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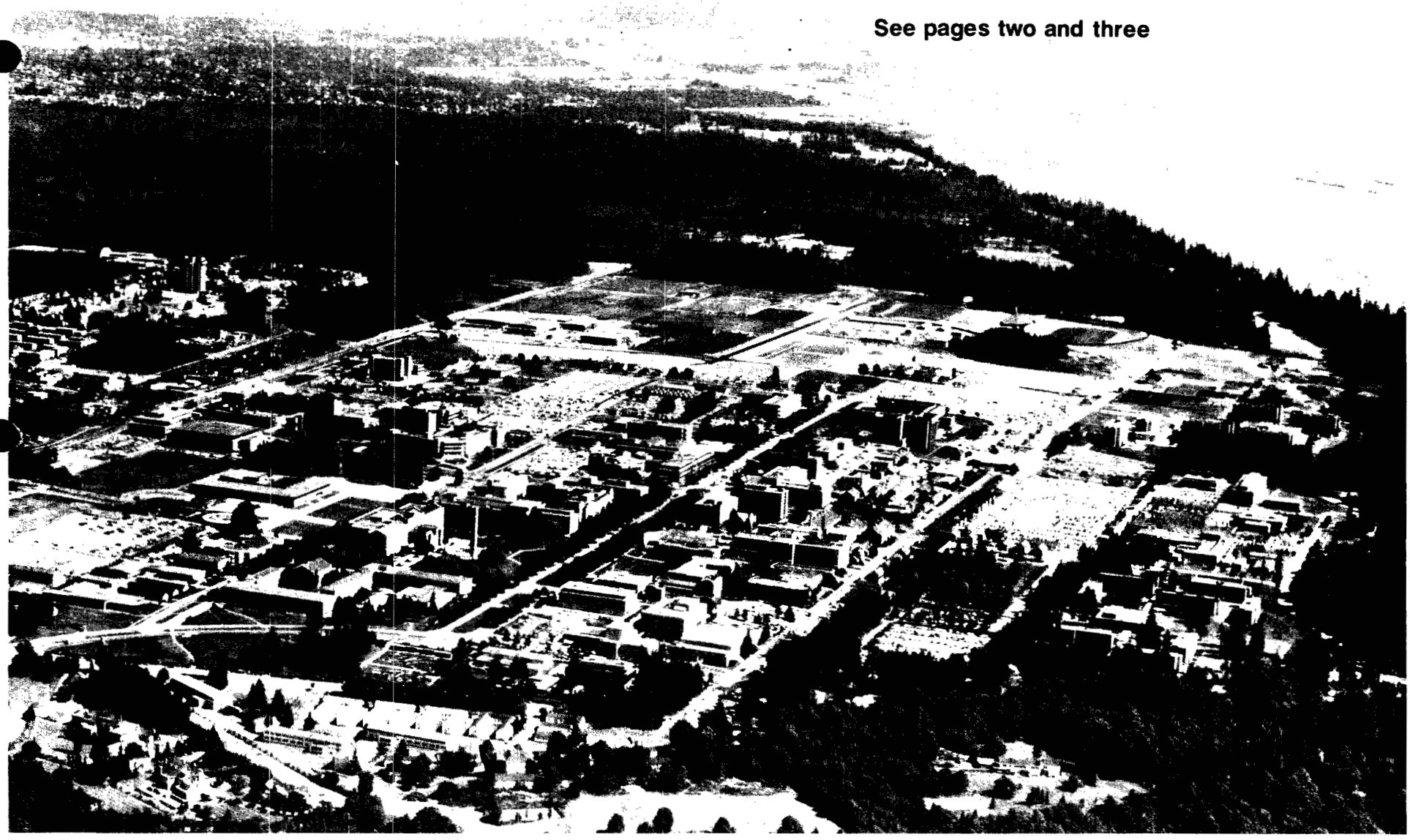
Photo by George Allen

A REPORT ON UBC's FIVE-YEAR, $71.6 MILLION CAPITAL PROGRAM

See pages two and three

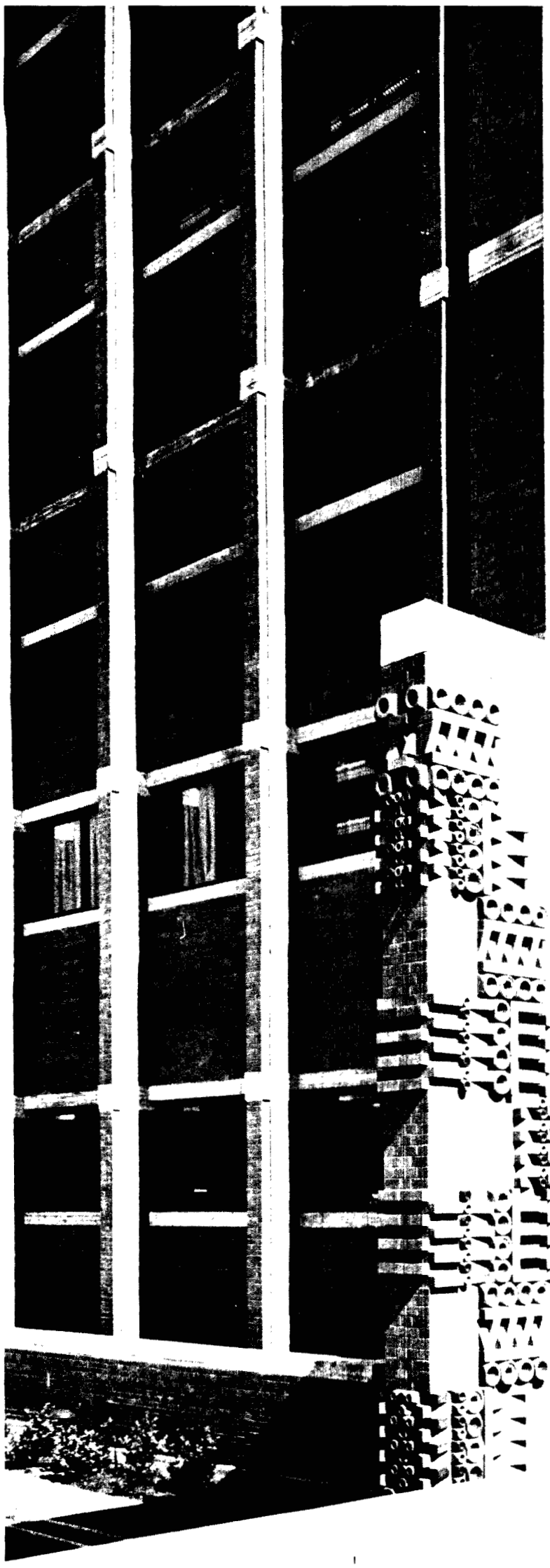


Inside this issue...

