic and psychological conditions which are preserving our forests almost exclusively for timber production.

The frontier scenario of the future won't be cattlemen driving off sheepherders and grain farmers.

It may be timber companies trying to keep urban recreationists out of their timber stands.

Unless the proposed UBC experiment works.

MONEY SOUGHT

The experiment is the introduction, for the first time anywhere, of "best-use" forestry. UBC hopes to convert its entire 10-square-mile Research Forest near Haney to best-use forestry management and is looking for research money to put it into operation.

Formally, best-use forestry is "the continual integration of forest-land uses to provide the maximum benefit to the welfare of society," according to Mr. John Walters, director of the Research Forest.

Behind its introduction lies a combination of social and technological changes impinging on the forest industry.

"Today there are more people who are more mobile and have more money and more leisure time," Mr. Walters said. "They're articulate. They're more assertive. Their attitude towards private property is changing. They don't respect it the way they did in the past."

The public is demanding that private logging roads be converted to public highways. They regard the forests of the province as their heritage and they are demanding increasingly sophisticated access into them.

"Foresters have tended to have a passive if not negative attitude towards recreational use of timber land. That's changing," Mr. Walters said.

"You can't merely put up a picnic table and an oil drum for litter in a company forest area today. You have to provide sophisticated, intensively-managed recreational facilities and ways have to be found to do this on an economic base through tax concessions to the companies or direct charge to the public.

"And even if you provide all this free they'll be

Contented UBC cows munch grass at Vancouver Island farm



Planned

Basically, the higher, less-fertile levels have been zoned primarily for recreation -- hunting, fishing, hiking and picnicking -- and for the production of drinking and irrigation water. Timber production has been assigned a lower priority here.

Timber production is the first priority in lower, more-fertile elevations with watershed management and recreation inferior to timber. Recreation corridors will run along streams and other appealing stretches of the zone for the use of fishermen, hikers, riders and picnickers.

"Best-use forestry tries to sort out the conflict between different groups in society wanting exclusive or near-exclusive use of our forests," said Mr. Walters. "Since there isn't enough forest to go around on the coast, the only way to sort out the conflict is to integrate as many of the uses as possible.

"This means intensive management. You can't have intensive use of a forest without intensive management.

"The challenge of the experiment is to work out ways of integrating the different uses successfully. How do you open the forests up to recreationists without having it burnt down? How can you produce drinking water for urban centres and allow swimming and fishing and logging in the same area without pollution?

SOLVE PROBLEMS

"These are problems we have to solve."

More mechanized forms of fire protection will have to be developed, perhaps using infra-red scanners for fire detection. The recreation corridors along the streams through the timber-producing areas could be separated from the coniferous trees by hardwoods such as birch and broad leaf maple. Fire doesn't run through these hardwoods as easily as through a conifer forest and so they act as a natural fire-break.

The whole experiment will be done on a sustained-yield basis. "Sustained-yield is used by foresters throughout B.C. It means that the maximum amount of timber logged in any area each year is the same as is added by nature through forest growth," Mr. Walters explained.

"We will apply sustained-yield to the other forest products -- recreation, wildlife and water production -- and harvest no more deer, for example, than the number added each year, which would otherwise be in surplus.

"The forest is a living organism. We want to manage it in ecological balance so that it produces in perpetuity and at the same time maximize our benefits from it."

Perhaps the most innovative feature of the experiment is how it may resolve the problem of who

*Please turn to Page Four
See FOREST*



MR. JACK WALTERS, director of UBC's Research Forest near Haney, B.C., and inventor of a gun for planting tree seedlings, will oversee a proposed plan to implement a "best-use" forestry scheme at the

12,000-acre forest. Forest is widely used for scientific experiments and as a training site for students in UBC's Faculty of Forestry. Picture by the UBC Photo Department.

UBC HAS MODEL DAIRY FARM

A little known "campus" of the University of B.C. is the 1,500-acre Oyster River Research Farm on northern Vancouver Island between Campbell River and Courtenay.

The farm, valued at \$500,000 when it was acquired by UBC in 1962, is not only a research and student training centre for the Faculty of Agricultural Sciences, it is also a model dairy farm which will this year generate some \$145,000 in milk sales alone.

Dean Michael Shaw, head of UBC's Faculty of Agricultural Sciences, is quick to point out, however, that the farm doesn't produce large profits.

The farm's income in the last fiscal year was \$147,754, which included money from the sale of milk to the Fraser Valley Milk Producers' Association, the sale of timber and livestock and the rental of houses on the farm.

Counterbalancing the revenue were salaries paid to eight full-time employees and other operating costs totalling \$142,897, which resulted in an excess of revenue over expenditure in the last fiscal year of \$4,857.

In 1967, shortly after Dean Shaw was named to head the faculty, a decision was made to restrict the Oyster River farm to a dairy operation exclusively. Up until 1967, the farm had a mixed animal population, including beef cattle and hogs as well as

dairy cattle.

The decision to drop beef cattle and hogs from the operations of the farm was largely an economic one. Once these animals had finished feeding trials they had to be shipped at considerable expense to the mainland for slaughtering because there are no abattoirs on Vancouver Island.

In 1969 an irrigation system was installed at the farm to increase the hay crop. These factors -- restriction of the farm's operations to dairy cattle and improved feed production -- made the farm more self-sufficient and enabled it to become a break-even operation in a relatively short time.

FARM OPERATIONS

Today there are 296 dairy animals, including 95 milking cows, valued at \$75,445, on the farm. The milking animals product one-and-a-half tons of milk a day.

The operations of the farm are controlled by a management committee established by Dean Shaw in 1967 and chaired by Prof. Warren Kitts, head of the Department of Animal Science in the agricultural sciences faculty. The day-to-day operations of the farm are the responsibility of Mr. Leo Kansky, a UBC animal science graduate who was named farm

manager in 1955.

Now that the farm is operating on a break-even basis the management committee envisages that more use will be made of the property for faculty research.

One long-term experiment, involving the cross-breeding of Holstein and Ayrshire cows, has just been completed at the farm. The Holstein-Friesian Association of B.C. made donations of dairy animals to the Oyster River herd to aid the project.

Two new members of the Department of Animal Science, Dr. Raymond Peterson and Dr. John Hodges, are analysing the results of the experiment to determine if the cross-breeding has been beneficial in terms of both present and potential milk production.

They are also interested in studying, through breeding, the possibility of increasing the protein content of milk, since the world is protein-deficient.

"In the future," said Dr. Kitts, "we want to use the farm for an overall agricultural system analysis to study grazing habits, forage production and the energy inputs and outputs of various crops such as grass and corn for winter feeding of cattle."

The UBC farm also serves as a training centre for students who are interested in the applied aspects of

*Please turn to Page Nine
See FARM*

FOREST

Continued from Page Three

will pay for intensive management. The forest industry has unanimously agreed that the forest environment should be protected from abuse but has justifiably rejected suggestions that it absorb the cost of providing forest recreation to the public.

The potential value of recreation shouldn't be underestimated. As much money is invested in salt-water sport fishing boats and equipment on the coast of B.C. as in commercial fishing. And the balance between sport and commercial fishing investment is widening each year.

The return from one acre of forest on steep, rocky soil used for recreation is probably much higher than the value of timber grown on the same acre each year, remembering that it takes 100 years for a tree to mature.

TOURIST REVENUE

With the vast population living on the west coast of the continent, coastal B.C. may soon become the Alps of North America. Though the tourist revenue could be enormous, so would the cost of forest management, and under the present system the managers of the forests — the forest companies — don't see a nickel of the tourist dollars the forests attract.

Why should forest companies pay for providing first-class camping facilities, maintaining trails or stocking lakes with fish?

Recreationists using the University Research Forest will pay for the privilege. Part of the best-use experiment will be to change the public's attitude towards the forest. First by educating recreationists on how to use the forest without destroying it, and secondly by convincing them that their recreation incurs a cost.

Fishermen entering the Research Forest, for example, would choose a length of stream for their exclusive fishing that day and be charged a fee.

Though the experiment sounds idealistic, it has a realistic basis. It must pay for itself.

The Research Forest, the only one in B.C., finances its research and teaching through revenues from the forest. Up until now this has mainly been through timber sales. Between 1953 and 1970, some 100 million board feet of logs worth \$5.8 million were harvested and converted into lumber worth \$3.7 million.

About 200 research projects have been done at the Research Forest by foresters, ecologists, zoologists and others from UBC, Simon Fraser University, and the federal and provincial governments.

About 1,000 UBC forestry students have received their field training there and the B.C. Institute of Technology, B.C. Forest Service and B.C. Aviation Council use it for teaching.

For years groups of high school and elementary school students have received instruction at the Research Forest on ecology, tree growth, tree identification, forest management and forest protection.

There is a special trail for the blind designed in such a way as to give them knowledge of the forest through the senses of touch, hearing and smell.

A program is now being planned to train high school teachers in forest instruction.

Mr. Walters, a graduate of UBC's Faculty of Forestry, received his own field training at the Research Forest after the Second World War, a few years after the provincial government crown-granted the Research Forest to the University in 1941.

The area had been the site of the largest railroad logging operation in the Pacific Northwest between 1920 and 1931 when 7,000 acres of 700-year-old virgin forest were logged.

It was while a forestry student at UBC that Mr. Walters got the idea of a seedling gun, a gun that shoots seedlings into the ground and is now used throughout the world.

The seedlings are grown in special plastic bullet-shaped containers with holes at the bottom for root growth. As the seedling grows in the ground, its roots break open the bullet.

The alternative is the old method, still widely used, of

Other Property Described

In addition to its research forest and farm, UBC owns a variety of smaller properties scattered throughout B.C. What follows are brief descriptions of each.

GEOLOGY FIELD SCHOOL. Located near Oliver, in the southern Okanagan Valley, the UBC Geology Field School was purchased in 1961. Nearly 90 acres in extent, the property is used in the spring and summer each year as a training school for third-year geology students and by graduate students working on thesis topics.

"The great variety of geological features at the property and the low rainfall make it particularly suitable for the geology department's purposes," says Dr. Raymond Best, associate professor of geology, who is responsible for the operation of the field school.

The property, once beautifully wooded and park-like, was overrun by a forest fire in the fall of 1969 and is now somewhat barren. The fire failed to destroy the UBC buildings on the property — a cook house, two bunk houses, two wash-houses and an office. Also on the property are six seismic trailers donated by oil companies.

In August of 1972 the UBC geography department plans to run its field school on the property.

THACKER ECOLOGICAL RESERVE. The reserve was a gift from the late Mr. L.T. Thacker in 1959. Located near Hope, it consists of 180 acres plus 1.73 acres of land on nearby Kawkawa Lake. It was intended when the property was given to UBC that it be left undeveloped and set aside for studies in animal and plant ecology by scientists in a variety of fields.

PRIDEAUX HAVEN. The haven, one of the finest and most sheltered small-boat anchorages on the B.C. coast, is located 14 miles north of Powell River. It consists of 40 acres of shore property and has a shoreline of about three-quarters of a mile.

