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UBC Scientists On Canada's Northern Frontier

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Tents of a UBC research team are dwarfed at the foot of a surging glacier being studied in the Yukon

New Goals for UBC Graduates

SEE PAGES SIX AND SEVEN

Britain's University of the Air

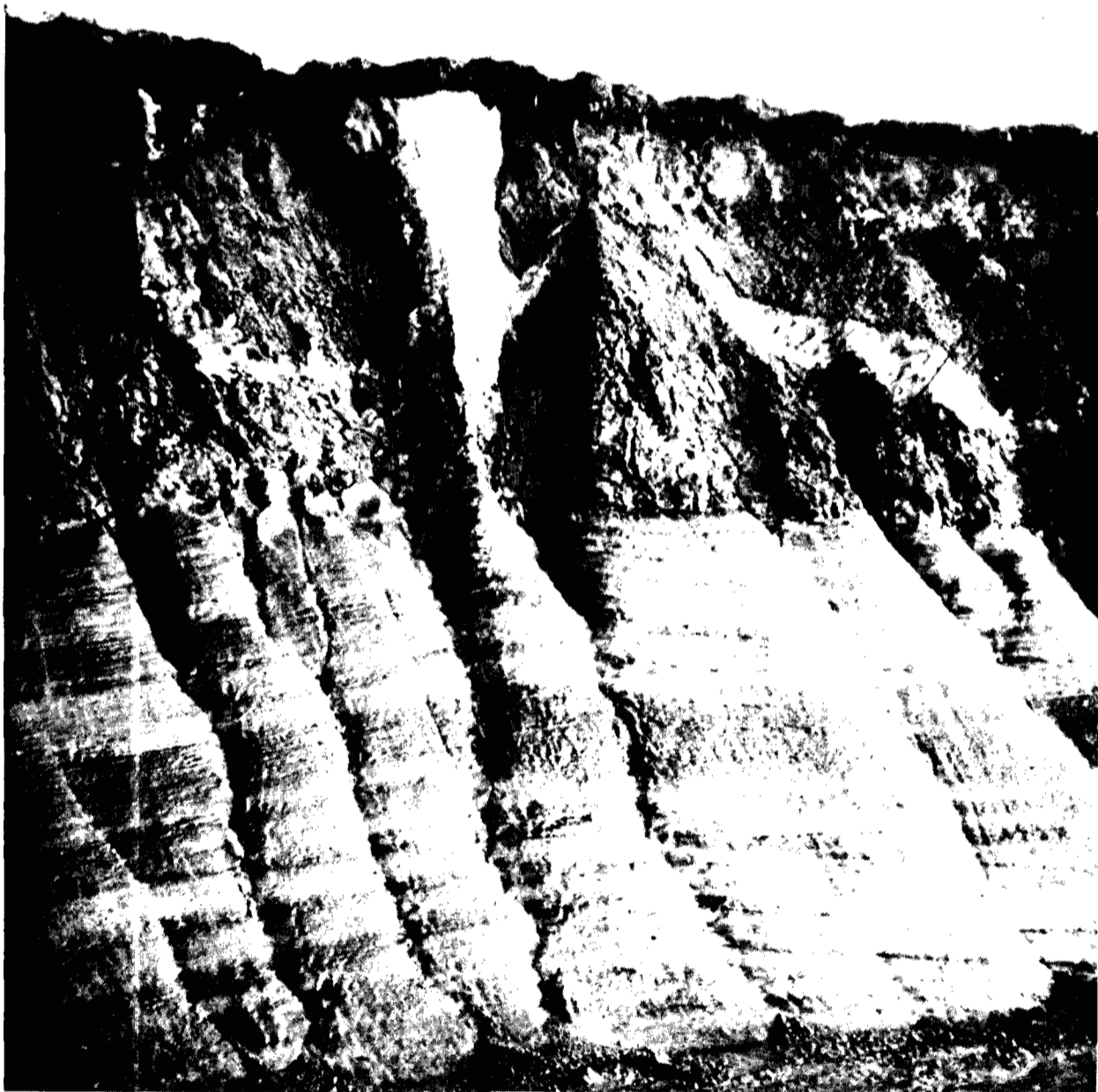
SEE PAGES EIGHT AND NINE



PETER THOMPSON

In gathering material for the article beginning at right, Peter Thompson, an assistant information officer at UBC, discovered that the North is a bundle of contradictions to most Canadians. In addition, he found that Canada is not investing enough money in research on Northern problems. His article discusses Canadian attitudes toward the North and describes some of the research projects being carried out there by UBC scientists.

THE NORTH YIELDS UP ITS SECRETS



THIS 30-foot exposed cross-section of Arctic terrain is made up of massive ground ice in its lower section and frozen soil containing an ice wedge, centre. The photo, by Prof. Ross Mackay of UBC's geography department, one of Canada's leading permafrost experts, illustrates one of the main problems associated with some northern construction, the location and amount of ground ice. Unless special measures are taken the ground ice may melt and cause sinking of the surface.

experts, illustrates one of the main problems associated with some northern construction, the location and amount of ground ice. Unless special measures are taken the ground ice may melt and cause sinking of the surface.

When it comes to the North, Canadians are schizophrenic. Most of us identify with the mythology of the North though few of us have been there. We resent people of other countries associating us with dog sleds and igloos, yet we feel a secret attachment to these symbols.

The North is our frontier and a large part of our national ethos. It is part of the nostalgia Canadians feel for their country and a large part of our future. It is also a place where few of us want to go. Canadian ambivalence to the North is perhaps best illustrated by the contradictory ideas most of us have about it.

The North, we believe, breeds individual self-sufficiency and is one of the few places left in the world where survival of the fittest still applies to man himself. But we also believe that human survival in the North depends on co-operation, on a highly developed sense of community and sharing.

We think of the North as a vast wilderness where a man can roam free from the restrictions of southern cities. And there is the other side of the coin, the idea of the isolation of the North, the lonely outpost, the solitary cabin as the refuge of civilization in the face of desolation.

Another conventional wisdom has it that any young man set on making his fortune should pack up and head north. But we also say the North is for the person looking for solitude and peace.

Even disinterested Canadians now share the notion that the North will somehow play a special and perhaps dominant role in Canada's destiny. Slowly we are beginning to realize that ours is a Northern country even though we may not yet see ourselves as a Northern people.

The Canadian Arctic, the area roughly north of 60 degrees, is larger than Manitoba, Ontario, Quebec and the Atlantic provinces combined. It makes up 40 per cent of the country. The geographic centre of Canada is some 250 miles north of Churchill, an area as remote to most Canadians as Uganda.

Canada and the rest of the world virtually ignored the North until construction of the Distant Early Warning Line in the early years of the Cold War. This was the first introduction of technology to the North on a concerted scale. Though the DEW line was obsolete before it was finished, it proved that industrial man can function in the North.

What has made us aware of the North is recent interest in the development of natural resources. Canada's Mackenzie Basin holds estimated potential reserves of 20 to 30 billion barrels of crude oil, 100 to 175 trillion cubic feet of natural gas, and three to five billion barrels of natural gas liquids.

Another 80 to 120 billion barrels of crude, 400 to 600 trillion cubic feet of natural gas and 12 to 18 billion barrels of natural gas liquids in potential reserves lie beneath the Arctic islands, according to the most recent figures of J.C. Sproule & Associates of Calgary.

The sum — 100 to 150 billion barrels of crude, 500 to 775 trillion cubic feet of natural gas and 15 to 23 billion barrels of natural gas liquids — is easily the largest concentration of fossil fuels on the continent.

Proved crude oil reserves at the end of 1969 totalled 120 billion barrels in the U.S. — excluding the Prudhoe Bay oil in Alaska, which may increase the total by some 25 billion barrels — and 13 billion barrels in Canada. Proved natural gas reserves at the end of the same year were 640 trillion cubic feet for the U.S. and 65 trillion cubic feet for Canada.

Iron ore deposits on Baffin Island are placed at one billion tons of 70 per cent ore, the richest in the world. This is not to mention minerals in the northern section of the rich Pre-Cambrian Shield. The southern portion of the Shield has been yielding minerals for decades.

These prospects thrill and frighten many Canadians. Among our fears are pollution of the North, social upheaval of indigenous people and irreversible damage to the area's delicate ecosystems.

Political instability in Middle East petroleum countries and other natural resource areas of the world is accelerating exploration of the North. A

casual glance at population projections for the next few decades, even assuming measures to control population increase in North America and the rest of the world, shows a future resource demand which makes resource development of the North virtually inevitable.

Besides, U.S. continental energy reserves are running low. So the question isn't whether the North is going to be developed or whether it's in the best interests of mankind for it to be tapped. The question is how it's going to be developed.

Will it be done without serious ecological mishap? Will Indians and Eskimos come out of it as badly as their ancestors during the westward expansion across Canada more than a century ago, only this time appeased by an advance column of government welfare cheques instead of missionaries?

Public concern over proper development of the North is growing daily. For the few who may not already know, petroleum companies plan to build a \$2 billion pipeline to carry two million barrels of crude oil daily from Prudhoe Bay on Alaska's North Slope to the port of Valdez 800 miles to the south. From Valdez the oil would be shipped by tanker down the B.C. coast to ports on the U.S. west coast. One such port would be at Cherry Point in the State of Washington, 30 miles south of Vancouver.

The proposal has made the Arctic much more of a reality to the people of B.C. than to any other group of Canadians. Many other Canadians demand wise Northern development because the issue rasps the nerve-ends of two growing and sensitive causes: concern for the environment and nationalism. From the point of view of Canadians, industrial damage to the North is associated with molestation of national symbols and desecration of an area of Canada held most spiritual, if only because so few of us have been there.

The concern of British Columbians is more immediate. It is the threat of oil spills washing the shores of Victoria and Vancouver.

Canada's reaction to the need for more Arctic research in the face of the big development push has been weak and possibly reflects our ambivalence to the North. The federal Department of Northern Development's total research budget to all Canadian universities was a mere \$250,000 in 1969-70. (It was during this period — the fall of 1969 — that members of the House of Commons committee on Indian Affairs and Northern Development flew north to meet the American tanker Manhattan, publicly upholding Canada's territorial claims in the North).

Yet Northern Development cut its research budget to Canadian universities for 1970-71 to \$200,000.