PETER THOMPSON, one of UBC's assistant information officers, reports in this issue on plans for two upcoming major projects—the Instructional Resources Centre to be built in the Health Sciences Centre and the next step in development of the Tri-University Meson Facility, or TRIUMF, the nuclear accelerator planned on the UBC campus. His reports start on pages six and seven. UBC's Board of Governors has approved plans for a huge Botanical Garden development covering a total of 77 acres. For details see page ten. And on page 12 you'll learn of plans for a survey of graduates by a commerce professor.

GRADS OF '64 WOULDN'T

Photo by B.C. Jennings



Take one UBC graduate, Class of '64, who hasn't seen the campus for five years. Give him a tour of the University in 1969 and his reaction is almost certain to be: "Everything's changed since I was here. I don't even recognize the place."

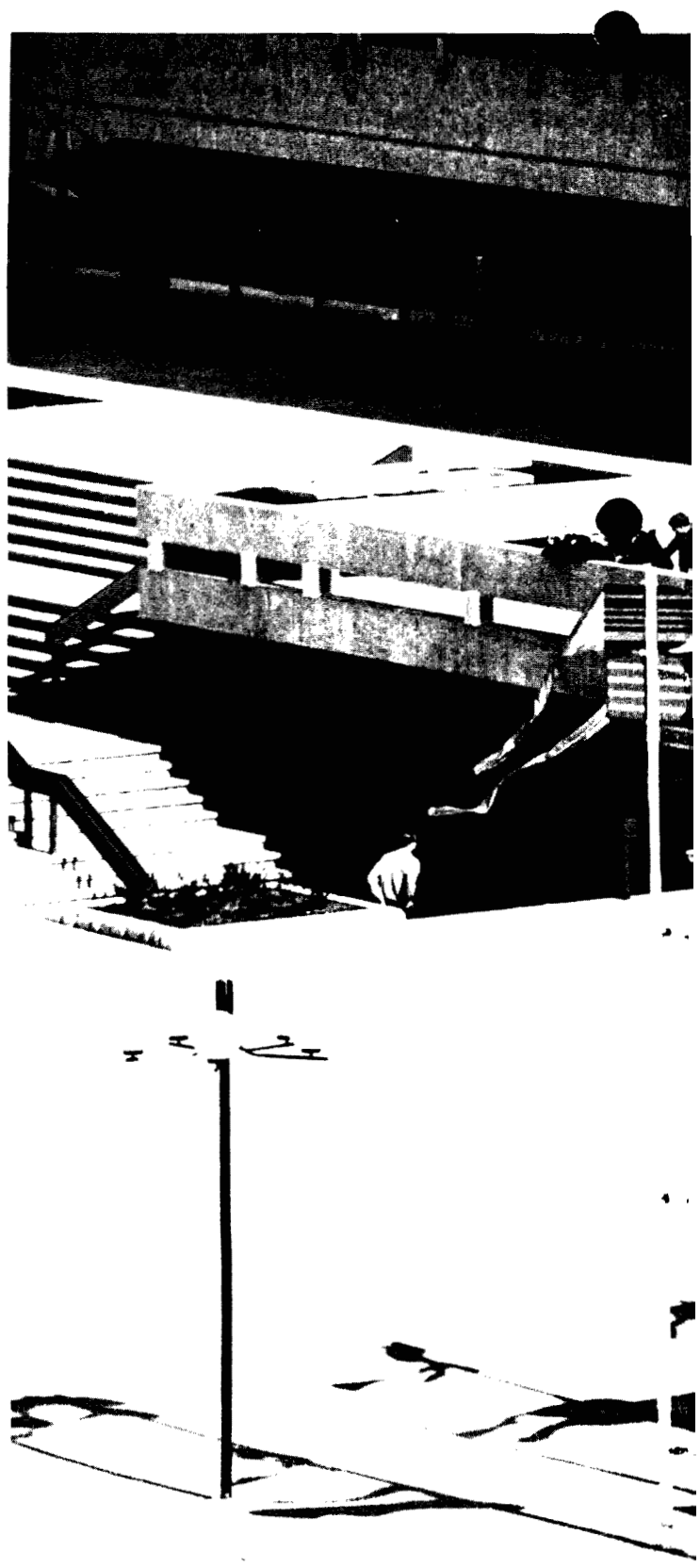
Small wonder. The expansion of the University's physical plant, to keep pace with the growth of enrolment from 15,489 in 1964 to 21,000-plus this year, has been enormous—and costly.

The two salient facts which emerge from figures released this month by the UBC bursar's office are:

—In the five years ended March 31 this year, UBC has committed $71,688,030 in new buildings and facilities; and

—This five-year expenditure represents more than two-thirds of the total investment in buildings since UBC moved to its present site in 1925. In other words, UBC

Three major construction projects completed during UBC's five-year building program are pictured on these pages. At right is the Henry Angus building for the social science departments of the arts faculty and faculty of commerce. Left is the Frank A. Forward building



KNOW THE UBC CAMPUS

Photo by Extension Graphic Arts

invested twice as much in buildings in the last five years as it did in the previous 39.

There are some other unusual features to this massive investment in campus facilities.