The haven was a gift in 1965 to the University from the Reed and Sarah Hunt Fund. UBC is entitled to use, improve or develop the property

for academic purposes, providing its natural beauty is not impaired and public enjoyment of the boat haven is not obstructed.

UBC has undertaken to ensure that Prideaux Haven will be perpetually available as an anchorage for pleasure craft. Dean Ian McTaggart Cowan, dean of the Faculty of Graduate Studies, says the shore property and the waters of the haven have unique values for marine biology and ecological research.

ROCKWOODS. The Rockwoods property is located at Batchelor Bay in West Vancouver near Whytecliffe and was donated to the University by the late Major General Victor Odium in 1959. There are six buildings on the five-acre property — four houses, a map house and a boathouse.

In 1965, UBC's Board of Governors allocated Rockwoods to the B.C. Work Study School, which staged conferences and training sessions at the property for several years. More recently, UBC's Faculty of Commerce and Business Administration has used the houses on the property as a site for courses in continuing education for businessmen.

MISCELLANEOUS PROPERTY. Under the terms of the will of the late Mrs. Florence E. Heighway, who died in 1960, UBC and the Canadian Arthritis and Rheumatism Society received two pieces of property located at 2141 Government Street, Victoria, and 1626 Venables Street, Vancouver.

Both pieces of property are administered on behalf of the University by a trust company and income is used "for the purposes of medical training." The Victoria property includes a warehouse leased to Kelly, Douglas and Co. Ltd.; the Vancouver property is leased to Vancouver Sheet Metal Ltd.

In 1969, UBC received a gift of property in downtown Vancouver from the late Mr. Eugene Sidney Woodward. The property at 1055 Granville Street is occupied by a camera store. The income from the property provides for the annual "Eugene Sidney Woodward Lectureships" in the Department of Economics.

reforesting an area by planting bare-root seedlings using a hoe. The survival rate of bare-root seedlings is much lower than those planted in a bullet using a gun. But most important is the cost difference.

GUN FASTER

Using a hoe, one man can plant 500 to 700 bare-root seedlings in a day at nine cents per tree. With the gun, a man can plant 2,600 a day at a cost of two cents per seedling.

The difference is critical because few people want the slow and low-paid job of planting using the old method. And also because of the volume of planting that needs to be done.

"About two million seedlings were planted in B.C. this year using the gun and 51 million using the old method," said Mr. Walters. "Both government and industry are aware of the need to plant more seedlings and are planning to set up nurseries to produce 75 million seedlings per year by 1975.

"But even that won't be enough. Plans are being discussed for 100 million per year and the B.C. Forest Service recommends that 500 million seedlings be planted each year, almost half the total number planted in all of North America this year.

"Using the old method, it would take 12,000 men and cost \$50 million alone to plant 500 million trees. So planting in the future must be completely mechanized."

It is uneconomic to sow seeds. Nature supplies a crop of Douglas Fir seeds only once every seven to 10 years and when she does she provides 30 million seeds per acre to allow for the enormous number of seeds lost to weather and rodents.

Besides, the seedlings replanted are from trees selected for their genetic superiority over the run-of-the-mill trees growing wild in unmanaged forests.

Mr. Walters is taking mechanical planting a step beyond the seedling gun. For about a year he has experimented with a method of dropping seedlings from aircraft.

At first the seedlings were dropped in a version of the

bullet container modified into a bomb. It was larger than the bullet and had plastic fins or stabilizers imbedded into the soil to guide its flight. The first stabilizers were made from plastic swizzle sticks which Mr. Walters says he enjoys collecting.

Then the seedlings were dropped without any container at all. What he did was grow the seedlings in dirt molded into the shape of a bomb. The day before the drop the seedlings and the dirt mold are frozen. The first batch were frozen in the camp kitchen freezer at the Research Forest's Loon Lake Lodge. After the drop the seedlings begin to grow as soon as the earth surrounding their roots thaws.

Many of the drops at the Research Forest have been done using a tilted runway — a short runway 600 to 700 feet long cut up the side of a mountain. New to North America, tilted runways have been used for years in New Zealand for dropping fertilizer. Tilted runways are advantageous in remote, rugged areas, such as coastal B.C., which are not serviced by road and are long distances from conventional airports.

Small aircraft land up the tilted runway, slowed down by the force of gravity. They can load up with about 4,000 seedling bombs, take off down the runway accelerated by the force of gravity, drop the trees and return for another load in as little as 10 minutes.

RESOLVE CONFLICTS

Lands, Forests and Water Resources Minister Ray Williston, at a forestry symposium celebrating the Faculty of Forestry's 50th anniversary Nov. 18, predicted social and economic disaster for B.C. unless conflicts in forest-land uses are resolved. And he has said that the problems will have to be solved within the next ten years.

"B.C. manages the largest publically-owned forest in the western world," Mr. Walters said. "As the only research forest in the province, UBC's Research Forest is the logical site for working out solutions to guide future management of provincial forests. It's our job. There's no one else to do it."



PROF. JAMES DUNCAN, right, head of UBC's Department of Mechanical Engineering, discusses with Mr. John Hoar, machine shop supervisor, the numerically controlled milling machine recently

purchased by the department. The machine, controlled by a punch tape prepared from computer cards, will automatically machine complex, precision surfaces. Picture by Michael Tindall.

UBC Engineers Apply Computers to Machines

By PETER THOMPSON
Assistant Information Officer, UBC

Vancouver and western Canada have a chance of cashing in on the revolution now taking place in the design and use of machine tools.

The revolution involves hooking computers to machines so that objects with complicated or precision shapes can be manufactured automatically.

Many simple "numerically controlled," or N/C machines, are in use in North America. But the first sophisticated use of N/C machines will probably be in the making of dies, the parts of machines that punch or press manufactured objects into final shape.

Pots and pans, telephones, car and aircraft engines, refrigerators and almost every other manufactured thing has its source in dies.

Dies must be at least as precisely made as the shapes they are creating and until now they have had to be tediously and expensively hand-finished by industrial craftsmen called die-makers.

Until, that is, a handful of men around the world began thinking of applying computers to die-making.

Some of the leading work in this field has been done by Prof. James P. Duncan, head of the University of B.C.'s Department of Mechanical Engineering.

He has put together low-cost machining and simple computer equipment which can automatically produce almost any three-dimensional object. His N/C unit can be programmed with instructions transmitted over telephone lines from any point in the world.

His efforts are the logical outcome of the more than 30 years he has devoted to the manufacturing industry.

Fully-trained as a die-maker after graduating from

university, he spent much of his life as a professional engineer concerned with machine surfaces, first as an auto and aircraft design engineer with the company which later became Chrysler Australia Ltd., and later as a turbine designer in England.

Prof. Duncan's pioneering work in automated machining of surfaces, in the basement of UBC's old Mechanical Engineering Building, was rewarded a few months ago with a \$102,000 grant from the National Research Council, one of the largest NRC equipment grants ever received by UBC.

His first work was financed through a small grant from Prof. William Armstrong, then dean of the Faculty of Applied Science and now deputy president of the University. More money came from Caterpillar Tractor Co. and American Superior Electric Co. lent him equipment at no charge.

AIDED TRIUMF

The first N/C unit Prof. Duncan put together did work for groups on- and off-campus, including local and national engineering firms.

It did experimental work in shaping the inflector for the TRIUMF cyclotron now being built on UBC's south campus. The inflector will change the direction of travel of sub-atomic particles as they enter the huge, \$30-million machine. When TRIUMF goes into operation in 1973, it will accelerate these sub-atomic particles until they reach a speed at which they can be used in experiments.

Prof. Duncan's first unit also did work on the design of acoustical horns used in experiments aimed at reducing noise pollution, as well as in machining the forms for making components for a new type of

artificial kidney being designed at UBC.

Surface design of the components is critical to avoid blood clots forming inside the artificial kidney. If the kidney is successfully taken into production, it will cost a fraction of the cost of artificial kidneys now in use.

Both the noise pollution and artificial kidney projects involve Prof. Duncan's department.

His unit was also involved in experiments connected with the U.S. National Aeronautics and Space Administration's project to place a telescope in orbit around the earth. The telescope's mirror had to be accurate to within one-millionth of an inch.

Prof. Duncan's contribution was to minimize distortion of the mirror that would result when the mirror was placed in outer space where the gravitational force that acts on earth is absent. The gravitational "sag" in the mirror would disappear in space, causing distortion.

During the time he was working on his N/C machine he gave extension courses to representatives of the B.C. manufacturing industry through UBC's Center for Continuing Education. These contacts convinced him of the future potential of N/C machines for Vancouver.

"Vancouver is already a strong city for computer-based technology," he said, "and there are great advantages here for local companies such as Gearmatic Co., which bought an N/C machine after learning of our work and are very happy with the results.

"We've also found that without any changes in the aerial mapping procedures of McElhanney Surveying & Engineering Ltd., we're able to program our N/C machine to cut three-dimensional models of terrain to whatever scale is wanted.

"We've already produced a three-dimensional test model with the company's co-operation."

B.C. Hydro is interested in having work done for them and he said other local companies such as Lenkurt Electric Co. of Canada and Capilano Engineering Co. have been using N/C machines for some time.

PRODUCE DIES

"But the exciting potential of N/C machines will probably be in die-making. One unit has successfully produced a die in one-fourteenth the time currently taken by an industrial die-making firm.

"Apart from the enormous economies involved in producing dies in a fraction of the time it would take a man to do it, automated machining will overcome a serious factor limiting manufacturing today, the short supply of skilled die-makers and the high cost of manual finishing.

"As manufacturing activities increase, dies are needed in greater number and wear out faster. Some only last a few hours. And at the same time, fewer people seem to be attracted to die-making as a profession."

The new automated machining unit he has put together with money from his \$102,000 NRC grant has opened up another possibility for establishing a local manufacturing industry — producing precision artificial limbs on an international scale, Prof. Duncan said.

Co-operating with him is Mr. James Foort, bio-medical engineer with the division of orthopedic surgery in UBC's Faculty of Medicine, who was technical director of a research group at the Manitoba Rehabilitation Hospital in Winnipeg before joining UBC this fall.

Central to the project is a unique stereoscopic or three-dimensional camera designed by Mr. A.J. Bowker, a graduate of UBC's mechanical engineering department, who is in charge of mechanical design in the national aeronautic laboratories of the NRC.

Using the camera, photographs of the remaining limb and the stump of the amputated limb can be fed into the automated machining unit to produce replica shapes for an artificial limb.

"The amputee population of the world is small," Mr. Foort said, "and servicing it tends to be inefficient.

"We have the possibility of setting up a centralized manufacturing and distribution industry in Canada supplying de-centralized clinics with artificial limbs.