True, the Department has started an Arctic Land Use Research Program and provided some \$400,000 for it in 1970-71. Its research is mission-oriented and is designed to solve specific, immediate problems. It won't touch basic research.

Perhaps half, or \$100,000 of the \$200,000 Northern Development has distributed to the universities this year, will go toward mission research. This means that roughly \$100,000 of the \$600,000 the Department will spend on research this year will go to basic research. It is only fair to point out that other federal departments do sponsor research in the North, either by their own employees or through universities.

Mission research is properly, perhaps even desperately, needed in the North. But researchers, including some involved in mission research, say that not only is the total amount for both mission-oriented and basic research too little, but that the mix between the two types of research is wrong.

Ten years from now, they say, crucial questions will be asked which can't be answered because the basic research which should begin now is not being undertaken.

Without the basic research begun generations ago into permafrost, mineral exploration of the North, let alone development, would be impossible today. And in spite of decades of meagrely financed permafrost research, much more needs to be known on the subject before oil, gas and mining companies can operate efficiently and safely.

Permafrost is ground that has been frozen

year-round for some years. If it has a high water content and the surface melts, whatever is on top — airport, oil rig, building or highway — sinks. Half of Canada is covered by permafrost.

It seems that only two government scientists, supported by three technicians in the Building Research Division of the National Research Council, are working full-time on permafrost research in Canada. Only about 15 professors and students are doing permafrost research in Canadian universities. Consulting engineers with permafrost expertise are rare.

Permafrost problems dog almost every aspect of Northern development. In the Mackenzie River delta and the North Slope of Alaska, where much drilling is now being done, the amount of ice in the permafrost has a great effect on seismic readings and is a challenge to all construction, temporary or permanent.

This isn't to mention the tremendous technical and ecological challenge of getting the minerals out of the ground and transporting them to southern markets.

A pipeline from the Arctic gas and oil fields to markets in central and eastern North America would cross more than 1,000 miles of permafrost.

And this is only one aspect of Northern development. It doesn't take into account sociological, health or general ecological questions.

Because development is dependent on research, neglect of Arctic research today will prevent proper development in the future. One result will be a smaller pool of scientists trained to grapple with Northern problems.

Dr. John K. Stager, chairman of the University of B.C.'s Committee on Alpine and Arctic Research, says Northern research must be recognized as a special entity. "Northern research is area-oriented and not subject-oriented," he said.

"The only thing that many projects have in common is that they take place in the North. Right now applications for Northern research projects compete with applications for programs in the south.



DEAN IAN McTAGGART-COWAN

This is unfortunate because many Northern projects just can't compete.

"Research in the south is more likely to be year-round and carried out with easy access to all the scientific and technical amenities of our universities and cities. Northern projects can't match this and as a result applications for grant money tend to be disadvantaged. Besides, it costs more to go north.

"Funding for Northern research needs to be kept

separate. Otherwise research on permafrost, for instance, will compete with southern pollution and Indian and Eskimo sociological studies will compete with urban renewal. And they can't.

"If what we know about Northern and Southern Canada is considered as a ratio, the ratio will increase to the advantage of the South and to the detriment of the North. But the South will tend to depend more and more on the North for its economic well-being and even for its recreation, so anything that handicaps the North will also prejudice the South."

The Committee on Alpine and Arctic Research is one of about 10 groups in Canadian universities doing Northern research. The UBC organization has been operating for 10 years and includes alpine regions as part of its interests because large parts of mountainous B.C. have similar climate, vegetation and general ecology as the Northern tundra.

This year the Committee received \$23,000 from Northern Development, its only source of funds. The sum is one of the largest from Northern Development to a Canadian university group for Northern research. Industry so far hasn't sponsored any research through the committee.

UBC bodies associated with the Committee so far include the Departments of Botany, Geography, Geology, Zoology, and Anthropology and Sociology; the Faculties of Medicine, Dentistry and Education, the School of Home Economics and the Institute of Animal Resource Ecology.

The Committee was set up to help co-ordinate Northern research and develop inter-disciplinary programs for some graduate students working in the North. It reports to the Dean of the Faculty of Graduate Studies.

The Committee has sponsored research on permafrost problems, ecology, glaciers, the nutrition of Yukon Indians, the personality and occupational histories of workers in remote mining camps, and population studies on animal species.

Scientists associated with the committee warn repeatedly that development of the North must be done wisely to avoid threats to the amazingly delicate ecosystems of the area. The dangers are potentially more serious than anything we have encountered up to now in the South.

Plant material in the North has a very short growing life. It's often sparsely distributed. Some plant species are rare. Soils are immature, are early in their evolution and there is a lot of frozen water in the ground in some areas. This makes for potential soil erosion, soil loss and slumping.

The Arctic recovers unbelievably slowly. "We have come to realize that even the smallest research or exploration expedition must virtually bring back to the South all of its indestructible wastes," said Prof. Ian McTaggart-Cowan, Dean of the Faculty of Graduate Studies.

"What do you do with oil drums and other types of metal containers? If the ground is frozen you can't bury them. And you can't leave them there because all the chemical processes that destroy relatively indestructible materials in southern climates don't work very fast up there."

Prof. McTaggart-Cowan, a zoologist with a long association with the North, warned that the food chain there is very short and involves fewer units than in the South. Pollutants, for example, are apt to move more quickly through an Arctic food chain than through a southern one.

"We're discovering that the accumulators in the food chain are units that tend to be long-lived. Lichens, the moss-like vegetation in parts of the Arctic, accumulate radiation fall-out to a much greater degree than plants in southern latitudes where the turnover of biological material is more rapid.

"Fall-out products have been found to a very high degree in Arctic caribou. Fortunately they aren't of a form or of sufficient concentration to be destructive

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NORTHERN RESEARCH

Continued from Page Three

to humans, so far as we know today. But these things are warnings of what we're up against."

Prof. McTaggart-Cowan is supervising a research project on the ecological relationship between a pack of timber wolves and its environment in Mount McKinley National Park in Alaska.

The rigorous task of living in contact with the wolves month after month is being done by Mr. Gordon Haber, a Ph.D. student at UBC.

"We've chosen Mount McKinley because there is very little forest growth and observation is easy," he said. "Another reason is that this same pack has been studied off and on for more than 30 years. And though the food available to the pack is abundant, their number has remained about the same.

"The question is, why is the size of the pack stable? This is interesting from the point of view of theoretical biology, but it's also extremely valuable for our understanding of mechanisms in nature regulating populations so they conform to the capacity of the environment to support them."

He said there can be three or four females in the pack yet it is very rare for more than one litter to be born each year. Information gathered so far indicates that the dominant female in the pack attacks the other females when they come into heat and prevents them from mating. But this alone doesn't account for the pack's stability.

"There were seven in the pack last year and the dominant female had a litter of nine," he said. "The male she mated with was the second male, not the dominant one. He was the only one allowed into the den when she was having the pups, eight blacks and one tan.

"Not only the parents but the whole pack looks after them until about Christmas when the pack and the mother and father lose their responsibility towards them. The pups are treated as any other pack member, as a friend, and in the case of wolves it is as a friend, just as we mean friends. Wolves are very interesting animals with a highly developed social organization.

"After Christmas the pups are left further and further behind as the pack travels because they can't keep up. One day last year the pack was followed for more than 60 miles through snow over two very tall peaks. Our previous experience suggests that only two of those little fellows are alive by spring."

Prof. McTaggart-Cowan has two other high alpine or Arctic projects going. Ph.D. candidate Manfred Hoefs, working out of the Icefield Research Station at Kluane Lake in the Yukon where the temperature can go to 60 below, is studying the year-round ecology of Dall sheep, the northernmost large animal living in the mountains of western Canada.

The mountainside where the sheep are living is instrumented with micrometeorological stations and food eaten by the sheep has been mapped and analysed. The project aims at finding the physical limits for the survival of these animals.

The same kind of information is being sought in the third project — the role of migration in the energy cycle of bighorn sheep. The study is being carried out by Mr. Daryll Hebert of Cranbrook who should earn his Ph.D. this year. The data can be used for planning parks and other refuges where the species may survive destruction from an expanding human population.

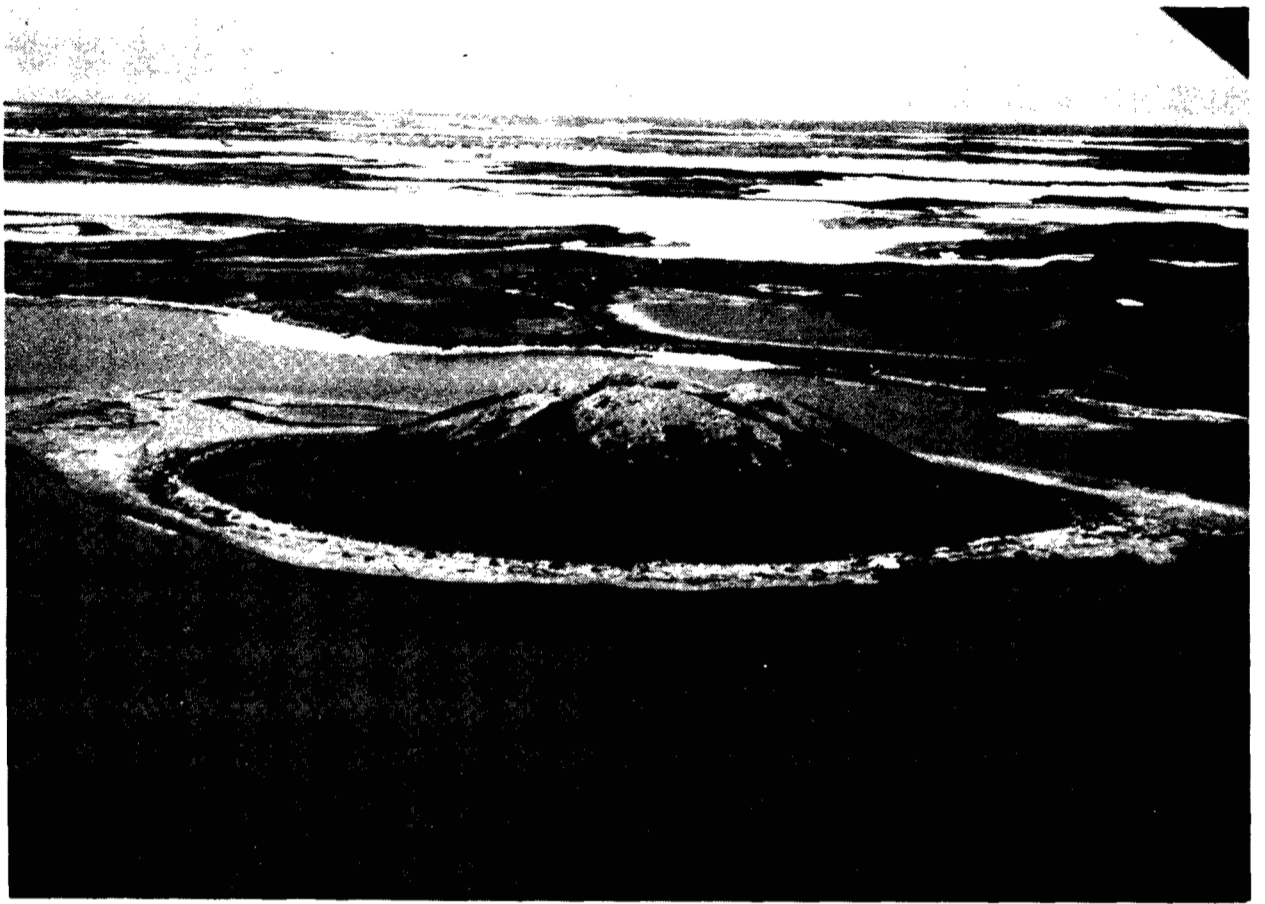
Bighorn sheep migrate down from mountains to lower levels in winter. All large mountain animals do this with the exception of bears, which escape winter by hibernating. Prof. McTaggart-Cowan's project is designed to find out exactly what the sheep gain by migrating.