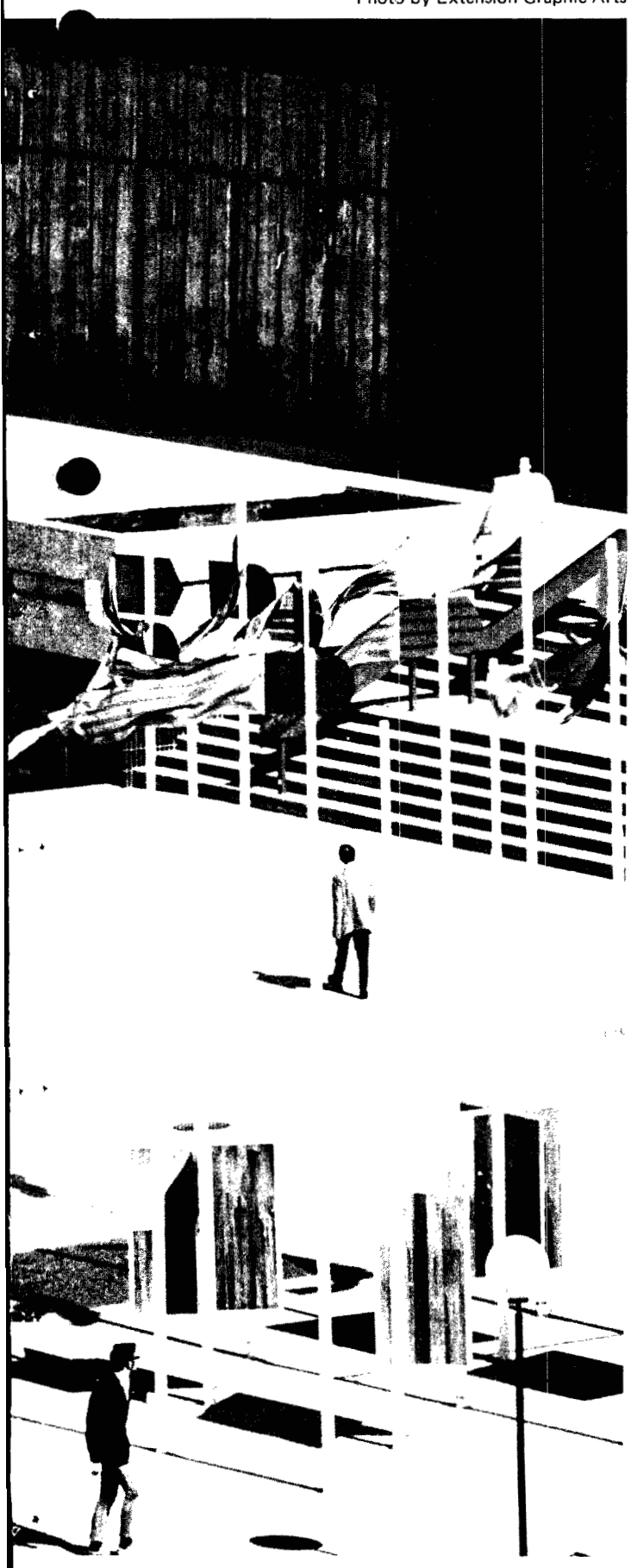
For instance, more than half the money invested in the five-year program—$37,010,377—was the result of special financing arrangements entirely outside of regular provincial government capital grants and fund drives.

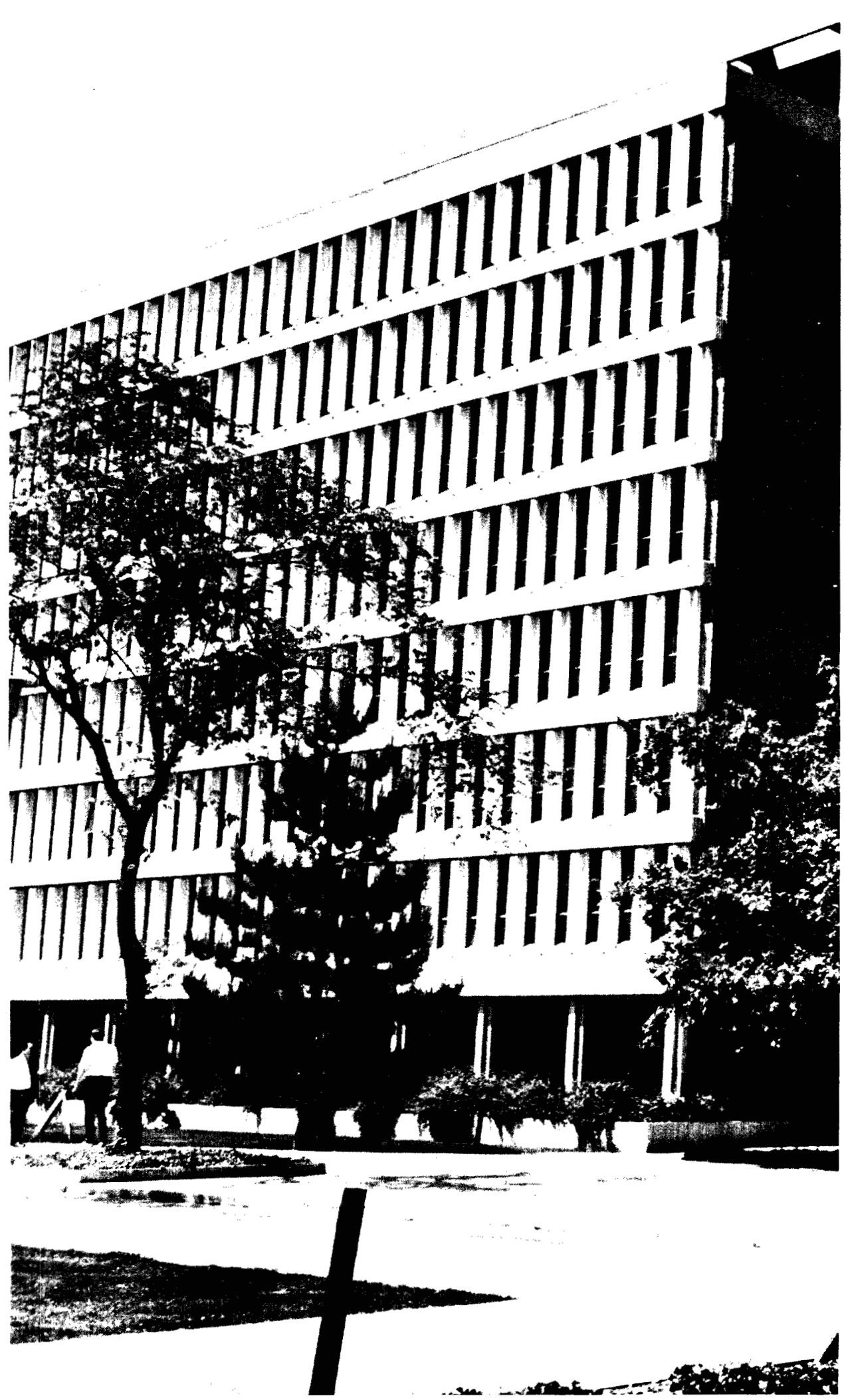
In some cases, the funds for these special projects were borrowed (e.g. for residences), the Alma Mater Society contributed more than $3.4 million toward construction of the Student Union Building and there was a massive gift of $4.1 million from Mr. P.A. Woodward earmarked for two developments in the new Health Sciences Centre—an addition to the Woodward