"The clinics would be equipped with cameras such as the one we're building now. An important

Please turn to Page Nine
See MACHINE TOOLS

David Suzuki Ta

Within our lifetimes society has made a quantum leap into the age of science and technology. There is no place on this planet that one can go and escape the debris of man's inventions. A scant 15 years ago, science and technology promised a world of plenty, of leisure and no poverty in which machines would do our every bidding. Yet today, these dreams have changed to a nightmare of urban sprawl, environmental decay and ever more frightening weapons of control and destruction.

Many of us scream for some kind of stability in this accelerating proliferation of new things, yet our insatiable appetites for novelty and titillation only feed the rate of change. Who is to blame, what has gone wrong? I would like to propose the thesis that the root of the problem lies not with science, not with politicians or power-mad fiends, but with us.

In the past decade, we have witnessed an accelerating turnover in social fads, each heavy with its vision of the apocalypse and laden with all of the violent rhetoric of we-they politics. So we have lived through: ban-the-bomb, civil rights, anti-Vietnam, university reform, population and pollution and liberation groups. Yet today, nuclear weapons continue as a billion-dollar industry, apartheid and segregation remain as rigid as ever, the Indo-China war continues on, universities have waffled their way through the crisis and now the ecology movement has diverted its critics. In no case are we any nearer a solution to any one of the problems, yet newer, more relevant issues dull the older ones into apparent unimportance.

Have we become a race of jaded do-gooders whose fleeting concern with "vital" issues is simply a form of mental masturbation? While this is undoubtedly true for many in these movements, it is too glib to dismiss the bulk of sincere individuals committed to the causes in this way. It seems to me that the fad issues represent peripheral manifestations of a common underlying cause. We delude ourselves in supposing that by preventing the Amchitka blast, saving the whales or whooping cranes, getting more representation in university government or cutting down on industrial pollution, we will ensure a better world because such actions don't get at the heart of the problem.

As the enormity of each issue becomes apparent to each person involved, as our energy and morale is battered in the fight for change, we shift from cause to cause in the hope that a new issue may be the key to transforming society. I hope that the current eco-craze will last longer because it comes close to grappling with fundamental issues of man on this planet. But I fear the fanatical fervor and dogma of the eco-freaks, whose commitment to their vision of the solution for the world often resembles the ruthless shortsightedness of the industrialists they so vehemently decry.

I cannot see how we can treasure the lives of other organisms so long as we show such contempt for human life. How can we speak of the intrinsic worth of redwood trees or maintaining wilderness areas while human lives and minds are destroyed by apartheid, segregation and napalm? It is irresponsible to say that Vietnam, French separatism, police brutality and the oppression of women are not germane to the environmental problem. In fact, unless we also deal with these problems, the ecological crisis will never be solved.

I would like to pose two questions and deal with them in order. 1. Will we survive the next 15 to 20 years in the sense of maintaining society as we know it? 2. If we do, will the world be a better place?

Most of us have been involved primarily with short-term problems and here I feel that the fundamental cause of many of our crises resides in the autonomous nature of elite groups. In a complex technological society skills of a very specialized nature come to be practised by highly trained people. So we

have neurosurgeons, criminal lawyers, brake specialists, etc. As each group of specialists grows in size and importance, they come to acquire or are granted special powers of self-regulation that renders them virtually immune from the suggestions and criticisms of the general public. With the autonomy, there is an inexorable change in commitment from the privilege of serving the community to a concern with growth and maintenance of power which too often conflict with the needs of the public.

I include as specialists any group, garage mechanics, businessmen, policemen, lawyers, doctors and teachers. Those of us in the University, I'm sure, are conscious of the way the Administration and Physical Plant, with all of their rules and regulations, become impediments to the activities of the very people they originally started to serve. I don't mean to deny the importance and necessity of specialists. It is their relative immunity from and insensitivity to inspection and criticism by the people affected by them that creates difficulties.

Examples of the non-concern of elite groups for other people are numerous and painful to recite:

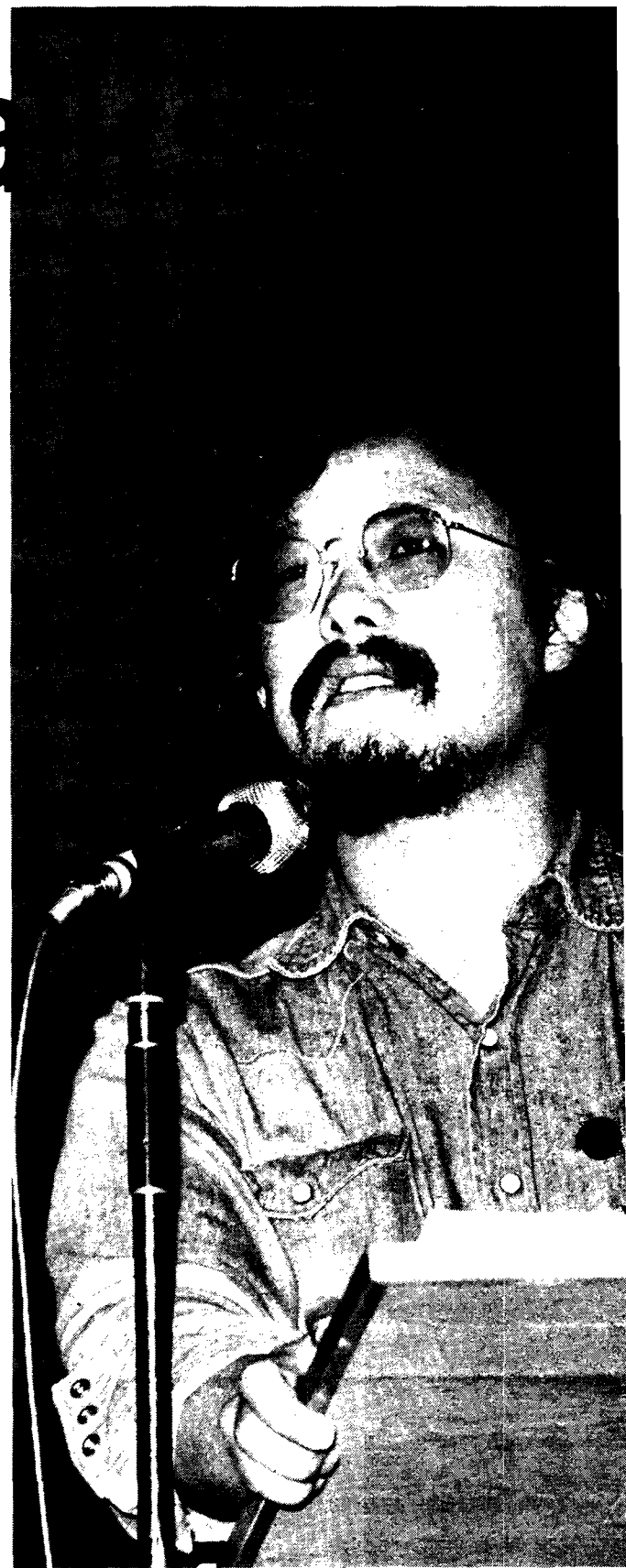
- The police are so concerned with enforcing law and order that they often end up hurting and killing the very people they are there to protect;
- The United States military tests bombs and dumps nerve gas weapons with complete impunity and its record of lies to the elected representatives of the people is shocking;
- Lawyers and judges look to the law for justice yet wink at collusion and display the very prejudices which have no place in a just society;
- The lying, deceit and exploitation of business and advertising are too sickening to recount;
- The medical profession perpetuates the myth of omnipotence and public service while covering up the laziness, stupidity, avarice, incompetence and drug addiction of many of its members.

I would like to spend some time with the group of specialists with whom I am most familiar — scientists. Scientists hold a very special position in present society, since their work, when translated by technology, affects every aspect of civilization. Yet, by the nature of its languages, complex machinery and requirements for prior knowledge, science has remained cloaked from the prying eyes of non-scientists.

Scientists, of course, are people with many reasons for being in science — curiosity, social status, fame, the Prize, etc. But they are uniformly committed to the need for freedom in their work, a freedom which often abrogates any responsibility to the rest of society for the application of that knowledge. There is no question that we need science to destroy many of our myths and superstitions. Copernicus showed us that the earth was not the centre of the universe, Pasteur demonstrated that living things only come from other living things and Darwin explained how man evolved. Each man evoked profound upheavals in his society that helped to rid us of ignorance and create a less egocentric view of man.

But while science and technology are now providing us with satellites, color TV, antibiotics, plastics and jet planes, they have also proliferated the spectre of hydrogen bombs, ICBMs, nerve gas and a technology that threatens to destroy every vestige of freedom and individuality. All of science is double-edged, full of promise to create a better life, yet ominous with possibilities for ever more frightening weapons and dangers. Scientists can no longer deny their responsibilities to inform all of society about their work and its implications — and to stop that work if its application is inevitably harmful.

Let me give you an example of advances in one small area of science — genetics — as an illustration of the potential for beneficial and destructive application to



society.

The most exciting area of science in the past ten years has been molecular genetics, where the actual biological language has been decoded. With an understanding of how a gene is made and what it spells, it is now possible to make genes in test tubes and to consider injecting them into cells by tying such genes onto viruses. In fact, the first completely synthetic gene was completed at the end of May, 1970. This holds the promise of cures for many forms of inherited mental disease, diabetes, albinism and so on. It also provides an ultimate weapon for total biological control since the injection of a small number of genes could completely cripple one's mind or body.

For those who hold that this science is fiction of the far future, I sadly point out that already geneticists have injected viruses into children in an attempt to "cure" a hereditary disease. Dr. Sol Spiegelman, of Columbia University's medical school, has described the isolation of pieces of viruses which can suck up certain molecules in cells. He calls them "self-reproducing magic bullets" and while they may destroy cancer targets, the same tools may be potent biological weapons.

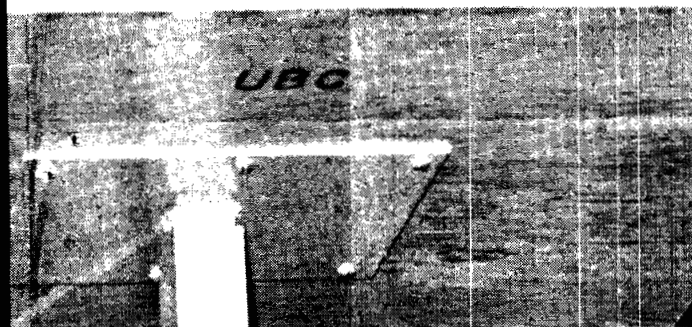
I'm often told by my colleagues that my vision of the world and the use of science is a warped one which overplays a pessimistic view. But I wonder, is my concept of reality so far out of line? I wish it was.