A group of captive bighorn sheep north of Cranbrook have been put into "metabolic cages" — pens built on stilts with a wire mesh at the bottom. One group of sheep is fed the food that would be available to them if they migrated and another group the food that would be available to them if they didn't migrate. All food, feces and urine is weighed and analysed. A record is also kept of uneaten food so that a complete energy balance is obtained.

Preliminary figures, he said, reveal that the sheep fed the same type of food as a group of free, migrating sheep get about three times as much protein as non-migrating sheep.

He said there is a definite advantage to the sheep in being able to migrate with the ebb and flow of the seasons, gains in the form of important chemical

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Pingo, or ice-cored hill, is shown growing in a drained Arctic Lake in this photo by Prof. Ross Mackay of UBC's geography department. These unique hills are associated with permafrost and occur in their greatest

number to the east of the Mackenzie River delta on the edge of the Arctic Ocean. This particular pingo, located near Tuktoyaktuk, is 90 feet high. It is probably several thousand years old.

nutrients as well as digestible energy. Any project to manage or conserve a wild sheep population will have to take this into account.

In the Department of Zoology, work on the population dynamics of rock ptarmigan is providing basic knowledge on the species and population ecology in general. It also has some relevance to the welfare of man.

The research done as part of a Ph.D. program by Mr. John Theberge is part of a larger study under Dr. J.F. Bendell to find out how populations are regulated in nature. Dr. Bendell's group is also working on woodland caribou, blue and ruffed grouse, California quail and deer mice.

Dr. Bendell said the rock ptarmigan, a type of grouse, was chosen because it is an ideal bird for the study. It occurs in large numbers on the open tundra and is easy to see and catch throughout the year. The bird is an important part of the natural economy of the North. It provides food for man and animals. And Indians and Eskimos use the bird's skin and plumage in a variety of ways.

"More important," Dr. Bendell said, "the bird undergoes a dramatic 10-year population cycle. The population builds up over five years and then decreases. This also happens in other species such as the snowshoe hare. Lemmings have a three- to four-year cycle.

"If we find out what causes the cyclic fluctuation in ptarmigan we may have information that can be applied to many other animals and even our own situation. We all know that humans are the only species on earth whose population is unregulated. From what we see in studies of natural populations, this can't go on forever.

"If we don't control our own numbers in a rational way, natural forces will do it for us. Natural constraints to population include starvation, disease and high juvenile instability caused by social strife."

Mr. Theberge concluded from his part of the rock ptarmigan research that the population cycle isn't regulated by external environmental factors such as food supply, weather or disease, though these factors and others have some effect. The main regulatory factor seems to be the number of young birds that manage to survive the winter. Proportionately more young live through their first winter at the bottom of the cycle, when the population is low, than at the top.

Mr. Theberge maintains that this is indirectly related to changes in the social behavior of fall or winter flocks. He hatched chicks in an incubator from eggs laid during the increase and decrease of the cycle and subjected the birds to tests to measure their aggressiveness. The conditions in which the birds were raised were kept constant throughout the study. He says the aggressiveness of the chicks born when the population was at its peak and decreasing was higher

than during a year of increase.

"Mr. Theberge thinks that there is a change in the intrinsic quality of the chicks in their eggs which affects their aggressive behavior in winter flocks and causes changes in their mortality," Dr. Bendell said.

He said another Ph.D. student began work on the same problem this summer and is now observing fall and winter rock ptarmigan flocks in the Yukon to see if Mr. Theberge's conclusions hold in the field.

Work on the population dynamics of ptarmigan began four years ago in co-operation with the Alaska Department of Fish and Game and the University of Alaska's Institute of Arctic Biology.

Prof. McTaggart-Cowan's concern for the Arctic ecosystem is echoed by Prof. Vladimir Krajina of the Department of Botany. He and his graduate students have done fundamental work on tundra and alpine plant communities. Projects have been undertaken on Banks and Devon Islands, in the Mackenzie Delta and in the British and Richardson Mountains.

"In many areas of the North, permafrost lies just beneath the surface," Prof. Krajina said, "a condition which could mean disaster if unbalanced.

"The shallow soil on top of the permafrost is



PROF. ROSS MACKAY

called the active layer. It holds moisture for vegetation growth. If the vegetation and soil are disturbed the permafrost will melt, deepening the active layer and moving the moisture in the soil further from the surface, perhaps out of the reach of plant roots. If this happens the chances are high that the result will be a desert, since summer rainfall in many parts of the Arctic is meagre.

"A vicious circle can occur. If the vegetation dies, heat from the sun will be able to penetrate deeper into the soil, melting the permafrost further so that the area affected increases. This mechanism could also occur if the vegetation is accidentally burned. If this happens it might take 100 years or longer to reverse the situation."

Prof. Ross Mackay of the Department of Geography is one of Canada's leading authorities on permafrost and its problems. He began his work in 1951 when interest in the North was limited largely to the military. Since 1954 he has been concentrating on the Mackenzie River delta area and the adjacent coastal area west to Alaska and east to Darnley Bay.

Prof. Mackay's kind of knowledge is proving vital to Northern development. The type of permafrost present and its distribution is critical to many geophysical operations, construction projects and to an understanding of surface disturbances. Permafrost along the western Arctic coast is at least 1,000 feet deep, he said, and is probably 1,600 to 1,700 feet deep in some areas.

Though he doesn't take on consulting jobs, he gives whatever help he can when asked. He usually handles each week a number of requests from oil companies, construction firms, consultants and the federal government concerning permafrost problems.

In return for help given, major oil companies operating in the Mackenzie delta have provided logistic and other field support both winter and summer to Prof. Mackay and his graduate students. "There is a popular confusion over permafrost and permafrost damage," he said. "Permafrost is defined on a temperature basis and refers to all materials at or below 32 degrees Fahrenheit and not on how much water or ice is present in the ground. Permafrost with a low ice content near the surface presents little difficulty in construction.

"Sand and gravel, for instance, usually have so little associated ice that working with them in the Arctic is not much different from working with them in Vancouver. The same applies to the extensive bedrock area of the Canadian Shield.

"But the ice content of many silts and clays is high, so high that there is an excess of water when they are melted. Such soils are the typical cause of construction problems in the North.

"The worst cases are where there are ice bodies — in places more than 100 feet thick — lying just below the ground surface. The town of Inuvik at the mouth of the Mackenzie River is underlain with a great deal of ground ice about 15 to 20 feet below the surface. But proper construction methods have prevented it from thawing."

Prof. Mackay and his Ph.D. students are involved in a number of projects. Three students are completing Ph.D. theses based on field studies at a UBC field station near Reindeer Station. A former student has done studies on the delta's environment and vegetation, Mr. C. Peter Lewis is studying the subdivision of delta lakes, and Mr. Michael W. Smith is working on variations in ground temperatures.

Though the projects were undertaken as basic science projects, some of the results are of applied interest in seismic disturbance and related work.

Much attention is being given to the origin of massive ice sheets that have formed naturally in the ground. Drilling by oil companies has penetrated ice sheets more than 100 feet thick in some places. Portions of these ice bodies are frequently exposed along the coast. Coastal erosion or melting of ice is usually rapid. Just to the southwest of Tuktoyaktuk, for example, one coastal stretch has been eroded back 1,000 feet since 1935.

Perhaps the most intriguing study of all deals with the growth of "pingos," or ice-cored hills. Pingos may reach a height of about 150 feet and there are well over 1,000 of them, large and small, in the western Arctic coastal belt.

Prof. Mackay is measuring the growth rate of several "young" pingos. Two are about 20 years old, two others are about 50 and one is perhaps 75 to 100 years old. One pingo grew about eight inches vertically during 1969-70, another 4.5 inches and a third three inches.

Nearly all pingos grow near the centres of the bottoms of lakes which have drained. To find out just how pingos grow, Prof. Mackay plans to drain an Arctic lake and study the growth of a pingo in a "natural" laboratory experiment.

He is also working on how the Mackenzie and Laird Rivers mix. The Laird empties into the Mackenzie at Fort Simpson some 700 miles south of Inuvik.

"In June it may take at least 300 miles for mixing of the waters of both rivers to become nearly complete. This is an astonishingly long distance and it surprised all of us. I'd hate to think of the effects of an oil spill under these circumstances."

Dr. Garry C. Clarke is studying another fascinating form of ice in the North — "surging" glaciers. A small group of glaciers covering part of western Canada and Alaska don't behave normally by travelling down a valley in a steady progression.

Instead they surge, advancing rapidly for a short period, churning up huge pieces of ice and rock, only to stop and lie almost dormant for long periods before the cycle begins again. The cycle is anything

of even the thickest glaciers doesn't melt. And glaciers to the south don't surge because high summer temperatures keep the bottom constantly melted.