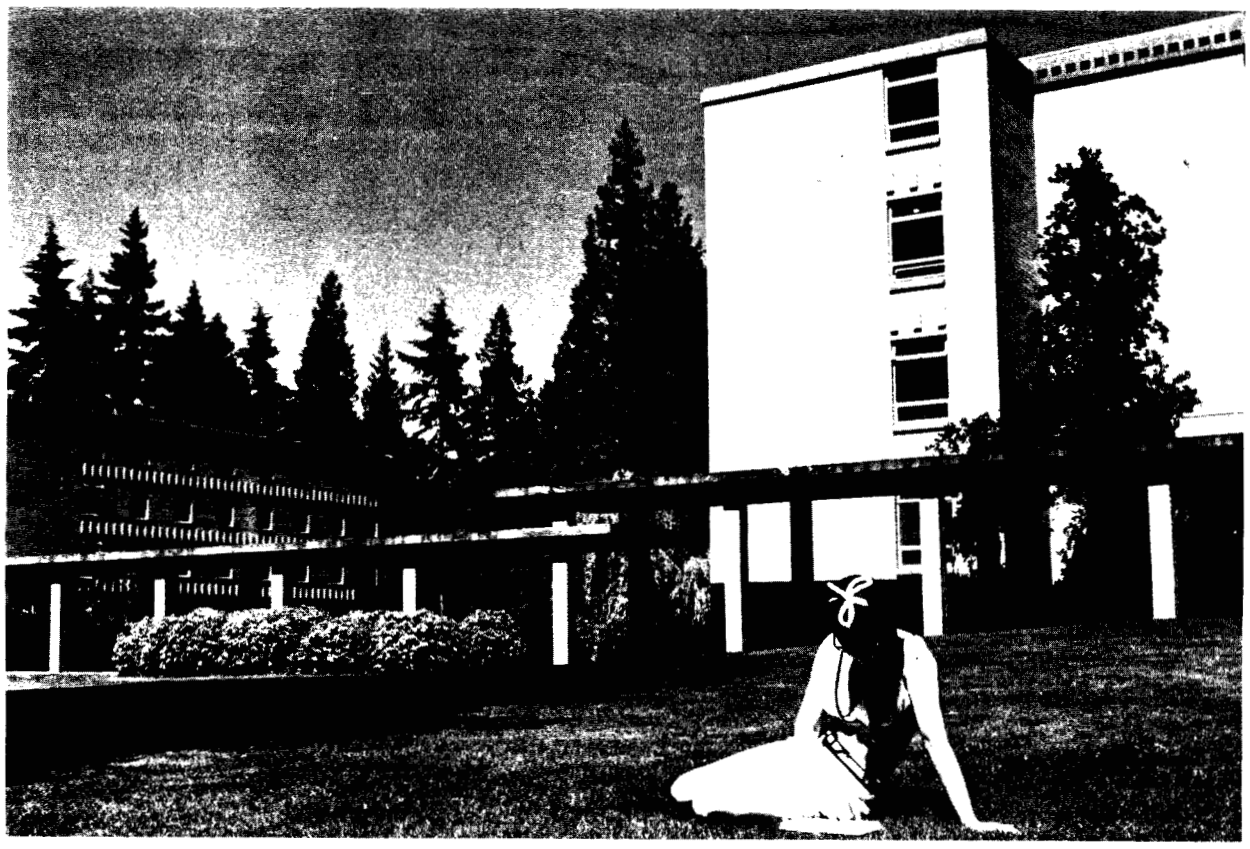
Continued on page four
See EXPANSION

for metallurgy, one of several units in a new applied science complex under construction. Several other units in the complex had to be postponed because of a shortfall in funds. Below is the Student Union building, constructed with student and University funds.

Photo by Extension Graphic Arts







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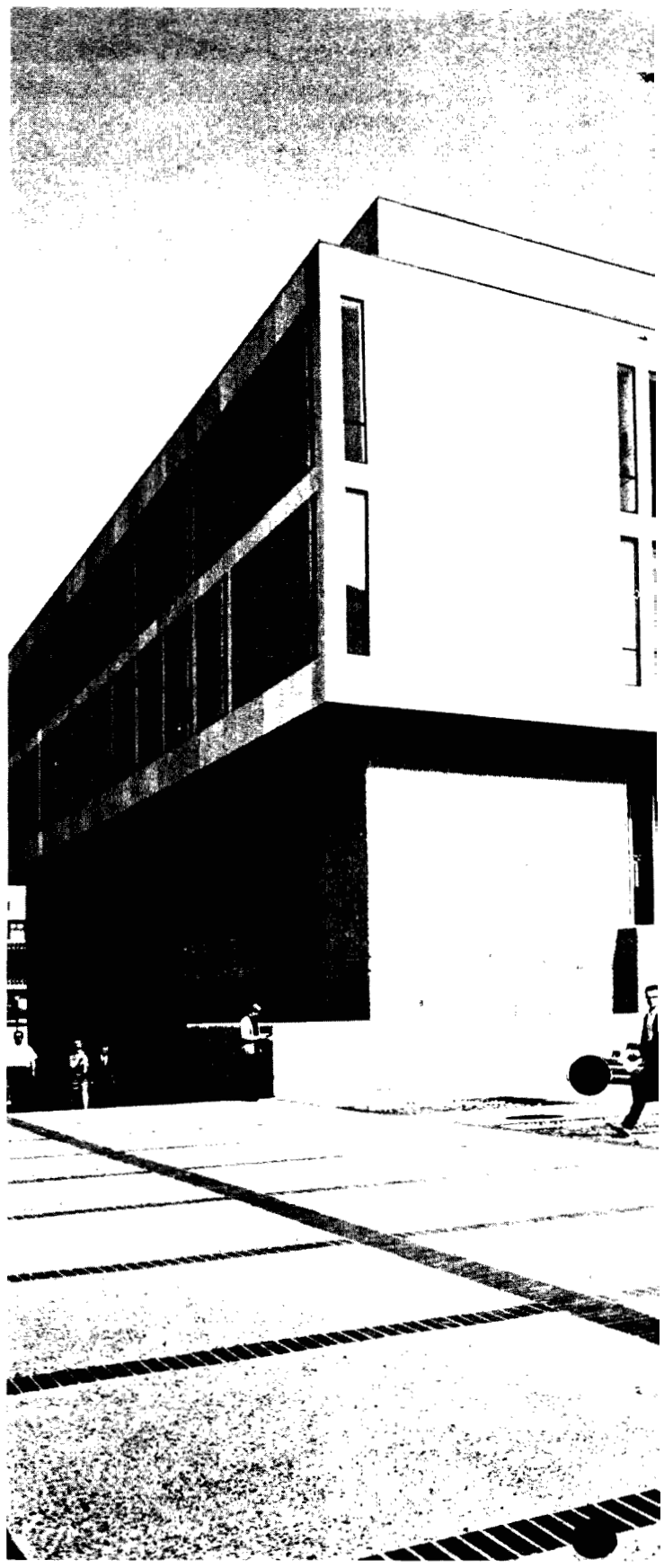


Two projects which escalated in cost during UBC's five-year capital development program were the Music building, above, and the John Barfoot Macdonald building for dentistry at top right. Both projects