I would suggest that the way our society operates, with its commitment to short-term quickie solutions, we may "solve" the pollution problem by changing man to tolerate higher levels of dirt rather than cleaning up the air, water and land. We're already doing it. Today, in Los Angeles, school children can't play outside during recess. But when the smog alert sounds, people close doors and windows, turn on the air filters, drop Murine in their eyes and out they waltz. In Tokyo today there are machines which dispense fresh air when you drop in a coin. Recently I was thinking about the mercury problem and I asked myself, "Why can't we make a

ence-You and Me'

Picture by UBC Photo Department

Dr. David Suzuki, professor of zoology at the University of B.C. and the winner of several prestigious awards for his work in the field of genetics, spoke during November to one of the largest student audiences of the 1971-72 session. The bulk of his address, which lasted more than an hour, is reproduced on these pages.



back that requires mercury to survive?" Then, when levels get high, we purchase a tablet containing the bacteria, eat it and the bacteria run through our bodies gobbling up mercury. A day later we get a pimple on the end of our nose and we just squeeze out the mercury. Is that going to be our solution?

I would like to construct another scenario. It is clear that the concern over expanding population is resulting in strong social pressures to limit family size. There will undoubtedly be legislation enacted to encourage small families by rewarding sterilization or to punish by extra taxes families with excess children. In such a society the decision to have a child will be a serious, positive step which will cost money. Children, therefore, will become much more precious to the couple and to society.

I'm sure, therefore, that government will require that all pregnant women be tested to ensure that no child with a gross abnormality such as mongolism is allowed to be born. The technique of amniocentesis is now used routinely to analyze the genetic makeup of a foetus. I can see legislation requiring all pregnant women to have an amniocentesis so that any gross abnormality can be aborted. All of this is a realistic scenario for the near future.

Now let us suppose that a biologist approaches a government official and states that there is a class of embryos which can be predicted at the time of conception to have a high probability of never completing high school, not passing above the poverty level of income, becoming involved in crime, having mental and physical disabilities and dying prematurely. If this can be predicted, so the argument might go, we could save society as well as the individual child a terrific burden by abortion. This sounds compelling until we realize the above description fits Indians on reservations and blacks in ghettos. Here, clearly, the genetic constitution described above is detrimental only in a

racist environment. And I wonder whether our solution to racial problems will be by eliminating race rather than changing society to encourage differences. Our intolerance of blacks, Indians, Jews, Asians and long-hairs has already driven men to incredible solutions.

I hope you can see the dangers and hopes of future research from these simple examples. Are we to avoid dilemmas by calling a halt to research, as some radicals are demanding? This could deny to many cures for cancer and other diseases, but that's no great sacrifice. However, it would deny an activity which in my view makes us unique and worth being human — the asking of a question which we then try to answer. This activity ranks with art, music and poetry as a uniquely human thing which makes man beautiful. To stop science would be to destroy an important part of human dignity.

What then are the responsibilities of the scientific elite? It is no longer possible to shun the applied aspects of one's work. One can no longer carry out research solely for the accolades, the published papers, promotions and research grants. The work of scientists must be translated so that all people can understand the basic principles in order to scrutinize the research. We must be able to decide on how information will be applied.

Science is already being misused because scientists have not had the courage, interest or sense of responsibility to speak out. A classic example of this was the way in which the marginal effects of LSD on chromosomes was blown up out of all proportion to the actual scientific data in order to frighten people and prevent them from using acid. This was done in spite of the borderline nature of the effects of LSD on chromosomes and the known, potent mutagenicity and chromosome breakage by caffeine. The disenchantment of the young with this kind of "scientific proof" will rebound expensively, in my opinion. And so long as scientists refuse to clarify the factual evidence they stand guilty of trying to perpetuate the myth of freedom and objectivity by denying the public the right to evaluate the data. I do not mean to imply that LSD is *not* a dangerous drug. I believe it is, but for reasons of its psychological effects and not any genetic dangers. Moreover, the results with caffeine suggest that tests done in test tubes may not be readily extrapolated to people.

There are two aspects to the question of our immediate survival. We must create the means of preventing further input of technological progress instead of trying to control it after it has created problems. We must anticipate problems and stop them *before* they are created. This means that before any new technique or device is implemented, we must determine whether it will hurt other people or create problems in the long run. The immediate rewards of profit or power must no longer be allowed to dominate the flooding of our system with technological innovation.

It seems to me that the aura of science and technology has enforced on most people a feeling of helpless insignificance. I felt people had to be mobilized on a large scale to realize that applications of science and technology were too important to leave in the hands of specialists and that they had to have a say in these decisions. I turned to the medium of television in the hope that it might be a way to evaluate levels of consciousness on a large scale. I don't regret my involvement in television as a learning experience and have come away with a better perspective on the medium. Although we produced what in my view was a mediocre product that could have been better even with the facilities we had, it was a disillusioning experience for other reasons.

Scientists who comprise the scientific elite not only shun the responsibility of translating their work for the

public, they actively attempt to censure those heretics without the proper credentials who attempt to do so. Within the scientific elite, the man who speaks out loses credibility as a reputable scientist unless his views are highly supportive of the needs of the group. After a show with John Goffman, I received a call from an official in the Atomic Energy Commission of Canada who attempted to discredit Goffman as a scientist instead of dealing with the specifics of Goffman's charges. In the same way, Linus Pauling suffered incredible pressures simply because he believed in peace and felt that nuclear testing jeopardized it. Paul Ehrlich is coming under fire as a scientist because he deigns to "popularize" ecology. We know where these men stand, but where are their opponents who have as much opportunity to speak out in public? Where does the bulk of the scientific community stand? And among those who snipe so readily at the ego and power trips of scientists who speak out, very few have been willing to help or lay their positions open to public scrutiny.

Another disillusioning aspect is that the media represent power and one is left trying to impose his view against those with other views. And the media create an image for individuals which is too often assumed to be that of the real person. There are people on this campus who dismiss me as a person without ever having spoken to me and assume that the person created by the media is me. And so involvement in the media militates against the person-to-person involvement that I feel is so essential.

Nevertheless, if we are to avoid continual technology-induced crises, we need to assess the long-range effects of all innovation. People in power from Minister of Science and Technology Allister Gillespie to Senator Maurice Lamontagne, the author of a study on Canadian science policy, to Science Council President O.M. Solandt are proposing such a review. So perhaps it will be.

A second aspect to survival in the next decade is that this is the American century. The United States has dazzled the world with the gaudy, plastic products of its powerful technology. It has been a global imperialist, infiltrating the political and economic structures of countries throughout the world and ripping off gigantic pieces of the world's oxygen supply and resources while littering the planet with its wastes. If we are to survive at all it will depend upon the fate of the U.S.A., and we can only hope that the radical-reactionary polarization within that country will bring that system to a stop or that its whole superstructure will collapse under its own weight. It should be obvious to any thinking person that the American supertechnocracy does not work; rather than freeing people for a realization of their humanity it has impoverished, dehumanized and imprisoned the minds and souls of its people.

A fundamental issue which we as Canadians must recognize is that so long as we remain a colonial branch plant to the U.S., we will in fact have no say in the future of our own people. So long as our resources are funnelled to the U.S., so long as our land is owned or leased by Americans, so long as our universities continue to increase the importing of American scholars, so long as our culture comes from New York or San Francisco, we are committed to an American destiny. Even our branch plant radicals shout "off the pigs" or "right on" and our branch plant reactionaries act as if our university students are Berkeleyites. I don't believe that Canadians are better or different from Americans, but the national border permits us, in fact, to learn from the mistakes of the U.S. We can only profit from those

Continued on Page Eight
See SUZUKI

"In the long run, we must ask whether an increasingly complex technological society can perpetuate a sense of human worth and dignity."

SUZUKI

Continued from Page Seven

mistakes if we have had the independence to make our own decisions.

In the long run, we must ask whether an increasingly complex and impersonal technological society can perpetuate a sense of human worth and dignity. Is the current contempt of management for labor and vice versa, the loss of satisfaction from work, the polarization of young against old, the increasing dependence on drugs such as tranquilizers and sleeping pills, the manifestation of a technology devoid of humanity?

What I am going to say now has been swirling around in my head for the past few months and is meaningful only to me. I don't lay this on you as a trip. If anything I say is meaningful for you, then you will make of it what's important for you.

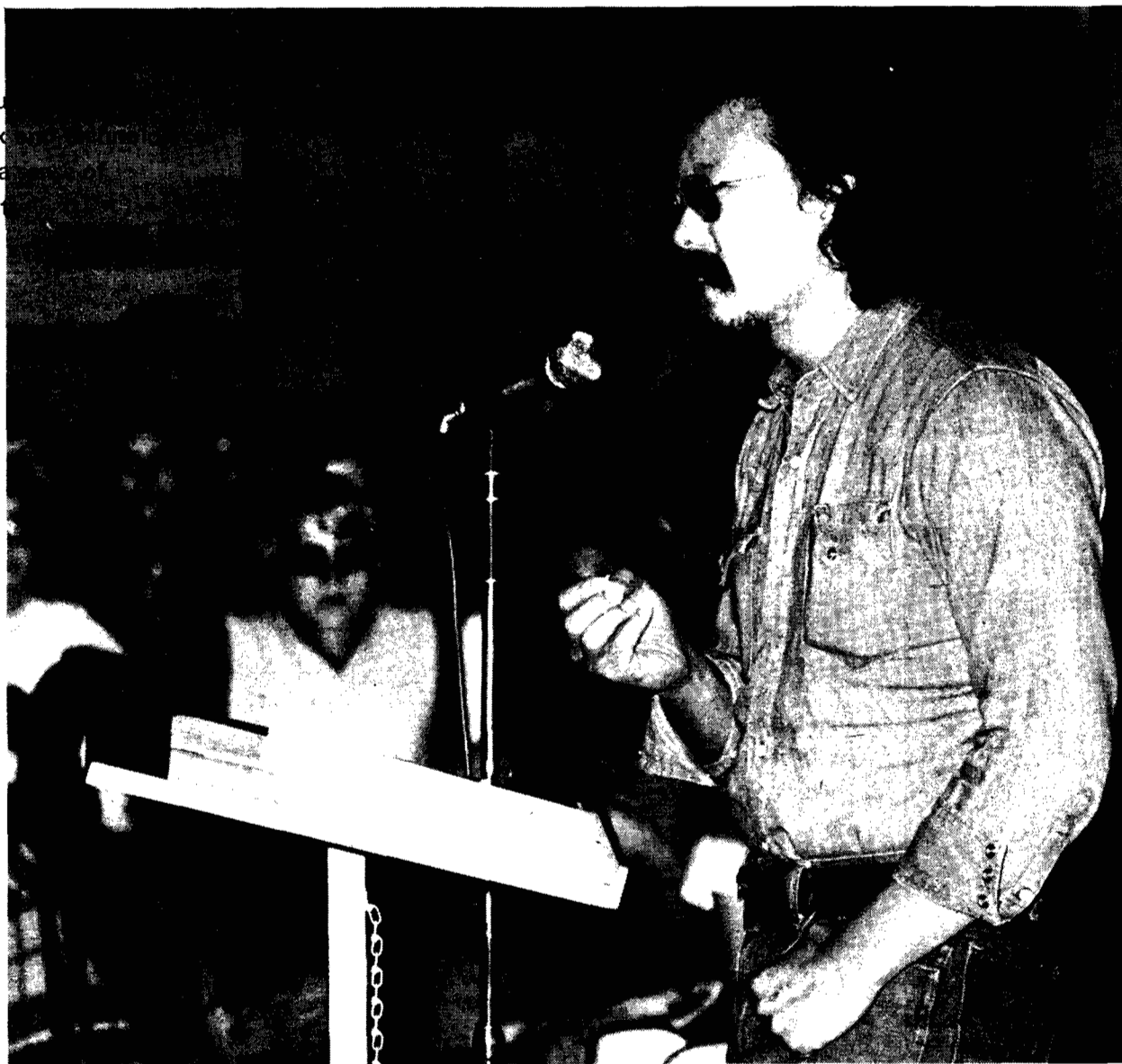
In my involvement with the pressing concerns of the world and my commitment to involving people in the ideas of science and technology, my own people-to-people relations have eroded. With more and more things to do and say, there has been less and less time for personal relationships. And as I reflected, I realized how narrow a view of the world science gives me. Because science as a game is so precise and logical, we scientists begin to look at people in the same light. In our drive to be logical, we negate feelings which are real but cannot be explained or understood. Love, joy, happiness and beauty cannot be examined in the same way that science examines fruit fly behavior. Yet how often do we put people down by saying, "You're being too emotional," or "You're taking it personally," as if being emotional or taking something personally in any way negates the reality of that person's needs. How often do we say, "But you're not being consistent," or "That's not what you said last year," as if consistency and constancy are immutable characteristics of human behavior. Science provides one way of looking at the world, but it has been successful in its sphere that we attempt to apply those tools to human behavior and interactions, too often at the expense of basic emotion.