Dr. Clarke, an assistant professor in the Department of Geophysics, led a three-man team on an intensive study of a surging glacier. The glacier they chose was the Fox in the St. Elias Mountain Range in the Yukon, the highest chain of mountains in North America. The Fox, one mile wide and five long, is located near other known surging glaciers.

Besides seismic soundings, gravity surveys and other geophysical studies done over three summers, the team put down through the ice electrical devices called thermistors to measure ice temperatures at various depths. The Fox was discovered to be surprisingly thin, about 270 feet at its deepest point.

Preliminary results indicate that most of the ice at the base is below the melting point. A small zone of ice at the melting point was found and according to the melting-base theory, an increase in ice thickness will enlarge the "hot spot" and bring on the next surge.

Dr. Clarke and his group were stationed in a tent



UBC zoologists are studying two types of large, mountain animals living in alpine climates. Dall sheep, below, are the most northerly-ranging of all large, mountain animals in Canada. Two groups of captive bighorn sheep, shown in top photo, are being studied by UBC scientists near Cranbrook to determine the

role of migration in their energy cycle. The photos were taken by Dr. Valerius Geist, a former Ph.D. student of Dean Ian McTaggart-Cowan of the Faculty of Graduate Studies. Dr. Geist is now with the Environmental Sciences Centre of the University of Calgary.



from 15 to 100 years, depending on the glacier. No one knows what causes some glaciers to surge.

One theory is that the glacier melts at its base and runs quickly for a short period of time on a lubricating film of water. The temperature at the top of the glacier is kept constant at below freezing by the climate. And the base of the glacier receives a constant amount of heat from the earth's crust. So the top of the glacier is colder than the base and the temperature increases with depth. But the temperature increase is roughly constant over a definite thickness of ice. This means that if the glacier becomes thicker and the temperature at the top remains the same, ice at the bottom of the glacier will warm up.

When the base of the glacier melts, the glacier surges. While surging it rapidly thins out and the base temperature drops until the bottom freezes again, locking it to the rock beneath. The glacier then enters its stagnant or quiescent stage.

This may explain why surging glaciers are located along the same latitude. More northerly glaciers don't surge because the climate is so cold that the bottom

camp next to the Fox some 50 miles from the Alaska Highway and supplied by air from the Icefield Research Station at Kluane Lake. The station is headquarters of the Icefield Ranges Research Project, a joint venture by the American Geographical Society and the Arctic Institute of North America. A series of research programs in the St. Elias Mountains have been operated from Kluane Lake since 1961.

Data from the Fox study are being processed by Dr. Clarke and his group using the University's Computer Centre. If they establish that glaciers surge because of melting ice at their bases, they will be able to predict whether a glacier is about to surge or not simply by putting down thermistors.

Meanwhile the Fox is being kept under aerial observation. If there is any sign that it is beginning to surge, Dr. Clarke wants to take temperature readings from the probes left embedded in the ice. The readings would have to be done quickly because the surface of a surging glacier crevasses and heaves so violently that travel across it is impossible. And once the glacier began moving, the probes would almost certainly be destroyed.

Energy and new ideas are percolating their way through the UBC Alumni Association.

With more than 50 years of operation behind it, the association is looking to the future in a mood of critical self-analysis.

"The Alumni Association has been in existence for more than a half century and I think it is tremendously important that for the first time in its history the concepts upon which it operates are being seriously tested and challenged," said Mr. Jack Stathers, the association's executive director.

In recent years the association has been carving out a new role for itself as a two-way communications bridge for the University.

Through a variety of new programs and approaches it has been striving, on the one hand, to interpret to the University the ideas of the community-at-large about higher education and, on the other, to promote understanding of the University's goals in the minds of the public.

In part, the association's re-examination of its role is the result of the increasing youthfulness of its membership.

UBC now has 52,779 alumni and 50 per cent of them have graduated since 1961. The average age of all UBC graduates is 30 and the current association president, Mr. Barrie Lindsay, is only 35.

TRADITIONAL ROLES

"The traditional roles of fund-raising and class reunions are still important Alumni Association activities," said Mr. Lindsay, "but certainly these activities that in effect encourage nostalgia are not an effective base for our future role in the UBC community."

Every graduate of UBC is ipso facto a member of the Alumni Association. Only about 6,000 graduates, however, are actively involved in the association's many endeavors.

In an effort to increase participation a representative sample of the membership are being surveyed and asked to outline what would motivate them to become more actively involved.

The association has pledged itself to implement the wishes of the membership to the greatest extent possible. It is hoped that all UBC alumni asked, and particularly the younger ones, will respond to the survey and express their ideas about the role the association should be playing.

Mr. Lindsay feels that to some extent the association suffers from a "fund-raising, tea-partying" image. This

NEW IDEAS PERCOLATE

somewhat cynical assessment of the association's role is, he believes, no longer valid, if it ever was.

These days the beverages served at the association's more swinging social functions, designed to appeal to its increasingly youthful membership, are almost anything but tea.

And although the association fears that its hat-in-hand image turns off a large number of its members, its fund-raising activities nevertheless attain a large measure of success.

In 1969, 10,118 alumni gave \$288,891 to the University. A total of 5,591 graduates gave \$144,085 to the Alumni Fund direct, another 763 gave \$76,896 to the three Universities Capital Fund and other special gifts from 3,764 donors totalled \$67,910.

The total amount given annually by UBC graduates has almost doubled since 1965 and Mr. Ian "Scotty" Malcolm, director of the Alumni Fund, points out that "the trend of giving has continued to rise despite the economic climate and student unrest."

Conscious of the need for relevance, however, Mr. Lindsay and the association's Board of Management, which is among the youngest of any alumni organization in the country, have already accomplished a major shift in the association's role and are converting it into a vital communications device for the University.

"I see the association's role as not only attempting to maintain the interest of alumni in the University, but also trying to foster more interest from the University to the alumni and the community-at-large," he said.

Mr. Lindsay feels that the University suffers from isolation because of the intrinsic nature of academic life and UBC's location on the tip of Point Grey.

He thinks that UBC alumni, who were once students and have now assumed responsibilities in the community, have a foot in both worlds and are in an optimum position to foster communication between the University and the society that supports it.

A concrete example of the association's new role was the recent visit of a key association committee on government relations to Victoria.

The committee has made an annual approach to Victoria on behalf of the University for many years. This year, true to its objective of fostering communication, the committee adopted a new approach.

"For the first time we didn't go asking for anything

other than a better understanding of the role of UBC," said Mr. Lindsay.

The committee met with Members of the Legislative Assembly representing all three political parties to



MEMBERS of the Alumni Association's government relations committee and senior UBC administrative personnel visited Victoria recently to meet with Members of the Legislative Assembly of all parties. For details see story below. Let to right in photo above are: Mr. Evan Wolfe, Social Credit MLA; Mrs. Frederick Field, association second vice-president; Mr. William White, UBC's deputy

"What are the University's capital requirements?"
"How can tenure be justified?"
"How does the University get rid of a rotten professor?"
"Why doesn't UBC operate on a year-round basis?"

These are some of the questions raised by British Columbia Members of the Legislative Assembly from all three political parties when the UBC Alumni Association's government relations committee visited Victoria recently.

DELEGATION LISTED

Representing the Alumni Association at the Victoria meeting were Mr. Robert Dundas, chairman of the government relations committee; Mr. Barrie Lindsay, president of the Alumni Association; Mr. Frank Walden, first vice-president; Mrs. Frederick Field, second vice-president, and Mr. Jack Stathers, executive director of the Association.

Three active members of the UBC community also attended the meeting: Dr. Peter Pearse, president of the UBC Faculty Association; UBC's registrar, Mr. J.E.A. Parnall, and UBC's deputy president and bursar, Mr. William White.

The UBC representatives were present to answer MLAs' questions first-hand and to help attain the government relations committee's objective of giving the MLAs "a better understanding of the role of the University."

The committee met separately with the New Democrats and the Liberals in caucus and with a group of Social Credit MLAs. Despite differences in political ideology and their parties' positions in the house, the MLAs raised questions that reflected common themes.

The Alumni Association committee members felt that the MLAs expressed a genuine interest in

Victoria Delegation

University affairs and that their questions reflected the attitudes of their constituents toward the University.

What follows are some of the questions raised by the MLAs (in italics), the responses by members of the delegation and some of the impressions brought away by the Alumni Association committee members.

• *What are the future capital requirements of UBC?*

Mr. White outlined the University's \$85 million capital program for the five-year period 1969 to 1974. The plan calls for expenditure of \$17 million a year. He told the MLAs that in the first two years of the plan the shortfall totalled \$22 million.

The MLAs were shocked at the amount of capital the University claimed it needed for expansion and replacement of existing facilities. The discussion led to questions about the proper role of the University in society.

• *If the University expects large-scale capital support, should it not attune its efforts more closely to the needs and desires of society?*

Questions in this area were answered by Dr. Pearse, who argued that the most vital role of the University was the propagation and extension of knowledge and not job training. Some MLAs found this viewpoint difficult to understand.

Committee members concluded from this portion of the discussion that the values of the general public often conflict with those of the University community. The committee felt there was a need for members of the academic community to make their

views on the role of the University more widely known to the general public.

• *Why doesn't UBC operate on a trimester system, which it was felt would make more efficient use of the time of faculty members and physical plant?*

Mr. White and Mr. Parnall replied that evaluations by the University have shown that UBC's two-term system is less expensive than the trimester system. Committee members felt an evaluation of the two systems should be carried out and the results published.

• *How can tenure be justified?*

Dr. Pearse said that one of the most important roles of the University and its academic members was that of social critic. He argued that in order to fulfill this role effectively, a faculty member required protection from the possibility of pressure related to his future employment status.

WELL RECEIVED

The committee felt that Dr. Pearse's arguments were well received by the MLAs, but that even taking the validity of the argument into account, the MLAs still did not feel that tenure could be justified. Interested MLAs raised a related question:

• *How do you get rid of a professor who is not properly performing his job?*

Dr. Pearse explained that the most important method is non-renewal of his contract. New professors are normally hired on short-term contracts, and are not given tenure until they have convinced

THROUGH ASSOCIATION

discuss the goals and policies of the University. The active interest displayed by the MLAs confirmed the committee's belief in the need for such communication. Mr. Lindsay believes that the questions asked by the



president and Bursar; Mr. Barrie Lindsay, president of the UBC Alumni Association; the Hon. Donald Brothers, Minister of Education; Mr. Robert Dundas, chairman of the Alumni Association's government relations committee; Mr. Jack Parnall, UBC's registrar, and Mr. Frank Walden, Alumni Association first vice-president. Photo by Jim Ryan.