Source of Funds for UBC's Five-year Capital Program

April 1, 1964 to March 31, 1969

	CAPITAL FUND GOALS 1964–1969	ACTUAL RECEIPTS FROM ALL SOURCES	
Province of British Columbia			
Capital grant 1964–69	$18,000,000	$19,000,000	
Capital grant 1969–70		1,892,772	
Fisheries Storage Building		8,000	
B.C. Hospital Insurance		3,878,703	$24,779,475
Government of Canada			
Health Resources Fund		$ 6,872,158	
The Canada Council	908,206	1,100,911	
Department of Health and Welfare	113,000	128,781	
Atomic Energy Control Board		632,350	8,734,200
Three Universities Capital Fund			
– General	11,760,000	$ 8,005,332	
– Designated		410,000	8,415,332
U.B.C. Development Fund	1,018,794		1,029,935
Bank of Montreal – prepaid rent and bank loan – General Services (Administration) Building			1,947,623
Mr. P.A. Woodward			4,177,527
Alma Mater Society for new SUB			3,424,940
Thunderbird Winter Sports Centre for addition to Centre			997,364
Faculty Club Membership for Club addition			723,822
Killam General Fund Income for education gymnasia			781,374
District 5 Association of Kinsmen Clubs for Health Sciences Center			121,260
Armoury Rental Fund for education gymnasia			83,201
British Columbia & Yukon division of The Canadian Cancer Society for Cancer Research Institute			50,000
College of Dental Surgeons of British Columbia for dentistry research lab			50,000
The Children's Rehabilitation and Cerebral Palsy Association for Health Sciences Center			18,703
Cecil Green for purchase and renovation of Cecil Green Park			228,365
University – Research Forest reserve		$ 100,000	
– General revenues		2,176,060	2,276,060
Ancillary Enterprises – Operating margins, CM&HC and Bank loans			13,762,332
Various other funds			86,517
	$31,800,000		$71,688,030

EXPANSION *Continued from page 3*

Biomedical Library and the new Instructional Resources Centre (see pages six and seven).

In addition, UBC came within a hairsbreadth of meeting the five-year capital fund goal of $31,800,000, which it set in 1964 when the Three Universities Capital Fund was announced. Actual expenditures totalled $31,688,560.

To reach this goal UBC anticipated it would get $18,000,000 from the provincial government, just over a million from the Canada Council and federal department of health and welfare, $11,600,000 from the Three Universities Capital Fund and $1,018,794 from the UBC Development Fund, the capital drive which began in 1958.

The Three Universities Capital Fund, a joint appeal by UBC, Simon Fraser University and the University of Victoria, aimed at raising $28,000,000, with UBC to recieve $11,760,000, or 42 per cent of the total.

UBC actually got $8,415,332, or about $3,500,000 less than it anticipated from the appeal and an unprecedented increase in construction costs during the five-year period caused some significant deviations from the original objectives of the capital program.

For instance, only a portion of the expansions planned for the biological sciences and the engineering complex were able to proceed.

On the other hand, funds became available from other sources which enabled UBC to spend more money

Photo by B.C. Jennings

increased in cost because funds became available from other sources after the construction program started. At top left is a student residence complex, an example of a project for which the university borrowed funds.

on some projects or undertake other developments which were not anticipated when the five-year capital program was announced.

Two major projects which were increased in scope were the music building and the John Barfoot Macdonald dentistry building, a development which also involved additions to the adjacent basic health sciences buildings.

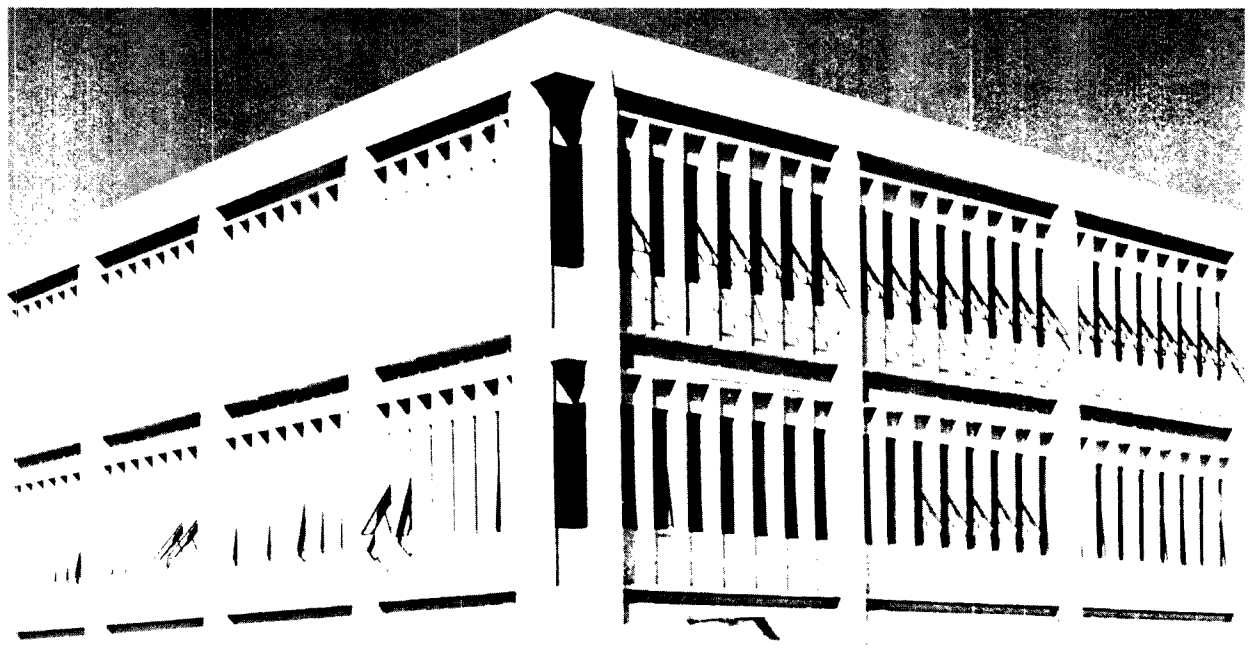
Expenditures on the music building, for instance, rose from $1.5 to $2.5 million because of the availability of grants from the Canada Council and the increase in construction costs.

Similarly, the cost of the Macdonald building and additions to the basic medical sciences buildings escalated from $4,229,000 to $5,984,127 because of the establishment of the federal government's Health Resources Fund, which contributed under its program of assisting Canadian health sciences developments.

In addition, there were a number of building projects totalling $2,728,735 which had to be undertaken during this same five-year period but which were not in the plan originally drawn up.

The largest of these was the Thunderbird Stadium, which cost $1,236,188. The stadium project had to proceed because the old East Mall Stadium was demolished when construction of the new Student Union Building began.