Many of us, I'm sure, had high hopes for Pierre Elliott Trudeau. He's a genuine intellectual, he sounds great, he has style and class. Yet, in spite of his commitment to the ideals of democracy and all its guarantees of freedoms, when the crunch came he applied naked power to preserve his position and structure and was applauded by the great majority of Canadians. I spent four years in a concentration camp during the Second World War under the War Measures Act for committing the crime of having genes that came from Japan three generations ago. I had hoped that this mockery of the ideals of democracy resulted from temporary insanity brought on by war hysteria. But we didn't learn from that mistake and instead chose to erode democracy again in 1970. This was a profound shock to me.

I have begun to realize that my problem was that I believed the words. But in the end all the words in the world don't mean a thing. In the final analysis, we are what we *do*, not what we *say*. When we study ants we don't ask the ant to say what he is or read the books ants have written — we watch what ants do and that defines them. But with man we listen to his words and become confused because he says things that his every action belies.

- ◆ We say we believe in freedom, yet people in power remove it whenever they feel threatened;
- ◆ Jerry Rubin wants everyone to do his thing but he'll kill the pig who tries to stop him;
- ◆ We say we believe in peace and we go to war to preserve it;
- ◆ We say we believe in education, yet we establish enough regulations and hierarchy to prevent it.
- ◆ Listen to what politicians, lawyers, doctors, professors and engineers say they believe in. They all sound great — but then look at what they *do*. That's what they are.

And so I came to realize how in our society, words



have power because we believe the words. And he who uses words well has power over others and his power comes because of the way our society operates. We want to give others power. We want others to make decisions for us because basically we don't believe that we are capable of taking the responsibility for our own freedom. And I began to see how, for me, life has been one filled with constant insecurity and of self-doubt. In order to feel my own worth I required that others tell me, "That was good," or "You're great." But when we rely on others to define ourselves, we can be up one minute and those same people will have us down the next. And that's what drives us on to succeed so that others will say "You're O.K." But there are always people who are "better," "brighter" and "more successful" than we, and for many this results in a feeling of impotence and worthlessness.

So it's easier to let Mr. Bennett decide that we shouldn't see liquor or alcohol ads because we're so stupid we'd surely be seduced by them. It's easier to let university professors and administrators set the rules because students really believe they are incapable of knowing what they want, that they're too ignorant to make an effective contribution. And this mentality is actively encouraged and reinforced by those of us in power. And so we professors flaunt all of our degrees, credentials and official positions as if these symbols of power demonstrate that we have wisdom.

As I reflected on this I had to ask, am I any different from *them*? I, the good guy; them, the bad guys. I realized that in my lab I have played the game of power without ever recognizing it. Even though the work that comes out of my lab is truly a product of the sweat and ideas of everyone in it, I have received the credit, I have made decisions on expenditure of money and distribution of space, I have written letters of recommendation, given lectures on *our* work and applied for grants. The burden of responsibility and power that comes with this position now is overwhelming. I wonder why the lab cannot run as a true democracy and whether decisions made by consensus wouldn't be better decisions and relieve one person of crushing responsibility.

And I thought of my relationship with women and how I have used words oh, so cleverly, and I have actually believed my words even when my every action showed exactly where I stood. I have been insensitive to pleas to "Let me be me," or "Accept me for what I am," and instead used words like "love" and "need" to demand fulfillment of my needs without regard to theirs. I thought of how often I've said to friends "You've got to make up your own mind, it's your decision," and then attempted to impose my will subtly so that what I wanted would be done. We give apparent freedom, then play with words to manipulate, usually without even knowing it.

I realized how often I play the role of parent to my children. I say, "What do you want to do today?" and when a suggestion is made, I resume my role as big daddy and reply, "Oh, I've only got a couple of hours, let's go to Stanley Park." The illusion of freedom, but with me at the controls.

And so I realized that Nixon, Agnew and Trudeau are not the evil, vicious creatures I had thought. They're "good" people who believe in the ideals of their country, love their families and have faith in God. But they're people, people not much different from you or me. And if we *can't get out of playing games, assuming roles and imposing our will on those we love*, how can we expect others in higher positions of power to behave any differently? Because, you see, we're all locked into that game of power. Look at the roles we are channelled into from the time we're born. Boys are expected to have different aspirations and roles from girls. And so socio-economic and racial differences impose different hopes and expectations. We assume the roles of parent, child, teacher, lover, student, boss; roles which imprison all parties involved into set patterns of behavior.

Science and the universities are places where power games are played to the hilt and where peoples' minds and lives may be destroyed. That's not exaggeration, that's fact. Faculty and student suicides, murders, mental breakdowns, ulcers and alcoholism attest to this. Yet those who cry for violent change, who demand freedom by confrontation and threat or who impose decisions by rank and position only perpetuate a system based on violence and power. By playing that game we only perpetuate it. And so I feel there is no way to change universities or society from within because we have to play the games in order to get in at all.

We need a revolution, a revolution in our minds that recognizes our own human fallibilities and weakness. We need to accept love, pain, anger and joy as the most valid expressions of humanity. We need to understand that *loss of power, means freedom from the terrible burden of infallibility and roles* and that acceptance of freedom brings responsibilities to oneself and the recognition that we can only be free so long as others are. And only when we are there can we really hope to escape the insane spiral of crisis and violence.

This is where I am in my head. But the most difficult part lies ahead. I must now *be* what I *think*. Until our gut reactions are what we think they should be we are not there. We begin the revolution when we feel the horrible burden of power over others and try to *let them be free* so that we are free. As Pogo said, "We have confronted the enemy and *them* is us."

UBC NEWS IN BRIEF

A COLUMN FOR UBC GRADUATES ROUNDING UP THE TOP NEWS ITEMS OF RECENT WEEKS. THE MATERIAL BELOW APPEARED IN MORE EXTENDED FORM IN CAMPUS EDITIONS OF 'UBC REPORTS.' READERS WHO WISH COPIES OF CAMPUS EDITIONS CAN OBTAIN THEM BY WRITING TO THE INFORMATION OFFICE, UBC, VANCOUVER 8, B.C.

UBC's president, Dr. Walter H. Gage, was invested as a Companion of the Order of Canada by Canada's Governor-General, the Hon. Roland Michener, at a ceremony in Ottawa on Oct. 29.

Appointment as a Companion of the Order, Canada's highest decoration, is made for "outstanding merit of the highest degree, especially service to Canada or humanity at large."

The Medal of Service of the Order of Canada, awarded to individuals "for merit of a high degree in many different areas of service to Canada or to humanity at large," has also been awarded to Mr. John Liersch, a member of UBC's Board of Governors, and four faculty members.

Faculty members honored were: Dean Emeritus Henry F. Angus, former dean of Graduate Studies; Prof. B.C. Binning, of the Department of Fine Arts; Prof. D.H. Copp, head of the Department of Physiology, and Prof. Harry V. Warren, of the Department of Geology.

GLOOMY PICTURE

A recent federal government report paints a gloomy picture of job prospects for next spring's graduates of Canadian universities.

It indicates that many graduates, particularly at the bachelor's and master's degree levels, will have difficulty in finding jobs for which they are qualified. It suggests that prospects are brighter for PhD's as a group, although there will be a shortage of jobs in some disciplines.

The report, entitled *The Market Situation for University Graduates in Canada*, was prepared by the research branch of the Department of Manpower and Immigration.

The department warns that the report should not be "judged to have predictive characteristics not intended by its authors." But it says it is "anxious to make available such insights as it has" about the job situation.

Even making due allowance for the "preliminary" and "exploratory" nature of the study, the report is startling. Its major conclusions:

- There will be only one job requiring their qualifications for every two bachelor-level graduates next spring;
- Only one appropriate job will be available for every three graduates with master's degrees;
- In this buyer's market some masters may be hired for jobs that would normally be done by bachelors, thus further constricting the BA's job pool.

The Manpower report was intended as a protection of the job market situation for 1970-71 graduates. However, since the increases in both supply of and demand for graduates in 1972 are expected to be of the same order as in 1971, the study is considered to offer "a preliminary view of the 1972 situation." (Issue of Nov. 10, 1971).

TENURE DISCUSSION

The chairman of a UBC Senate committee to study the Universities Act says consideration of tenure for university professors by the committee is "inevitable" in the light of recent statements by the Hon. Donald Brothers, B.C.'s minister of education.

Dean A.J. McClean, head of the Faculty of Law and chairman of an 11-man Committee on the Universities Act, said the committee, established in October, had one meeting to deal with some of the basic questions to be considered by the committee, including the question of tenure for university teachers.

Dean McClean told *UBC Reports* that the first meeting of the Senate committee took place prior to the newspaper reports of Nov. 17 in which Mr. Brothers was quoted as saying that his department

plans to review the question of tenure for teachers in B.C.'s universities.

"In the light of Mr. Brothers' comments," Dean McClean said, "a discussion of tenure, which would probably have taken place in any case, is now inevitable."

Mr. Brothers was quoted as saying that the changes he has in mind would involve "extensive revisions" of the Universities Act, the legislation which sets out the basic framework for university government in B.C. and designates the powers of senior university officials.

Dean McClean also said that he plans to discuss with UBC's president, Dr. Walter Gage, the question of liaison between the UBC Senate committee and Mr. Brothers' department.

He said that any contact with the provincial education department should be through President Gage. "The question of tenure," he said, "is of sufficient importance that one would expect there would be some consultation by the department of education with the universities."