MLAs, as representatives of the people of B.C., reflect public feeling toward the University.

He and other members of the committee were struck by the discrepancy between the way the University is viewed by the MLAs and the way it is viewed by active members of the University community. He believes that it is as important for the University to understand the attitudes of the public as it is for the public to understand the policies of the University (For details see story below).

A further conclusion reached by the committee was that "despite all the publicity that emanates from the University, it is still not understood."

In an attempt to overcome this problem the Alumni Association has developed a series of FYI (For Your Information) bulletins.

The FYIs are short, snappy news releases that keep readers informed about some of the basic needs of the University and about some of the things it is doing to serve the community. Recent FYIs, for example, dealt with developments in the Faculty of Forestry, which celebrates its 50th anniversary this year, and the new Health Sciences Centre at UBC.

"Both forestry and medicine are academic disciplines where developments affect the entire population of British Columbia," said Mr. Lindsay, who explained that the FYIs are mailed to "people who are in positions to mould or effect change in public attitude and opinion."

FYIs are received by all members of the legislature, all school trustees and elected municipal officials throughout the province, all chambers of commerce and boards of trade, and all members of the UBC Senate.

So far the association has chosen the relatively easy route of explaining the value of UBC's professional faculties to the community. Selling the public on the value of a liberal education, Mr. Lindsay concedes, is a much more difficult proposition.

In the past two years the Alumni Association has, through its branches program, been making efforts to extend understanding of the University throughout the province by encouraging top-ranking University people to travel around the province and make their views known, and by co-operating with the University's Center for Continuing Education in its efforts to extend the University's role out into the wider community.

The UBC Alumni Association has 15 branch

organizations throughout B.C. It also has six branches located elsewhere in Canada: Calgary, Edmonton, Winnipeg, Toronto, Montreal and Ottawa, as well as branches located in the United States in New York, San Francisco, Los Angeles and Seattle.

Last year President Walter Gage toured many of the B.C. branches and received an exceptionally warm welcome from UBC alumni on all occasions. This year both Dean J.F. McCreary of the Faculty of Medicine and Dean Joseph A.F. Gardner of the Faculty of Forestry will make similar tours.

In co-operation with the Center for Continuing Education, the association this year is sponsoring non-credit courses in such subjects as "Reading and Study Skills," "New Directions for Women," and "Pollution in the Environment" at five provincial locations: Kamloops, Chilliwack, Prince George, Trail and Vernon.

Concurrently, the association is attempting to strengthen graduates' interest in the University through the organization of strong divisions programs, which permit graduates to relate to the University via their own specialty.

FOUR DIVISIONS

The association now has four divisions programs in Commerce, Law, Home Economics and Nursing and the success of these programs indicates that graduates are much better able to identify with specific segments of the University community with which they have had closer ties than with the University as a whole.

As well as devising new methods of communication, the association has enhanced its tried and true methods. The *UBC Chronicle*, the association's longest-lived communications organ, has drastically altered its content within the past few years from nostalgic memoirs to critical analysis of various social issues in which the active University community is involved.

The Chronicle, edited by Mr. Clive Cocking, assisted by Miss Susan Jamieson, has achieved a high standard of excellence and last year was given an award for editorial content by the American Alumni Council.

The association has also been instrumental in assisting the University in the development of public service television broadcasting in the lower mainland area of B.C. Aided by a grant from the association, UBC's

Please turn to Page Twelve
See *NEW IDEAS*

Questioned by MLAs

their colleagues of their competence. Non-renewals are common.

Tenure is not meant to protect poor professors, and it probably doesn't any more than employment practices in government and industry. We have explicit procedures for dismissal for incompetence. And, of course, there are more subtle methods such as withholding salary increases and promotions, as in other occupations.

The committee concluded that the whole question of tenure should be debated by the University community and by the community-at-large to provide better understanding of the issues involved.

• How many foreign, particularly American, faculty members does UBC employ and is sufficient Canadian content being provided in courses?

Dr. Pearse pointed out that citizenship is not the important factor. Familiarity with Canadian institutions and problems is, however, especially in areas such as the social sciences where it is important to have Canadian content. In general, he subscribed to the doctrine that Canadian talent should be used where it was available, but not at the expense of academic quality.

Dr. Pearse pointed out that 80 per cent of UBC's tenured faculty are Canadian. He said that there is considerable turnover at lower ranks and that at these levels there are now more Canadians available than has been the case in the past. Consequently, more Canadians are being hired.

The committee members felt that MLAs were convinced that the University was conducting its affairs properly in this area.

The committee also noted that much of the discussion centred on the more general problem of overall planning for higher education in British Columbia.

MLAs of all parties were critical of the government for its failure to assume sufficient initiative for overall planning and of UBC for failing to enunciate its goals and policies clearly. They expressed a strong desire to see such a statement by the University as a guide to government policy.

The roles of the present Advisory Board and Academic Board were discussed and criticized.

The Advisory Board is responsible for making recommendations to the Minister of Education for division of provincial government grants among the universities.

MAJOR COMPLAINT

The major complaint regarding the Advisory Board was that it meets seldom and does not employ research staff to analyse critically the submissions made to it by the universities.

The chief responsibilities of the Academic Board, as outlined in *The Universities Act*, are: "to collect, examine, and provide information relating to academic standards, and to advise the appropriate authorities on orderly academic development of Universities established under this Act and of colleges established under the *Public Schools Act* by keeping in review the academic standards of each."

The Academic Board is also empowered to "report

on any matters respecting academic standards and development in higher education as may be from time to time required by the Minister of Education."

MLAs, on the basis of the discussion, concluded that the Academic Board does not take advantage of the wide powers of investigation and analysis granted to it, nor does it appear to be doing what it is empowered to do under *The Universities Act*.

ROLES INADEQUATE

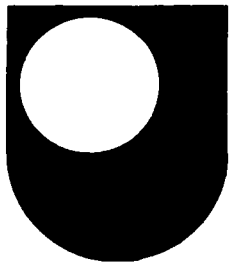
There was agreement among all MLAs that the roles being played by these boards at present are inadequate. There was disagreement on the question of whether the solution lay in increasing the powers of the existing boards or providing a new framework for the development of higher education.

Even those MLAs who agreed that a new framework was necessary disagreed on whether it should be modelled on the centralized Board of Regents system used in California or whether a less centralized co-ordinating agency would be sufficient.

Under the California system a single governing board co-ordinates and governs all public institutions of higher learning within the state.

Under the co-ordinating agency approach, a board would be empowered to co-ordinate and control certain selected activities of public institutions of higher education, but restrained from exercising general governing or administrative powers. Under this pattern, the existing Board of Governors of each institution would continue to exercise traditional control over all matters except those expressly delegated to the co-ordinating agency.

The Alumni Association, in its submission to the Advisory Committee on Inter-University Relations, chaired by Dr. G. Neil Perry, former deputy minister of education, concluded that the co-ordinating agency was the most suitable.



BY MARK WALDMAN

THIS UNIVERSITY OFFERS A

A new kind of educational institution — one which may be the forerunner of the universities of the future — began operations in England in January.

The Open University or, as it is more popularly known, "The University of the Air," is designed to fill an enormous gap in the existing educational system by providing an opportunity for mature students to obtain a university degree.

The present educational system is very much a "one-ladder affair" and although the system has been tremendously expanded during the last ten years it remains quite inflexible. For those who wish to obtain a university degree, there is a well-defined program of secondary education leading to university entrance and an equally well-defined system of specialized courses within universities which a student must first take before receiving his baccalaureate degree.

Thousands step off the ladder before reaching the top and although many school-leavers later discover that they need a higher education, either for job promotion or simply for personal satisfaction, the possibilities for returning to school are bleak. It usually means giving up a job and placing a severe financial burden on one's family. It is for this reason, particularly, that few school-leavers return to finish their education.

In recent years educators have recognized that the present educational system largely ignores this huge reservoir of human talent and potential. Some correspondence courses have been set up but the offerings have been meagre — until now. In January, a new University designed especially for the school-leaver began operating in England. It is called the Open University.



Basically, the Open University is a correspondence school. In fact, it represents a radical departure from the old concept of a correspondence school. The name Open University is a particularly apt one. It is open to students, to places and methods.

In setting up the Open University, the planners took, as basic, the axiom that "no formal academic qualifications would be required for registration as a student. Anyone could try his or her hand and only failure to progress would be a bar to continuation of studies."

The basic criteria for admission are: (a) Is the student sufficiently prepared to benefit from and succeed in the proposed studies at degree level?; (b) Is there a particular need for improved educational standards for the student's present or intended occupational group?; (c) Is the course the student wishes to follow one in which the Open University can provide adequate tutorial help in his region?; (d) Did the student apply early or late in the list of applicants?

When the University has considered all applicants in the light of answers to the first three questions — and these are used only to a limited extent — applicants are accepted on the basis of "first come, first served."

The prospectus of the Open University states quite explicitly that only in exceptional cases will it accept students under 21 years of age (e.g., a handicapped student who cannot attend a regular university). The aim of the Open University is to cater to those who

have left school and who now want to return and to the more mature student who knows what he wants in the way of an education and is sufficiently motivated to work hard to get it.

The heart of the Open University is a small campus near the new town of Milton Keynes, a village in Buckinghamshire to the northwest of London. On this campus are housed the main administration buildings, some laboratories for post-graduate research and offices for the designers of the courses. This campus represents only the administrative centre. The real campus is spread, in fact, over the whole of the United Kingdom.

It was decided in the beginning that for the University to be really effective in teaching it must establish more than just "paper contact" with students. To this end the United Kingdom was divided into twelve regions, each with a regional office. The regional centres administer a pool of

counsellors and study spaces in about 200 towns. These are gathering places where students and counsellors can meet and thus avoid "academic isolation."

The courses offered by the Open University have been especially designed for the part-time student who will be studying at home. They consist of three basic elements — correspondence study, a series of broadcasts on radio and TV and a one-week, obligatory summer school.