Other projects not anticipated in the original plan were alterations and additions to UBC's computing center ($430,280) and alterations to Brock Hall to convert it to study space ($161,240).



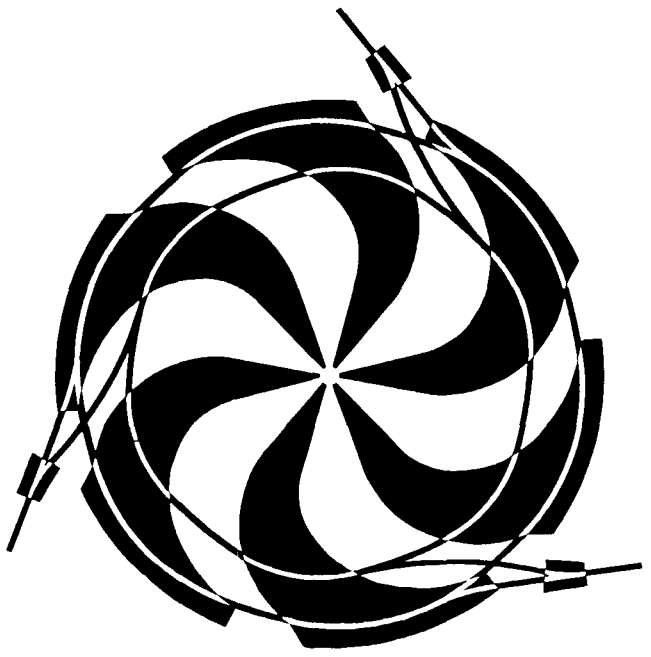
Stated Goals and Actual Expenditures during UBC's Five-year Capital Program

April 1, 1964 to March 31, 1969

STATED OBJECTIVES	CAPITAL FUND GOALS 1964—1969	ACTUAL EXPENDITURES	
Agricultural field development	$ 500,000		$ 522,983
Biological Sciences (Including Oceanography and Fisheries)	6,000,000		
Fisheries Storage Building		$ 17,999	
Planning Total Complex		445,822	
Portable accommodation		223,101	
West wing		2,982,452	3,669,374
Commerce and Social Sciences — Henry Angus building	2,538,000		2,852,374
Dentistry, including expansion of basic medical sciences	4,229,000		5,984,127
Education additions	900,000		900,000
Engineering complex	5,930,000		
Planning common block, Civil and Mechanical Engineering Buildings		$ 532,630	
Civil Engineering Structural Testing Laboratory		326,110	
Mechanical Engineering Annex alterations		10,000	
Metallurgy — Frank A. Forward building		2,664,586	3,533,326
Forestry—Agriculture	3,427,000		
H.R. MacMillan building		$5,065,534	
Agronomy Barn conversion		54,161	5,119,695
Geophysics and Geology — Alterations to BCRC building	125,000		134,000
Library — Completion of stacks and reading space	972,000		978,338
Mathematics, Geology and Geography — Alterations to Agriculture & Forestry buildings	50,000		72,917
Music	1,585,000		2,587,444
Physical Education and Recreation	250,000		
Armoury conversion		$ 47,215	
Field development		216,951	264,166
*Social Work	525,000		58,342
General services and campus development (includes initial expenditure on steam plant addition, including boiler)	4,769,000		5,510,270
			$32,187,356
Less expenditures on projects prior to April 1, 1964			498,796
	$31,800,000		$31,688,560

*Graham house was renovated for social work rather than build new facilities.

A CYCLOTRON CALLED TRIUMF



. . . is now under construction on the UBC campus to serve the research needs of scientists at four western Canadian universities. In addition to probing the basic structure of matter the machine could mean cheaper nuclear power, more effective therapy for victims of cancer and a boost for development of secondary industry on B.C.'s lower mainland. Assistant information officer PETER THOMPSON describes the facility in the article which begins below.

The atom, whose very name implies something unimaginably small, is too big for one area of study.

Two decades ago atomic physics was a single discipline. Scientists studying particles smaller than atoms were known as nuclear physicists. The machines they used were colloquially called "atom smashers", a term which has joined the limbo of things past and has something of the eagerness and embarrassment of adolescence about it today.

Nuclear physicists are concerned with the atomic nucleus. But about 10 years ago a new breed of atomic physicist became interested in the behaviour of individual components of the atom instead of a large group of particles like the nucleus. These "particle" physicists have had to use machines of higher and higher energies in trying to chase down the fundamental pieces of matter. Their machines form the second generation of cyclotrons. They are so expensive that only the wealthiest of nations can afford to build them.

Now cyclotron technology has advanced to the point where nuclear physicists are able to build a third generation of machines with energy levels midway between first generation machines and the very high energy machines used in particle physics. Technology has also reduced the cost so that Canada will be among the first countries in the world with one of the machines.

MAGNET CONTRACT

Early this month a contract worth about $3 million will be given to a Canadian company to build the 4,200-ton magnet for the TRIUMF accelerator at the University of B.C.

TRIUMF will produce high-energy protons and secondary sub-atomic particles called mesons. Atoms are arranged very much like a solar system. Neutrons and positively-charged protons make up the nucleus at the centre. Electrons carrying a negative charge orbit around the nucleus in much the same way as the earth revolves around the sun. It is through mesons that strong nuclear forces hold protons and neutrons together. This is the very subject third generation machines will investigate and for that reason they are called meson factories.

Three other meson factories are planned at this time. A $56-million machine is being built at Los Alamos, New Mexico. It is a linear accelerator 1,800 feet long which will operate in the 800 million electron volt range, the highest of all meson factories now contemplated but much lower than the billion electron volt second generation machines.

Russia plans to shut down an existing machine at Dubna in 1972 to convert it to a meson factory with an upward limit of 680 million electron volts. Switzerland is building a $22-million machine near Zurich. Its upper energy range will be 600 million electron volts. Like TRIUMF, the Swiss machine is a cyclotron.

Basically all cyclotrons are the same. Low-energy, electrically-charged particles are injected into the centre of the cyclotron between two poles of an enormous magnet. The magnetic field causes the particles to orbit around the centre of the magnet. An electric field boosts the energy level of the particles as they orbit so that with each boost they travel in a wider circle until they reach the outer edge of the machine with a much higher energy level than when they entered the cyclotron. Particles extracted from the machine are passed through experimental devices.

There are two other cyclotrons in Canada at the University of Manitoba and McGill University. Both are first generation machines.

TRIUMF UNIQUE

TRIUMF's 4,200-ton magnet will guide negative hydrogen ions along a pre-determined path until their energies are built up to 500 million electron volts. Negative hydrogen ions are formed by adding an electron to a hydrogen atom instead of removing the hydrogen atom's sole electron to leave a proton as in more conventional cyclotrons.