Mr. Brothers was reported as saying that revisions to the Universities Act could not be prepared in time for the 1972 session of the Legislature, which begins Jan. 20. (Issue of Nov. 14, 1971).

PRIORITIES APPROVED

The University of B.C.'s Senate recommended a list of priorities for additional academic space for the next two years after nearly two hours of debate at its Nov. 17 meeting.

By a 49 to 11 vote Senate passed a recommendation from its Agenda Committee calling for a revised report from the Senate Committee on Academic Building Needs to be forwarded to President Walter H. Gage and the Board of Governors for consideration and decision.

The revised report recommended, in descending priority, either a new building or extension of the Henry Angus Building for the Faculty of Commerce and Business Administration; a new building to house both the Departments of Civil and Mechanical Engineering; a new north wing to the Biological Sciences Building for the Departments of Botany and Zoology and the Institutes of Oceanography and Animal Resource Ecology; and additional space for the Department of Anthropology and Sociology. (Issue of Nov. 24, 1971).

VOTE ON RANK

UBC faculty members have voted by a margin of more than two to one to retain the present system of faculty rank.

Nearly 80 per cent of the faculty of the rank of assistant professor and above voted on the rank question. The balloting was carried out under the supervision of the deans of UBC's 12 faculties and resulted in a vote of 782 in favor of retaining rank against 373 in favor of eliminating rank.

Only two faculties — Arts and Law — voted in favor of eliminating rank. In Arts the vote was 188 to 151 in favor of elimination, while in Law the margin was 14 to 6 for elimination.

Most faculties voted by a wide margin to retain rank. In Medicine the vote to retain rank was 104-23, in Education the margin was 137 to 24 and in Applied Science it was 59-27.

The vote on the rank question was carried out at the request of President Walter H. Gage. In April, the Board of Governors received the results of a vote taken at the March 24 meeting of the UBC Faculty Association where a proposal to abandon rank was approved by a vote of 54 to 31.

The recommendation to abolish rank was made by Prof. Walter Young, head of the Department of Political Science, in a brief to the Association. Prof. Young said he was "disappointed but not surprised" at the result of the vote carried out at the request of President Gage. (Issue of Nov. 24, 1971).

UBC
REPORTS

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Letter to the Editor

Dear Sir:

Due to a misunderstanding, for which I am probably mainly responsible, a misleading statement was included in the introduction to the interview with me, published in the Oct. 27 edition of *UBC Reports*. The introduction states that my archaeological research was supported only with grants obtained outside the University.

While it is true that the financial support we received over the years in aid of archaeological research came chiefly from sources outside the University, the UBC Committee on Research has always been most generous with their grants. Though by necessity relatively small, these grants have been of great importance, especially in the early years when no other funding was available, in making it possible to develop a program of ongoing research. This continuing program permitted an impressive number of students who later went on to professional careers in archaeology to obtain their grounding in the discipline at UBC. It is most important therefore that the record be set straight on this point.

Sincerely,

Charles E. Borden,
Professor Emeritus
of Archaeology.

FARM

Continued from Page Three

farming. Each year five students interested in such areas as dairying, agricultural mechanics and soils spend the summer months at the farm to familiarize themselves with its operations.

The farm also serves as a demonstration unit. Each year it is visited by some 2,000 persons, including local school children and dairy farmers who want to see the latest developments in dairy operations.

"In a sense," said Dean Shaw, "the farm is one of the faculty's most effective extension operations."

UBC's interest in the farm began in the early 1950s as the result of an association between the late Chief Justice of B.C., Mr. Sherwood Lett, who was also UBC's chancellor at that time, and the farm's then owner, Mr. Barrett Montfort, a retired New York banker and real estate dealer.

Mr. Montfort, who was interested in the scientific feeding of dairy cows and cattle, leased the farm to UBC in 1954 and contributed considerable sums of money to its operating budget. Mr. Montfort died in 1962 and under the terms of his will UBC was given title to the farm provided that it continued to be used for general farming, "including instructional and demonstrational purposes . . ."

MACHINE TOOLS

Continued from Page Five

advantage of using a stereoscopic camera is that data can be taken accurately and instantaneously. Present methods involve hand-measurement with tapes and calipers.

"The data would be sent to the central fabricator, who doesn't ever need to see the patient."

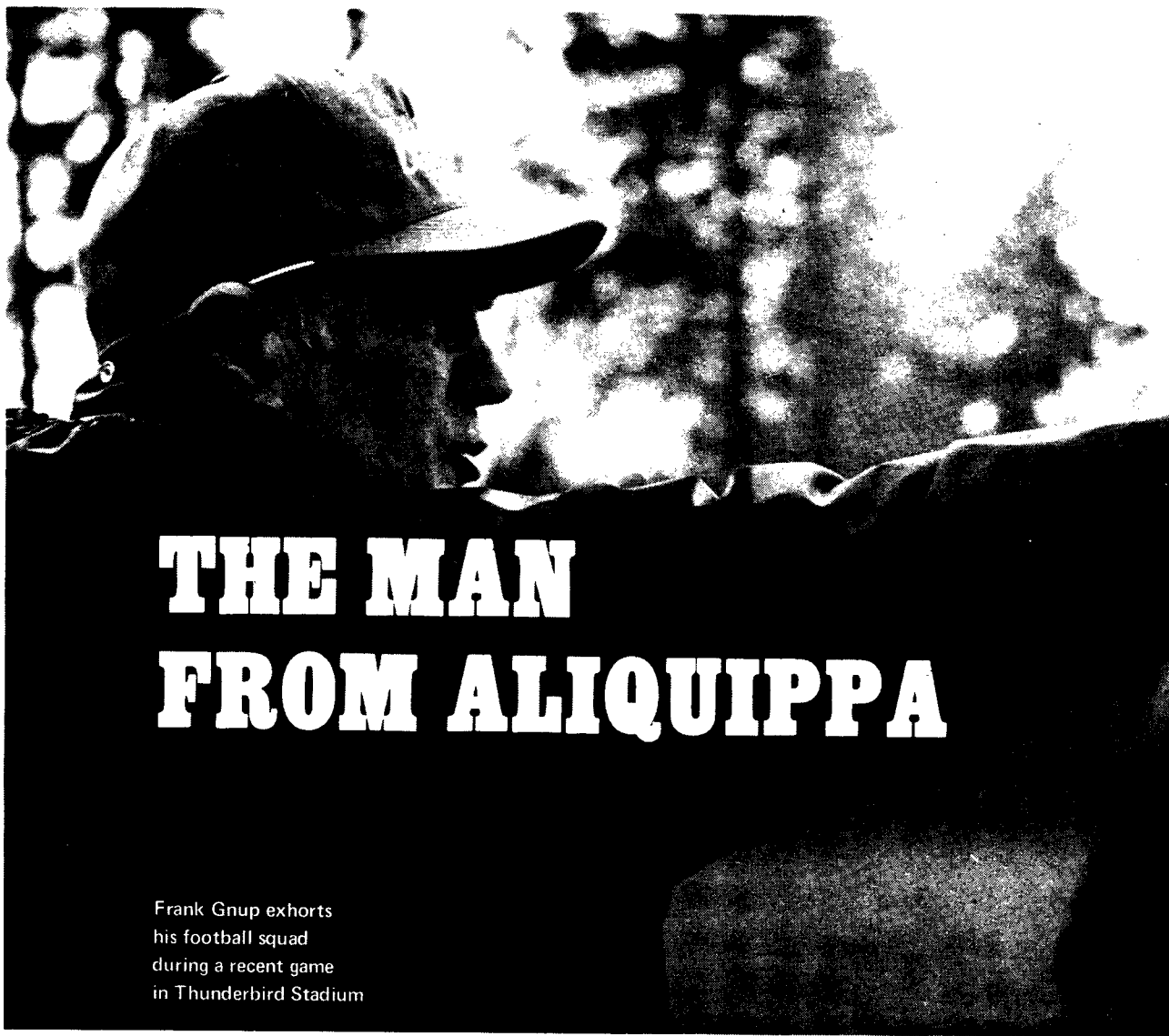
An application will be made to the Medical Research Council for money to complete experiments using the new unit for making artificial limbs.

The \$102,000 grant boosted the mechanical engineering department's total NRC funding this year to more than \$300,000. The department got about 75 per cent of the money it applied for from NRC, the highest rate of return of any mechanical engineering department in Canada. The national average for mechanical engineering schools was 50 per cent.

Prof. Duncan came to UBC in 1966 after helping to build a mechanical engineering school at the University of Adelaide in Australia from 1947 to 1954 and a similar school at the University of Sheffield in England from 1956 to 1966.

He took his bachelor of engineering degree from Adelaide in 1941 and his master of engineering degree in 1954. Ten years later he was awarded the doctor of science degree from the University of Manchester.

He was visiting professor in engineering mechanics to Pennsylvania State University for a year before coming to UBC.



THE MAN FROM ALIQUIPPA

Frank Gnupe exhorts
his football squad
during a recent game
in Thunderbird Stadium

Picture by UBC Photo Department

Frank Gnupe,

the cigar-smoking coach of the UBC Thunderbirds football team, grew up in the school of hard knocks in Aliquippa, Pennsylvania, where he was known as the Aliquippa Assassin, despite the fact that his high school playing weight was only 114 pounds. Frank's ability to bounce back has stood him in good stead during his 16 years as UBC's football coach. Despite an overall won-lost-tied record of 52-98-7, his UBC teams have three times captured Western Canadian Intercollegiate Athletic Association titles and this year his squad put together a three-game winning streak, something that hasn't happened for years. The interview with Frank Gnupe below can never hope to convey two qualities that make him unique — his Casey Stengel-like conversation and the quality of his voice. The latter has been described by a Vancouver newspaper columnist as the sound of "the jolly green giant rubbing two concrete apartment blocks together."

UBC REPORTS: What do people do in Aliquippa, Pennsylvania?

FRANK GNUPE: Well, 27,000 of them work for Jones & Laughlin, one of the biggest independent steel companies in the world. That's the main industry. It's a bit like Seattle and Boeing. They'd all starve to death if Jones & Laughlin went down.

UBCR: Did you work in the steel mills?

GNUPE: Sure did. I started with the steel company in 1936 when I was 16 years old. I had to do a little finagling with my birth certificate to get in. They wouldn't hire you until you were 18. But there was a depression on and I got in there.

WORKING PAPERS

I went to get my working papers and the lady said, "Would you lie to get a job?" and I said, "Lady, when you're starving you'd lie to get a lot of things." My mother went down and we swore I was 18 and I wasn't. Worked eight, 10 hours a day, getting 10 cents an hour. Today, kids are getting \$4.50 an hour. They get as much an hour as we got a week, damn near.

UBCR: Was it a tough town?

GNUPE: They had some tough kids there, but it was a good town. Still is. When you weren't working you were playing baseball and football. You played on cow pastures. Fields we played football on had shale stones and in those days some of those guys were playing in bare feet and if you got your shirt ripped up you'd come home and get clobbered. Many families couldn't afford to buy shoes so kids played in bare feet. They didn't have a good football field in high school while I was there. They got a new field after I left. Played on a field that was sloped. Other teams hated to play us because half the time you were going up hill, the other half you were going down hill.