In addition to supplying written correspondence packages, the University will also give out tapes, slides, and records. The real innovation, however, lies in the wide use the University plans to make of the British Broadcasting Corporation's TV and radio stations. Each correspondence package is scheduled to coincide with an appropriate lecture or lectures on radio and/or TV. The correspondence, broadcast, and other components of the teaching system will be as

AN OPEN UNIVE

Another University of B.C. graduate who has visited and taken an interest in Britain's Open University is Mr. A.E. "Andy" Soles, the former principal of Selkirk College in Castlegar, B.C., who was recently appointed assistant superintendent (post-secondary services) in the Department of Education in Victoria. The following article is based on a faculty seminar which Mr. Soles gave at Selkirk College before taking up his new post with the provincial government. The opinions expressed by Mr. Soles are personal and should not be construed as government policy.

By ANDY SOLES

Whether or not a fourth public university will be required for British Columbia will depend upon a continuing demand for higher education which will be determined, in the final analysis, by social and economic conditions. Today and for the next decade, the need for space and facilities would appear to be in the post-secondary field, but precisely what kinds of facilities will be required is not at this time entirely clear. It would seem that the real demands might be in the technical areas. Perhaps we need another Institute of Technology, more vocational training schools, more comprehensive colleges.

Perhaps we need only wait for educational demands to subside. Recent surveys undertaken by the Department of Education show quite convincingly that elementary school enrolments are dropping in most districts of the province. Obviously some very careful studies need to be made to determine our real requirements.

MANY QUESTIONS

If these studies should reveal that we do in fact need a fourth public university, we should, in my opinion, examine very carefully Britain's Open University. We would want to know how successfully the Open University was maintaining good academic standards. We would want precise information on per student costs. (Certainly we cannot afford higher costs in post-secondary education). We would want information on the student attrition rate. There are many questions we would want answered. But if they could be answered to our satisfaction we should, as one alternative, consider a modification of the Open University of Britain for British Columbia.

How would such an institution be organized and operate in our province? The first requirement would be a basic campus located in a central part of the province. In my opinion a basic campus would include the following:

1. A building to provide faculty offices and conference rooms but not, at least in the initial phase,

classrooms.

2. Basic teaching or course development (but not research) laboratories for the physical and life sciences. As needs were determined it might be necessary to add technical laboratories.

3. A library, carefully selected to include the major basic works in the various disciplines.

4. A completely equipped audio-visual centre.

The tasks of the full-time faculty based on the central campus would be: (1) to develop learning packages; (2) to set and grade examinations; (3) to maintain a continuous liaison with course tutors; (4) to monitor academic standards; and, (5) as opportunity presented itself, to do major face-to-face lecturing in a number of regional centres. They would be faculty members as well qualified academically as any one would find in a reputable university in Canada. They would also have the opportunity to bring to their campus scholars of national and even international reputation to lead their course development teams.

The nine existing community colleges in B.C. are potential regional centres where the real work of the Open University could go on. Selkirk College, for example, which serves the West Kootenay area, could be designated a regional centre for the Open University. Associated with it would be a number of study centres where students would have access to books, course tutors and audio-visual equipment. Study centres associated with Selkirk College might be located in Nelson, Trail, Grand Forks, Nakusp, Salmo, Rossland, New Denver, Slocan and Fruitvale.

I would like to make clear that I am not advocating that two-year colleges be turned into degree-granting institutions. The degrees would be awarded by the Open University.

The exact location of study centres would, of course, depend upon student demand. Undoubtedly, some of these should be located in secondary schools, where high school students could also make good use of whatever books or audio-visual equipment were available.

A regional director, who would look after such matters as the registration of students and the appointment and supervision of part-time tutors and counsellors, would be based in each of the colleges. He would probably draw his part-time course tutors and counsellors from among the faculty of the colleges or from qualified personnel within the community.

Arrangements would have to be made with the Canadian Broadcasting Corporation and with local radio and television stations to broadcast lectures or demonstrations which would be closely integrated with the learning packages sent out to the students. Facilities would be provided in the learning centres to



Dr. Mark Waldman received his Ph.D. from UBC in 1970. While at UBC, he was a member of Senate representing graduate students. He wrote the article on Britain's Open University while a post-doctoral student at Oxford. He is currently continuing research at the Hebrew University of Jerusalem.

SECOND CHANCE

fully integrated as possible. Radio and TV have been used in the past as educational tools. However, the task undertaken by the Open University represents the most ambitious to date.



The Open University will not only be open in terms of people, places and ways of teaching, it will also be open in terms of the flexibility of the courses that it gives. One of the main harangues of students these days is the increasing specialization and decreasing personalization of a university education, i.e., courses do not seem to relate to each other, to students, or to society. At the Open University, in

contrast to the more conventional universities, an interdisciplinary approach and maximum flexibility seem to be the overriding considerations in course planning.

The first-year science course, for instance, takes as its aim to present and explain some of the concepts and principles of importance in modern science and to show how science, technology, and society are interrelated. Among other things, the course will discuss the growth and meaning of science, the emergence of science related to the social framework, instruments as extensions of man's senses, the periodic table, cells and organisms, the genetic code, evolution, population explosion, diversity in morphology, and what is life? This covers the philosophy of science, chemistry, physics, biology, genetics, anthropology and sociology. At an ordinary university, a student would have to take separate courses in each of these subjects. At the Open

University he takes but one course and, most important of all, the material is taught as an interdisciplinary subject and not as unrelated facts. The advantages are obvious.

In 1971 four faculties will be operative — Arts, Science, Mathematics and Social Sciences. In 1972 the Faculties of Technology and Educational Studies will be added. At a conventional university a student is normally expected to specialize in one subject. At the Open University it is still true that a student can specialize — if he wants to.

The intense specialization of the conventional university program has been highly criticized in the past as producing "isolated specialists," i.e., people who, although they may be expert in their own field, cannot relate, much less interact and co-operate, with experts in other fields. Some readers may think that the Open University, by the scope of its courses, will fail to properly educate in depth. The Open University hopes to teach its students how to absorb large amounts of data and how to fit this data into an overall general context rather than into specialized, confined areas. Graduates from the Open University will be *generalists* and may well be the vanguard of a new breed.

To obtain a BA degree at the Open University a student must take two foundation courses and four more courses at second or subsequent levels. A BA (honors) degree is awarded to a student who completes two foundation courses (i.e., two first-year courses) and six more courses at second or subsequent levels provided that two of these six are at third or fourth level. A student can take one but not more than two courses a year. Thus, he or she can complete a BA degree in three years, or a BA (honors) degree in four years or the degree can be spread over many years. (Under the British university system a BA degree is usually taken in three years and a BA (honors) degree in four years. To let prospective employers know what a student has taken, the degree certificate will list the courses in which credits have been gained).

Money must figure in any discussion of higher education. The facts are clear. An Arts student at UBC pays just over \$1,800 in tuition fees alone in four years. A student at the Open University, provided he has ready access to a radio and TV beforehand, will pay only \$360.



Besides the cost to the individual student, the cost to the taxpayer must also be reckoned with. The Open University has no large blocks of classrooms like the Buchanan Building and no multi-million dollar Student Union Building. Moreover, there are no operating costs in the Open University budget for maintaining such large buildings. Classes are held in the home with the exception of one-week summer schools, when classrooms are rented, and the community "study centers" are not elaborate affairs. In an optimistic mood, Dr. Walter Perry, the vice-chancellor or president of the Open University, calculates that after initial capitalization and running-in the University may, in about ten years' time, be able to a significant extent, to support itself on student fees and sales of material both in the United Kingdom and overseas.

The Open University is a huge undertaking. The planners hope to enrol 25,000 students for the 1971 session (the term runs from January to December). This will raise by more than half again the number of first-year students studying for first degrees in the United Kingdom.

Should the Open University prove successful, not only will it fill an enormous gap in the present educational system, it will be a forerunner of the universities of the future.

UNIVERSITY FOR B.C.?

play back broadcasts which students want to hear again or which they may have missed. Arrangements will have to be made to receive and distribute correspondence assignments and learning packages through a central agency.

Courses and programs developed at the third- and fourth-year levels of work should be closely articulated with those provided in first- and second-year in the regional colleges, since I would anticipate that most students would still attend regional colleges for their first and second years. However, the Open University would have to develop first- and second-year study programs for students who are remote from a regional college or who must work full-time and cannot afford to attend a college. Other regional centres may have to be developed, for example, in the Peace River block, the east Kootenays and so on.

Another important part of the Open University concept is compulsory attendance at summer school. Most of our regional colleges could very easily provide such service.

HOLDS PROMISE

I have outlined only in the barest detail a way in which the Open University concept might be introduced to B.C. But such a scheme promises some definite advantages. Let me conclude by suggesting some of them.

(1) It would extend additional post-secondary educational opportunities up to the degree level to students in most parts of our province. This would be an important advantage for the large numbers of people who have completed two years of post-secondary education in regional colleges but cannot go further.

(2) It should result in some reduction in per student costs. If this is so, it is an important advantage. I need not remind you of the recently-published report of the Economic Council of Canada which has some interesting things to say about the escalating costs of higher education in Canada.

(3) It places the responsibility for education on the student himself. He will have to want education badly enough to work independently. All kinds of help will be available to him, but he will have to make the effort.

(4) By co-ordinating the efforts of noted scholars in the development of learning packages, students will be exposed — albeit indirectly — to the best minds of our nation.

(5) From the point of view of the regional colleges the scheme will afford their faculties the opportunity

of instructing at more senior levels of work.

(6) It will bring higher education closer to people, not only physically but by reducing the "psychological" distance between them and universities. In so doing it will cut through some of the mystique of university education and perhaps lead to greater public support for it.

(7) It ought to lead to further experiments into the important matter of giving instruction or communicating knowledge to people living in a complex age in which they have to know more and learn more quickly than at any other time in history.

(8) It ought to add a degree of flexibility to our educational system, making it possible to keep more



MR. ANDY SOLES

of our people abreast of current thought and practice and allowing them greater opportunities for retraining.

(9) It ought to contribute substantially to a realization of our dream of life-long education.

(10) Finally, it ought to make it possible for those who, for a variety of reasons, had no hope of continuing their education to do so.

These are some of the promises the Open University may hold for British Columbia.

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MAKING GOOD THINGS OUT OF GARBAGE

A new project that makes good things out of garbage has been started on the UBC campus.