What makes TRIUMF unique is the design of the magnet and the use of negative hydrogen ions. The magnet will consist of six spiral-shaped sectors, each divided into upper and lower pieces or poles.

Before engineers could put any design details down on paper they had to find out what factors could limit its size and the weight of the 1,050 low-carbon steel plates which will make up the magnet. The plates will be three, five or 10 inches in thickness and will vary from one foot to more than 31 feet in length.

The capacity of the world's largest steel mills were investigated. After determining the upward production and machining limits, engineers also checked out transportation systems to see if the components could be brought to the site. About 10 per cent of the value of the contract will go towards transportation costs from eastern Canada. Six companies submitted bids: Marine Industries; Dominion Bridge; and Vickers, all of Montreal; and General Electric of Toronto; Canadian Westinghouse of Hamilton; and Davies of Levis, Quebec.

First known restriction on the weight of individual sub-assemblies was the projected lifting capacity of 100 tons at the site. So each of the sections making up the six 700-ton sectors will have to be within the 100-ton limit.

FLEXIBLE DESIGN

Designers also considered the economic advantages of the various manufacturing alternatives. And the design also had to take into account possible future modifications to capitalize on advancing cyclotron technology.

Negative hydrogen ions will be injected into the centre of the cyclotron between the two poles. The magnet will hold the particles in orbit while a radio-frequency power source boosts their power level. Each boost will increase the orbital radius.

Please turn to page eight
See TRIUMF

TV TUBE AIDS HEALTH PROFESSIONS

Assistant Information Officer Peter Thompson describes the new Instructional Resources Centre which will be constructed in the UBC Health Sciences Centre at UBC next year. One of the chief aims of the ultra-modern facility is to cut off spiralling medical costs. To accomplish this medical instruction is turning to technology and economies of scale.

The television tube is becoming as necessary to medical instruction as the test tube has been to medical research. Faced with the problems of producing more health professionals with a limited amount of staff and of trying to explain rarer and more complex diseases, medical schools are turning to audio-visual teaching aids and are grouping their instructional resources around electronic teaching hardware.

Canada has one doctor for every 825 people. Twenty other nations have more favorable doctor-per-capita ratios. Just to maintain our present ratio we need to graduate 1,300 doctors a year. But Canadian medical schools are graduating only 870 a year. And the same short supply problem exists for 26 other health professions.

Scarcer even than graduates in the health sciences are qualified teachers. Society can turn out an instant university when hard pressed. It's more difficult to produce an instant lecturer in pathology or anatomy.

And medical research is forever finding cures for "incurable" diseases. The treatments are often sophisticated and require a group of health science professionals. The cause of some of the more complex diseases could be dealt with in a traditional lecture. But the effect of the disease on the patient, say in the way the victim walks, can't be described adequately in words and diagrams. It must be seen.

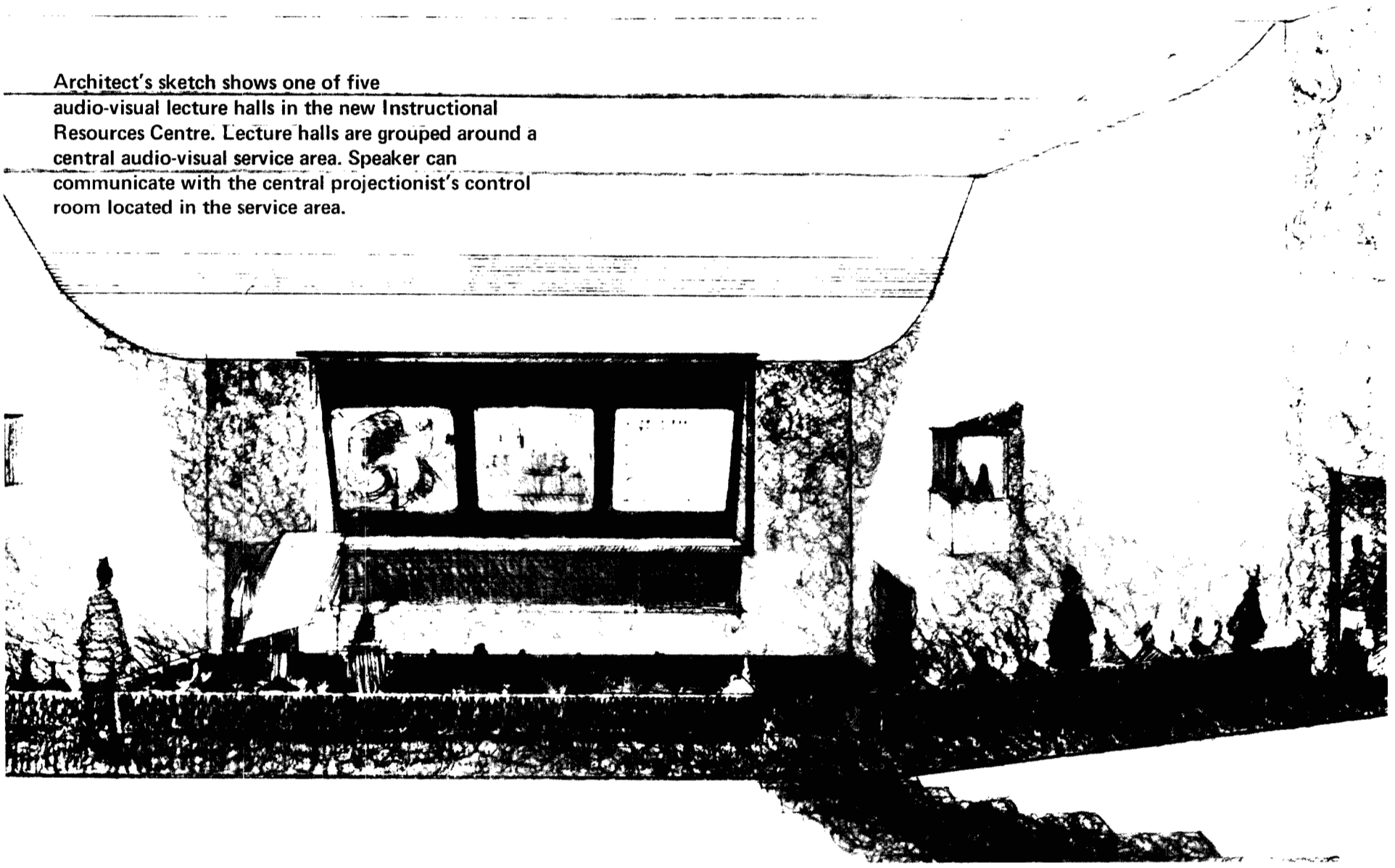
THERAPY TOOL

TV is particularly useful in psychiatric training. The psychiatric condition only comes out in the patient's behavior and this is better seen than described in print. Video tape is also useful as a therapeutic tool. In some psychiatric and hearing and speech defect cases, patients benefit from being able to watch themselves on film.