UBCR: You've got a lot of mementos hanging on your walls here of your high school and college football days. How did you get interested in football?

GNUPE: I was playing football when I was 11, 12 years old. I always wanted to play against the bigger guys. I thought I was tough and wanted to play with the big ones.

UBCR: Did you hold your own against them?

GNUPE: I held my own against anybody.

UBCR: What happened after you finished high school?

GNUPE: I had a chance to go to Duke University. That fell through and I went to the University of Wisconsin on a scholarship. We got there and found you had to work so many hours a day every day so we could offset the cost of the scholarship. So I decided to go to Manhattan College in New York. They gave us everything, room and board and tuition.

UBCR: Was that a good thing for you?

GNUPE: It was certainly a good thing for me because my old man was only working one or two days a week

and he couldn't keep a family and send a kid to school. Even in those days an education would cost \$1,000 or better a year. Athletic scholarships were the only way a lot of kids got into school.

UBCR: Do you think athletic scholarships are, on the whole, a good thing?

GNUPE: For a lot of kids they are still a way of getting an education. But sometimes it is taken advantage of because a lot of schools have got a tiger by the tail and can't get rid of it.

UBCR: In what way?

GNUPE: The football team, in a lot of those schools, could be dictating policy. They generate a lot of revenue and some of the schools are building buildings with it. So they have some say in how the school is run because to build a winning team they take in a lot of kids who perhaps wouldn't qualify.

UBCR: Do you disagree with the UBC policy of not allowing athletic scholarships?

GNUPE: No, I don't, because UBC has always had that policy and I don't see any reason why they should change it. A lot of American schools are giving up football because they got tied up with those so-called scholarship deals. They thought they would make a lot of money, and found out they couldn't draw or compete with established universities.

Recruiting is a problem too. When you recruit a boy you are looking for a good athlete and the question of him being a student is secondary. This school has always maintained that the student comes first. It's always been that way and I don't see any reason to change.

UBCR: Do you feel that UBC's athletic program suffers as a result?

GNUPE: It may suffer in terms of wins and losses, especially the football program because B.C. doesn't have a great high school football program. We've got only 27 high school teams playing football and a lot of the good players go to the United States on scholarships. We lose a lot of kids because of UBC's academic standards, too.

UBCR: The result has been that UBC's football teams haven't done consistently well over the years.

GNUPE: That's right. I think we started to come along in the early '60s. Then, from the middle '60s on, when Simon Fraser came into existence, they started to get the player that we got before.

UBCR: Because they offered athletic scholarships?

GNUPE: I talked to an SFU administrator the other day and he said they offer those kids a little bit. It may not be a great deal, but the kid is getting something, whereas they get nothing here.

UBCR: Has the fact that your record over the years has been a poor one been a bit of a discouragement to you?

GNUPE: It's been frustrating, not discouraging, because I always feel, what the hell, next year's going to be a better one. We always shoot for that. All we need is,

say, a half a dozen kids with ability to make a pretty good football team. Football teams aren't made up entirely of great players. I feel that if we could get a half dozen kids with good background we could play any league, really. I get frustrated because you want to do better and sometimes you don't have the kids doing what you are asking them to do.

UBCR: Are you a proponent of the idea of winning at any price?

GNUPE: No, never have been. Everybody likes to win, but you don't want to go out and kill somebody or take advantage of rules and regulations.

UBCR: Is the object of athletics, then, simply to give the boy who wants to play the opportunity?

GNUPE: I would think so, yes. At UBC we have an intramural program and an extramural program. The extramural program is for that kid that has a lot of talent and who wants to compete with his equals.

When you come right down to it competition is the spice of everything. You can't tell me that participation means a whole lot. There have been more protests over games in the intramural program than in any extramural program or professional organization that I have been associated with. Those intramural kids want to win as bad as anybody. They go all out.

UBCR: You think that competitiveness is something that's in the human animal, then?

GNUPE: I think it's an innate quality in people. If you could instill it in people, you would have, instead of 30 kids, 45 kids out there battling, beating each other's brains out because they were competitors. Some kids just give up pretty easy, they don't want to work at it any more. Times are a little easier now than they used to be.

UBCR: In what sense?

GNUPE: Economics. Thirty years ago people were emerging from the depression when they had to do a lot of hustling to live. When the Second World War was over the kids that came up had everything going for them. I don't know if that was a good thing for the kids. That takes some competitiveness out of you. Why should you get out and bash your brains out if you don't have to? That's one reason why the fight game is going down the drain. Why get my brains kicked in if you can go out and make \$5 or \$6 an hour driving a truck?

AVERAGE PLAYER

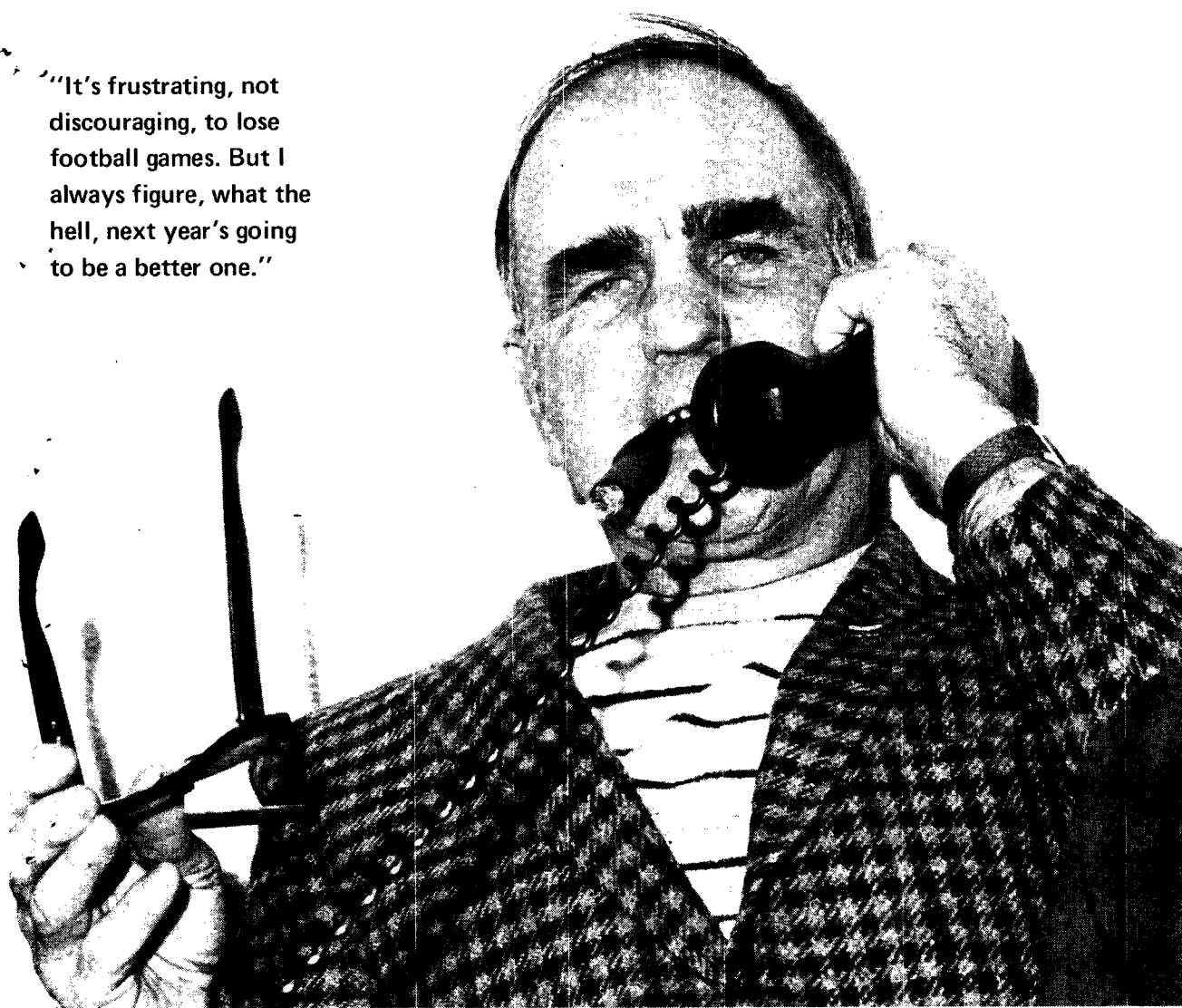
UBCR: We got to the point where Frank Gnupe was at Manhattan College, playing football and doing pretty well. You were characterized as a whirlwind on the football field.

GNUPE: I was just an average player. But I think I was competitive.

UBCR: Was it a rougher game then?

GNUPE: I don't think it was. You didn't have the

"It's frustrating, not discouraging, to lose football games. But I always figure, what the hell, next year's going to be a better one."



Picture by UBC Photo Department

protection you have now. We played without face guards and your nose was always busted in, but I don't think it was any tougher.

UBCR: What happened at the end of your college football career?

GNUP: The Second World War came along. I had a great life in the army. I was in signal corps for one year and then I transferred to the air force and tried to be a pilot. I got washed out on the psychological. They wouldn't tell me why they washed me out, but I figured they thought that I would get up in the airplane and it wouldn't stay up there very long, me or the airplane. So they transferred me to Mississippi first and from there I went to the Third Air Force headquarters football team. That was a team that was a pretty good football team. In fact we played in Texas and General Arnold, Hap Arnold, walked in with his staff and I never saw so many stars in my whole life. They were fighting a war in Japan and Europe and all the generals in the air force walked into the dressing room and Hap Arnold made a speech to the football clubs and said he didn't care where we got our football players but he wanted the best football players in the air force. He said he didn't care if they went to China to get them and they used to go to Africa and bring them back and play football because they were good football players and all the college kids and ex-pros were brought in. We had some good football teams in those years.

I was in the army air force for three years and ten months, and three years of that time I was playing football.

UBCR: What position did you play?

GNUP: I was blocking back. I guess equivalent to quarterback now. That's the guard with his brains kicked in.

UBCR: What happened when the war ended?

GNUP: I signed a contract with the Buffalo Bills in the All-American Conference. They drafted a lot of the kids out of the air force and service teams to play in that league. Now that league became the American Football League later on. Buffalo stayed in. About this time some people in Hamilton talked me into coming to Canada.

UBCR: What did they bring you to Canada to do?

GNUP: They thought I could teach them something about blocking. In those days, in the Canadian game, you couldn't block more than 10 yards down field beyond the line of scrimmage. Today, of course, blocking is unlimited. But they thought I could teach them something about the blocking game and I came to the Hamilton Wildcats.

UBCR: How long did you play for them?

GNUP: Four years. Then I signed up with the Toronto Argonauts and played in 1950. After that I went to Peterborough and coached an intermediate team, and then to Brantford where I coached a senior team and then I came out here.