It is called the University Endowment Lands Recycling Project and the two moving spirits behind it are Mrs. Janey Southey, the wife of a UBC junior faculty member and Mrs. Lynne Vickson, the wife of a UBC post-doctoral fellow.

Recycling — the conversion of waste products into re-usable materials — is not a new idea, but with increasing concern for the environment, recycling has become relevant again, Mrs. Southey explained. "During the second World War Canadians practised conservation of natural resources through recycling by choice and by legislation," she said and she believes that they can be encouraged to do so again.

So far the UEL group have confined themselves to recycling old newspapers, but other solid waste products such as glass and metal containers can also be recycled. The newspapers are converted locally into cardboard, wallboard and many other items requiring heavier grades of paper.

SAVES TREES

As explained by Mrs. Southey, recycling is advantageous in three ways: every ton of old papers recycled to make fresh newsprint saves approximately 17 trees and thereby helps preserve valuable natural resources; pollution is decreased because recycling plants cause less pollution than pulp and paper mills;

it saves valuable land space now being used as garbage fill areas.

The UBC project got under way last Thanksgiving weekend when a brigade of about a dozen children, aged 5-10 years old, went door to door through the Acadia Park and Acadia Camp residential areas.

They collected over a ton of newspapers from enthusiastic residents. A similar amount of paper has been collected from among the some 600 residents — mostly married students or junior faculty members of UBC — on a bi-weekly basis ever since.

The project is now organized on a much more sophisticated basis. The community has been divided into 15 areas, each with a representative who collects and deposits newspapers into about 10 specially designated deposit bins.

Even the highrise residents have worked out a method of collection: newspapers are deposited in a storage locker, the number of which is posted in the elevator. Residents either deposit papers in the locker or leave them beside the elevator stop on their floor to be collected by the area representative.

Children have continued their involvement in the project through the local University Hill Elementary School. The children bring newspapers to school to be recycled and a special room has been set aside where Grade Six children collect and bundle the papers.

Mrs. Vickson recalls one occasion in the early days of the project when she personally lifted a ton and a half of papers five different times in 24 hours.

SOCIETY COLLECTS

Collection of the papers from the deposit areas is now done by members of the Joshua Society, a co-operative group that is becoming self-supporting by collecting and selling recycleable materials.

Any profits that accrue from the UBC project will be used to provide playground equipment for local children.

Mrs. Southey and Mrs. Vickson would like to see recycling organized on a city-wide basis. They point out that Pacific Press alone uses 700 tons of newsprint each day. The idea has been spreading and about 20 deposit areas have been set up in Vancouver.

At UBC the Joshua Society has extended collection beyond the UEL project and now also calls on the UBC Computing Centre — a major campus paper user. Other UBC departments or others interested in participating in recycling are urged to contact Mrs. Janey Southey at 224-5767 or Mrs. Lynne Vickson at 224-7109.



VANCOUVER'S winter rains fail to dampen the enthusiasm of these University Endowment Land residents, who are collecting papers for recycling. At left are Sean and Tabatha Southey, aged seven and five respectively, children of Mrs. Janey Southey, third from left, one of the organizers of the project.

Another of the project's organizers, Mrs. Lynne Vickson, is at right with her three-year-old son Benjamin on her shoulders. Tommy Chambers, aged eight, is pulling a wagon loaded with papers and Michael Williams, aged six. Picture by David Margerison, UBC Photo Department.

NINE STUDY PROGRAMS OFFERED

Greece, Mexico, Japan, England, Tunisia, Italy and, if permission is granted to travel there, China are the destinations of nine educational-travel programs being offered during 1971 by the UBC Center for Continuing Education.

Since the Center (formerly the extension department) entered the educational-travel field in 1965, more than 300 persons have taken part in 14 international tours offered as part of the University's continuing education program.

Two kinds of programs are offered: (1) courses of directed study abroad, which may or may not be taken for credit and, (2) general educational travel programs.

DIRECTED STUDY

This spring and summer, four courses of directed study abroad will be offered. The Department of Fine Arts is sponsoring a summer school in Florence, Italy, May 21-June 30 on the art of the Renaissance.

Archaeology of the Ancient Near East will be offered in Tunisia July 3 to 31 with Dr. Hanna Kassis, archaeologist and Islamicist from UBC, as accompanying instructor. The course will concentrate on Tunisia with emphasis on the

Phoenicians and their empire centred in Carthage.

Two courses are being offered in England. A Shakespeare course July 5 to Aug. 7 consists of two weeks at Reading University near London and three weeks at Stratford-upon-Avon. A field study course for social studies teachers July 1-31 will be conducted by Dean Neville V. Scarfe of UBC's Faculty of Education.*

Five general educational-travel programs are planned by the Center for 1971. The educational components of these programs, which differentiate them from commercial tours, include orientation lectures on the history, culture and present-day life of the countries to be visited, visits to places not on ordinary tours, seminars and other educational events in the countries being visited involving local experts drawn from academic, governmental, business, professional and artistic circles and, in some cases, inclusion of UBC faculty members on the tour as resource persons.

This year's programs include:

• Classical Greece, a four-week tour in June emphasizing the antiquities of Greece, particularly

* Center for Continuing Education flight to London, England, will depart Vancouver June 26, returning Aug. 13. Flight is available to UBC educational-travel course participants (\$306). Flight is also available to other UBC students and faculty members and immediate family (\$316).

of the Peloponnese and Crete, headed by Dr. C.W.J. Eliot, of the Department of Classics.

• A three-week tour of Peking, Shanghai, Nanking, Canton, rural communes and other places in China in August if permission is granted by the authorities of the People's Republic.

• A three-week tour of major cities, cultural centres and rural areas of Japan beginning May 9.

• A three-week program of summer seminars at Ivan Illich's controversial institute of learning, Centro Intercultural de Documentacion in Cuernavaca, Mexico, during July and August.

• The Mayan Trail II, a three-week archaeological travel tour of Mexico beginning Dec. 17 and based on a similar program in 1969.

BROCHURE AVAILABLE

Brochures and detailed information on each of these programs are available by writing to the Center for Continuing Education, University of B.C., Vancouver 8, or telephoning 228-2181.

Previous educational-travel programs conducted by the Center have included: Mexico (1966), Japan (1968, 1969, 1970), South America (1969), The Moorish World (Southern Spain and North Africa, 1969), Peru (1969), Mexico and Central America (1970) and Europe (1970).

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.

BRIEF APPROVED

The University of B.C.'s Board of Governors has approved as official University policy a brief calling for an amendment to the British North America Act, the major document of the Canadian constitution.

The brief was presented to the Special Joint Committee of the Senate and House of Commons on the Constitution of Canada by Prof. Robert M. Clark, UBC's academic planner, when the committee visited Vancouver early in January.

The proposed amendment would make it clear that the federal government has the authority to allocate funds for higher education to provincial governments for current and capital grants to public and private universities, make direct grants for research, and provide scholarships, bursaries and loans to all students at post-secondary institutions.

The brief was prepared by a committee selected by the presidents or the Boards of Governors of UBC, Simon Fraser University, the University of Victoria and Notre Dame University in Nelson. UBC's Board approved the brief as official University policy on Feb. 2. (Edition of Feb. 11, 1971).

TUITION INCREASED

UBC's Board of Governors has approved increases in tuition fees for graduate students and in rates for students living in campus residences.

The basic tuition fee for students registered in the Faculty of Graduate Studies will be increased from \$300 to \$400 in the 1971-72 session.

Board-and-residence rates for students living in UBC's permanent residences will be increased by a total of \$10 a month over the next two years. The increase will be split into two equal parts — \$5 a month in 1971-72 and \$5 a month in 1972-73.

Also approved were increases in rates for students living in campus residences during the Summer Session. The increases are necessary to meet increased labor and operating costs in campus residences, which operate on a non-profit, self-sustaining basis.

The repayment of loans to build residences and the costs of operating them are met from the rents and other services charged to students living in the complexes.

The residence rate increases were discussed with the students' councils in each of the residences. The suggestion that the rate increase be spread equally over a two-year period was made by the councils and

SONGFEST SET

Fourteen UBC fraternities and sororities will take part in the annual songfest sponsored by the campus Greek letter societies in the Queen Elizabeth Theatre Friday, Feb. 26, at 8 p.m.

Proceeds from the event will go to the UBC Library Fund.

Tickets, at \$1.25 for students and \$2 for the general public, are available at two locations in the Student Union Building — a booth on the main floor open at noon hour and in room 230. Tickets are also available at the Vancouver Ticket Centre and at the door.

The annual songfest involves competition between fraternities and sororities for the Songfest Trophy. Phrateres, a campus social service organization for women, will also compete. A dance routine by UBC students will open the program.

the increase as a whole was endorsed by each of them.

The recommendation to increase fees for graduate students was made by a temporary committee established by President Walter H. Gage.

The effect of the new regulations is to change the existing fee structure for graduate students from one based on a flat charge for a specific degree to one based on payment of an annual fee as long as the student uses University facilities.

The \$100 increase for students working towards master's and doctor's degrees will apply to those students who are on campus. Those who are on extended leave for medical reasons or those not using the University facilities will pay only \$50 a year.

UBC now charges graduate students a basic \$900 for the master's and doctor's degrees. Students who are in the advanced years of their doctoral programs pay an additional fee of only \$50 a year. Under the new fee schedule all students will pay a flat fee of \$400 a year.

There was substantial disagreement among the 11 members of the committee set up to investigate graduate student fees.

Three graduate students who were members of the committee submitted a minority report dissenting from the recommendation to increase fees. The students were supported by Prof. B.N. Moyls, associate dean of Graduate Studies and chairman of the temporary committee.

The committee, in its majority report, said there was no valid rationale for establishing tuition fees for graduate students because of a lack of reliable data on the costs of various academic programs.

In addition to calling for a cost study of graduate programs, the majority report recommends that the minimum level of full-time teaching assistantships be increased and that consideration be given to establishment of a scheme of \$4,000 Dissertation Fellowships for students in the final year of doctoral programs, and calls on the Board to request an additional subsidy from the federal government for each foreign student enrolled at Canadian universities and colleges.

Prof. Moyls, in supporting the students who submitted the minority report, said increases in the cost of living, the lack of increases in financial assistance for graduate students and the impending threat of taxation of graduate awards by the federal government all tend to undermine the financial position of graduate students.

"If financial support for graduate students is not increased before student fees are increased, I am convinced that graduate students will lose out," he said. (Edition of Feb. 4, 1971).