UBCR: How did you find out about the job out here?

GNUP: I didn't really apply because I didn't know it was open. Dr. Gordon Shrum* came east and called my home and said he wanted to see me. Apparently Annis Stukis† and Ivor Wynne‡ recommended me. I had played football against Stukis and I knew Wynne from my days in Hamilton.

UBCR: And you were hired as a football coach, were you?

GNUP: I guess primarily as a football coach but, as you know, the athletic program here isn't separate from the academic program, which is a good thing because then your financial picture is a lot better. Your athletic program in other places has to make money to pay those coaches.

UBCR: What do you do in the academic program in the University?

GNUP: I teach students the fundamentals of football, golf and baseball.

UBCR: When you arrived, what did you find?

GNUP: When I came here I said to myself, "What the hell did I get into?" There must have been 20 some kids come out for football. But they were a tough bunch of kids. We have always had a few tough kids every year. But we've always had too few kids turning out to try to make the team and we've always come up with some kids that have no high school football background. In the States that kid would have played maybe two years in junior high and three years of varsity.

We have had kids that had never seen a football game until he came here. We had an Indian kid - I used to call him Chief, big kid - and I said, "You never saw a football game did you, Chief?" and he said, "Yes, I did." I said, "When did you see a football game?" He said, "This afternoon." He'd seen the Lions for the first time in his life. He had come out from Prince Rupert. He could carry two guys, a guy under each arm. But he couldn't understand what he thought was the brutal part. He couldn't understand why he had to clobber the guy and I couldn't get him to understand you'd better clobber that guy before he clobbers you, that was the name of the game. He thought it was a vicious game. A good thing he couldn't cause I think he would have hurt people if he had got mean.

UBCR: Do you encourage your football players to be mean?

GNUP: No. I don't think you can encourage a fellow that doesn't have a mean spot or the temperament to be mean. What you can do is tell him he'd better hit that other guy and hit him a little harder than he hits you. If you do, you'll lick him. And if you don't, you'll probably get licked. I always feel the guy that hits the

* Dr. Gordon Shrum, former dean of Graduate Studies at UBC and now chairman of B.C. Hydro, was representing the UBC Men's Athletic Committee when he contacted Frank Gnupe about coming to UBC.

† Annis Stukis was the first coach of the B.C. Lions and is still active in Canadian athletics.

‡ Ivor Wynne was a faculty member at UBC in the 1940s. He was dean of students at McMaster University in Hamilton, Ontario, at the time of his death last year. Hamilton's new football stadium is named for him.

first good blow is the guy usually has the battle won in the long run.

UBCR: Do you think it's possible to make a kid who isn't mean into a mean football player? When the kids come to you are they pretty well set in their ways?

GNUP: I read an article somewhere that said football was a character builder. Even if you're losing you can always say you're building character. I never did believe that because I felt that kids' character was molded by the time he was 13 or 14 years old. That 18- or 19-year-old kid is kind of set. Nowadays he is even more set, because he thinks he knows more than you do most of the time. I think you can refine some things maybe, he learns a little bit, but I don't think he learns as much as people coaching football tend to believe.

Psychologists say that they take out their frustrations by clobbering somebody but I couldn't go as far as to say that. Any game that you play should be a lot of fun and I think the fun is in the winning. Dr. Norman MacKenzie, who was president when I first came here, said, "Frank, we're not worried about winning, we are just worried about having fun." I said, "Well, I don't think you have any fun when you get beat, at least you don't have as much fun as if you're clobbering the other guy." Let's put it that way. You have a hell of a lot more fun in winning. We've won three games straight and you could tell the difference in the attitude of the kids. They like to win just like anybody else does and nobody can tell me that they are out there just having fun, because it is quite a bit of work. You don't work all week just to go out there and say you represent a team.

GOT TO GO

UBCR: What's the funniest thing that ever happened to you as a football coach?

GNUP: One of the funniest things, well I guess you could print it, we were playing Simon Fraser and one of the lads, it's quarter time, and he came up to me and he said, "Coach I got to go," and I said to him, "It's a hell of a time, you should have done that before the game started." He said, "I gotta go." I said, "Well if you have to go you have to go." I asked him a couple of days later, "You all right, were you all right?" He said, "No, I didn't make it."

UBCR: What do you tell your boys before they go out on the football field? Do you give them the old do-or-die-for-UBC pep talk?

GNUP: No, I don't think we can do that anymore. They used to give it to me when I played, but after awhile I started to wonder what it was all about, because I wanted to play, they didn't have to give me a pep talk. I feel I may be wrong, that every kid that is playing wants to go out there without having to be jazzed up. I feel every game is a game and each kid that is a competitor is going out there every afternoon to do his best and I don't think he has to be motivated. They tell me in the States they have motivators. I thought that in this day and age the kids were more intelligent and didn't believe that garbage, but apparently they get away with it in some places.

What we try to do is prepare the kids as well as we can under conditions we have here. See we don't have a great hurly-burly program here. The kids go to school. We practice at 5:30 p.m. because they have labs and we don't meet with them because kids have different classes. In the big time you would have a meeting every day with your football team. Also, in the States they have a quarter system, and a football player takes a light first quarter, then when the football season is up he loads a little more. You can't do that here.

UBCR: Do you think that the role of the manager in sports is overplayed?

GNUP: Sometimes when you get good football players you don't have to coach. In English sport, the manager or coach is superfluous. A few years back I told the baseball team, "Okay, gang, you guys are going to run this team." And they said, "Like hell, mac," they said, "you're the manager of this baseball team." You see these were Canadian kids, brought up where the manager and coach is the guy that runs it. In England they don't have to run it. They can't understand why there is substitution in the football game. Well, substitution is 'cause people get whacked around pretty good, can't take 60 minutes of that stuff any more. So in a lot of cases I think it is overplayed because look at the situation with the B.C. Lions. Eagle Keyes, who used to coach Regina, hasn't forgotten what he knew then. He just didn't have the talent here. Sometimes I think a good football team can make a coach, then a good football coach might mess up a football team that has some talent because of substitution and some of that other stuff, but if you've got talent in spite of coaching a lot of times you're going to win.

UBC ALUMNI Contact



ERIC KIERANS relaxes at dinner prior to tearing into government's short-term view of economic policy. Meeting was sponsored by Commerce alumni, faculty and students. Mark Kaarremaa Photo.

Kierans Urges Gov't Adopt New Economic Priorities

Canada faces even greater economic hardship in future unless the federal government adopts long-term economic policies aimed at boosting employment, former Liberal communications minister Eric Kierans warned during his recent Vancouver visit.

Kierans said government economic policies have concentrated too much on growth for growth's sake, rather than stimulating development of healthy, competitive industry providing high employment and a high return to Canada. He charged that the government had taken a short-term view of economic matters because it was more concerned with gaining votes than solving economic problems.

This was the basic message Kierans delivered in his Nov. 10 speech to 375 Commerce alumni, faculty and students in the UBC Faculty Club and in his conversations with the news media. Kierans, once director of McGill University's commerce school, resigned from the Trudeau cabinet in April after disagreeing with government economic policy.

Kierans argued that since the Second World War government policy had encouraged expansion of industrial capacity and output for growth's sake. The result was considerable construction and a surge in the economy but, he said, the surge was caused by the expansion and not the added output of goods. The price paid by Canada was inflation.

He said it is important during the '70s that less

emphasis be placed on growth for growth's sake and more on sound development of job-intensive Canadian industries — and development primarily in response to market demand rather than in response to government subsidy programs which too often has been the case in the past.

Kierans pointed out that while 2.6 million people entered the labor force in the last 10 years, 3.9 million are expected to enter in the next decade. The jobs, he said, will not be found in the natural resource extractive industries — which government policy has favored — but in service and manufacturing industries.

As part of a program of building employment, he suggested imposition of an across-the-board corporation tax of about 35 per cent on Canadian corporations which would ease the burden of high employment industries and force resource industries to pay a fairer share of taxes. Foreign corporations would pay rates comparable to those in their home country — generally higher.

Kierans also said limits should be imposed on exports of raw materials as these will be more valuable in coming years.

He also favored the staged introduction of free trade between Canada and the United States over 10 years, but not a common market arrangement. Free trade, he said, would reduce inflationary pressures and eliminate the least competitive industries and strengthen the most efficient, competitive ones.

MORE DEMOCRATIC

Mail Ballot for Alumni Elections

A special UBC Alumni Association general meeting has approved major revisions in the Association by-laws aimed at making Association elections more democratic.

It is also hoped that the revisions will lead to a higher level of alumni participation in Association affairs.

At the general meeting held at Cecil Green Park on Nov. 22, alumni approved by-law changes which provide for the annual election of Association board of management officers by mail ballot.

This means that all ordinary UBC alumni will now have an opportunity to vote for the officers who run the affairs of the Association. Previously, elections were held at annual general meetings in Vancouver which, in effect, made it possible only for Greater Vancouver area alumni to attend the meeting and vote.

"In my view this was an essential reform and I'm glad we've been able to achieve it," said Don Currie, chairman of the constitution revision committee. "Now we'll no longer have two classes of alumni. All alumni — whether they live in Prince George or Puerto Rico — will now have a say in who runs the Association."

The revised by-laws require that the annual elections of board of management members be by mail ballot and that this ballot be published in the spring issue of the *Chronicle* or other authorized Alumni Association publication. This publication, which is to be mailed by the third week of March each year, is also required to contain a photograph and a 75-word biographical resume of each of the candidates for office.

The completed ballots are to be mailed to a Vancouver postal box addressed to the returning officer and are to arrive no later than midnight, April 15. Ballots arriving after that date will not be

counted. On or before May 1, the returning officer is to publish in the major Vancouver newspapers the list of candidates elected. The same information is also to be published in the summer *Chronicle* coming out in June.

As for nomination procedure, the new by-laws stipulate that a nominating committee shall be appointed each year and shall consist of the immediate past president of the Alumni Association and four ordinary Association members appointed by the board of management. The nominating committee is to prepare by Jan. 15 and report to the board of management's January meeting a slate of nominees for the board of management offices, namely: president, first vice-president, second vice-president, third vice-president, treasurer, members-at-large and degree representatives.

Further nominations, the new by-laws state, may be made by five ordinary Association members who endorse their nomination with their signatures and who obtain the written consent of the person

nominated. Such nominations, together with photograph and biographical resume of the candidate, are to be received by the returning officer no later than midnight on Feb. 10 each year.

The new by-laws, of course, also provide for the appointment of a returning officer by the board of management. The returning officer's duties are to publicize the nominating committee's report, to encourage further nominations, to provide the *Chronicle* or other alumni publication with photographs and biographical resumes of candidates, to publicize the list of candidates elected and to ensure the security and confidentiality of the election.

It is hoped that the adoption of a mail ballot will help the Association become more active. "I hope that this change will encourage more alumni to become involved in the affairs of the Alumni Association," said Jack Stathers, Association executive director. "There's a great deal more that we could do with greater alumni participation."

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