FOUR APPOINTED

UBC's Board of Governors approved four senior appointments early in February, including a director for the newly-created Water Resources Research Centre and a head for the new Department of Radiology in the Faculty of Medicine.

The new appointments are as follows:

● Prof. Irving K. Fox, 54, a leading water resources expert at the University of Wisconsin, who will become director of UBC's Water Resources Research Centre July 1;

● Prof. J. Scott Dunbar, 51, of McGill University, who will become head of the new Department of Radiology at UBC July 1;

● Prof. Noel Hall, 41, a long-time member of the Faculty of Commerce and Business Administration, who will become director of the Institute of Industrial Relations April 1 and,

● Prof. Karl Ruppenthal, 54, who joined the UBC faculty on July 1 from Stanford University and has been named director of the Centre for Transportation Studies.

In addition, the Board has approved the appointment of Canadian-born Prof. J. Reginald Richardson, 59, professor of physics at the University of California at Los Angeles, as director of the TRIUMF Project, effective Sept. 1.

The TRIUMF accelerator now being built in UBC's south campus research area is a joint venture of the Universities of Alberta and Victoria, UBC and Simon Fraser University. It is scheduled for completion in 1973.

The new Water Resources Research Centre which Prof. Fox will head will do mission-oriented research in the field of water resources to further regional and

ISAIAH BERLIN TO LECTURE TWICE AT UBC

Sir Isaiah Berlin, one of the world's leading political and historical philosophers, will give two Dal Grauer Memorial Lectures at the University of B.C. March 1 and 2.

Described as having "one of the liveliest and most stimulating minds among contemporary philosophers," Sir Isaiah is president of Wolfson College at Oxford University in England and formerly held one of the academic world's most prestigious posts — Chichele Professor of Social and Political Theory at Oxford.

Sir Isaiah is particularly well-known for his studies of Russian political and intellectual history and both his lectures at UBC will deal with topics in this field.

On March 1 he will speak in the Frederic Wood Theatre at 12:30 p.m. on "The Russian Conception of the Writer's Calling." His March 2 lecture at the Totem Park Residences at 8:15 p.m. is entitled "Russian Obsession with History and Historicism."

Born in 1909 in Riga, Latvia, then a part of the Russian Empire, Sir Isaiah emigrated with his parents to England in 1920. In 1932, the year after he graduated from Oxford with a brilliant degree, he began lecturing at Oxford and has been associated with that institution ever since, except for service during the Second World War in New York and Washington, D.C.

Sir Isaiah is perhaps best known to the public for a number of outstanding books, including *Karl Marx: His Life and Environment*; *The Hedgehog and the Fox*, which examined the character of Leo Tolstoy, the famed Russian writer and philosopher; *Historical Inevitability*, a major contribution to the philosophy of history; and *Two Concepts of Liberty*, a plea for independence and human variety which has been compared to John Stuart Mill's famed essay *On Liberty*.

He has lectured widely in North America and made several appearances on American television. His radio talks in England have been described as "rapid, vivid, torrential cascades of rich, spontaneous, tumbling ideas and images."

national social objectives and train water resources specialists.

The work of the centre will be supported with a continuing grant of \$350,000 a year from the federal government.

The main function of the new Centre for Transportation Studies headed by Dr. Ruppenthal is to encourage and organize inter-disciplinary studies in transportation. The Centre has received a four-year, \$360,000 grant from the Canadian Transport Commission to support research. (Edition of Feb. 4, 1971).

FUND ESTABLISHED

A memorial scholarship fund has been established to honor Mrs. Alice V. Borden, assistant professor in the Faculty of Education, who died Feb. 2 after a lengthy illness.

Mrs. Borden, who was 62 at the time of her death, was the first director of UBC's Child Study Centre from 1961 to 1963, and continued to teach at the Centre up to Christmas, 1970.

The scholarship honoring Mrs. Borden will be awarded annually to a student teacher in the field of early childhood education. Contributions to the memorial fund should be sent to the Bursar's office at UBC. Cheques should be made payable to the "University of B.C. (Alice V. Borden Scholarship Fund)."

Mrs. Borden came to Canada in 1939 with her husband, Prof. Charles Borden, the noted archaeologist who has excavated numerous prehistoric Indian sites in B.C.

She was a graduate of the University of California at Los Angeles, where she received her bachelor of arts degree, and Tufts University, where she was awarded the degree of master of education.

Before her appointment to the UBC faculty in 1960, Mrs. Borden was closely associated with the former extension department in the development of pre-school education courses.

UBC ALUMNI Contact



MR. RALPH NADER

AN EVENING WITH RALPH NADER

Ralph Nader, noted American consumer affairs crusader, will be guest speaker at the May 19 annual dinner of the UBC Alumni Association.

Nader will speak on "Environmental Hazards: Man-Made and Man-Remedied."

The author of *Unsafe At Any Speed*, Mr. Nader is best known for his campaign to have cars made safer. He and his colleagues (known as "Nader's Raiders") have also campaigned on a variety of other consumer issues, from the need for improved rest homes to safer toys.

It is anticipated that about 800 UBC alumni will attend the annual meeting which will be held at 6 p.m., Wednesday, May 19, in the Hotel Vancouver. Mr. Nader will speak following the completion of annual business, including the election of the 1971-72 alumni board of management.

TICKETS, PLEASE

Please send me tickets at \$6.00

Enclosed is a cheque for \$

Name

Address

Phone Number

Mail to: Alumni Association, 6251 N.W. Marine Drive, Vancouver 8, B.C.

Co-operation Leads To Series of Courses

During this past year 30,000 adults took continuing education courses at UBC — more than the number of students enrolled in UBC's regular winter session.

Many of these adults came to UBC from communities around the province. And for many others, UBC took the courses to them in the communities where they live. It is an indication of UBC's continuing concern to reach out and serve the entire province of B.C.

Why do people take continuing education courses? "Well, 50 per cent of our students already have university degrees," says Dr. John Blaney, acting director of the Center for Continuing Education. "Wanting to learn is an appetite people never seem to satisfy."

At least 30 per cent of the continuing education students are professional people eager to keep up-to-date with new developments in their fields. And the Center for Continuing Education at UBC offers them more than 500 courses — everything from engineering, education and law to social work, forestry and community planning.

UBC's efforts in the field of continuing education began in 1936 when 512 people enrolled in courses offered by an extension department. As the developing technology of the province required that professional people learn new techniques and processes, UBC initiated more and more programs to meet these demands. The department was reorganized as the Center for Continuing Education in July, 1970, in recognition of its enlarged role.

The Center offers professional credit and non-credit courses and also undergraduate University degree courses, which are given in the evenings. By attending only night courses it is now possible to complete a bachelor of arts degree in English, Psychology, Anthropology and Sociology. The Center also offers 40 day-time, non-credit general interest courses.

TREND NOTED

"As we expand, there's a trend toward less conventional formats for our courses," says Dr. Blaney. "Industry has asked us to give on-the-job employee instruction; we design courses for individual companies; we produce a local TV show and we even offer an educational travel program."

There's even a course for new aldermen, co-sponsored by the Center and the Union of B.C. Municipalities. It lasts three days and last year attracted 110 aldermen-elect. This year's course will be held at Harrison Hot Springs Feb. 26-28 and March 19-21 and will introduce new aldermen to the organization and administration of municipal government.

Approximately half the lawyers in B.C. participated in continuing legal education programs last year. This spring, 17 law programs will be offered in Prince George, Nanaimo, Victoria, Vancouver, Kamloops, Vernon and the Kootenay district. Refresher courses for engineers are expected to get underway at the same time in central B.C., Vancouver Island and Prince George.

And this spring, the Center and the UBC Alumni Association have combined to offer a series of programs at various communities around the province.

The series begins with an evening general interest program on Feb. 24 in Kamloops. UBC history professor Donald Kubesh and political science professor Paul Tennant will discuss "The FLO and the War Measures Act" in a public meeting; fee is \$1.

On March 15 a reading and study skills course for businessmen and professional people will be launched in Chilliwack. The course will involve a three-hour

session once a week for five weeks; fee is \$60. Later, on March 23, a day-long program entitled "New Directions for Women" will be held in Prince George; fee is \$5 per person.

In early April a two-day program on "Pollution and the Environment" is planned for Trail. Selkirk College biologist Bruce Fraser and a yet-to-be appointed UBC faculty member will participate in the program. A music program with UBC music professor Cortland Hultberg is also being planned for Vernon this coming fall.

Other departments of the University also conduct continuing education classes on a regular basis.

REFRESHER COURSES

Two years ago the Department of Continuing Education in the Health Sciences was created to offer courses to graduates in the various health fields. Dentists in B.C. who previously had to travel to Alberta, Washington or Oregon for professional courses in continuing education now have 17 seminars to choose from.

The continuing medical education division is presently trying to update the knowledge of the province's established doctors by projects which range from an information bus that visits upcountry towns to a program encouraging community hospitals to run their own refresher courses. The Nursing and Pharmacy continuing education divisions are also offering an increasing number of courses to their graduates.

Three programs in adult education are given by the UBC Continuing Education Division of the Faculty of Commerce and Business Administration.

NEW IDEAS

Continued from Page Seven

Department of Information Services produces a weekly, half-hour program entitled *UBC Now*, which utilizes the specialized knowledge of faculty members for current affairs programs and documents various facets of UBC life. The program is broadcast on Tuesday at 7:30 p.m. over Channel 10 in Vancouver and affiliated cable systems in other lower mainland areas.

One of the communications channels the association is most concerned to keep open lies between the organization and the more youthful segment of its own membership.

With one-quarter of its membership under the age of 25, the association is aware that the generation gap may make itself felt within the organization.

The association's response to the needs of its young members has been the formation of The Young Alumni Club — one of the most innovative and well-received of the association's new programs.

The club began with Friday afternoon socializing at Cecil Green Park, the Alumni Association's beautiful headquarters on the campus. Membership is open to graduates and students in their graduating year.

More than 1,100 members flocked to join in the social evenings which consist of food, dancing and enthusiastic participation in elbow-bending exercises. The club is rapidly becoming a new campus tradition and has expanded this year to include Thursday evenings.

Last, but not least, among the association's new projects is the production of a new publication called *Guidelines* which will provide high school students and counsellors with a handy guide to educational opportunities available beyond high school.