These reasons are behind the $250,000 worth of audio-visual equipment which will be installed in the P.A. Woodward Instructional Resources Centre which will be built at the University of B.C. early in 1970. The $3.75-million building will be the keystone structure in the $80-million Health Sciences Centre complex now half completed at the University.

The 115,000-square-foot IRC will be located at the centre of the complex of buildings which has been taking shape over the past decade. It will also be central to the whole concept behind the complex designed to integrate and provide continuing education in the health sciences.

The IRC will concentrate the health sciences teaching resources at the University between the buildings where the basic sciences are studied—the



Architect's sketch shows one of five audio-visual lecture halls in the new Instructional Resources Centre. Lecture halls are grouped around a central audio-visual service area. Speaker can communicate with the central projectionist's control room located in the service area.

existing Wesbrook and pharmacy building and the three basic science buildings—and the buildings where medical knowledge is applied—the dentistry building, the existing 60-bed psychiatric unit opened last spring and the future 350-bed teaching hospital tower.

LINK BUILDINGS

The IRC will connect both the hospital tower and the custodian of medical knowledge, the P.A. Woodward Biomedical Library, now under expansion to double its size. When completed, the library will have a capacity of 200,000 volumes and 1,000 study places. It will become an integral part of the IRC, which will seat another 1,580 students.

And at the very core of the six-storey IRC will be more than 30,000 square feet on the basement floor housing the audio-visual facilities. This area covers nearly 28 per cent of the entire building and includes five lecture halls, ten seminar rooms, administrative offices and a mechanical floor. Motion pictures, video tapes, slides and drawings produced in this area will be shown in the lecture halls.

The plan for the audio-visual basement area came out of a field trip by Health Sciences Centre staff to institutions in the United States where electronic techniques are becoming common teaching tools. Design consultant was Philips Electronics Industries Ltd. The audio-visual facility will be run by the Faculty of Medicine's department of medical illustration.

"We're one of the first two health science instructional resources centres of many now being planned across the U.S." said Mr. Victor Doray, medical illustrations director. "The other is at the University of California at San Diego. But they're off on a different kick and their philosophy is quite different. So for once we're among the first."

Mr. Doray said that when the Health Sciences Centre staff began looking for examples of instructional resources centres applied to the health sciences they found themselves alone.

LONELY PLACE

"There was a certain amount of discomfort. It's a lonely place sticking your neck out. Many of our examples came from newer junior colleges in the midwest of the U.S. which had to go audio-visual because they couldn't get decent faculty. It's curious that when they did build up the colleges and faculties to the point of being able to do traditional-type lectures, the students wouldn't have it. They had become used to audio-visual instruction."

The IRC will have one 500-seat hall, two 100-seat and two 135-seat halls. Design allows for the future addition of three more halls seating 75, 100 and 200 students respectively. The halls will be grouped together around the perimeter of the audio-visual area so they can be served from one central projection core. Each hall will be equipped with rear projection screens. Images will be projected from behind the screen in front of the audience as opposed to conventional projection from behind the audience.

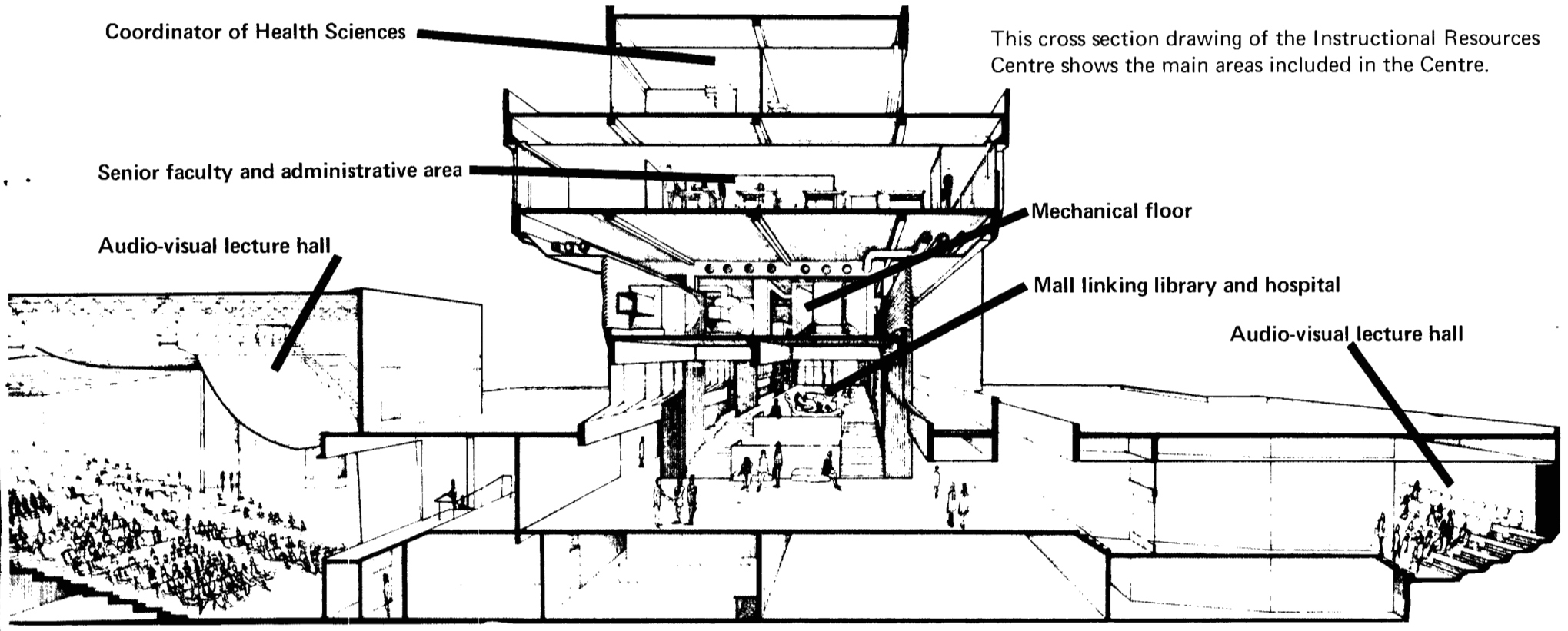
TAKE NOTES

Rear projection—an adaptation of TV projection—will allow enough lighting in the halls for the students to read or take notes. The halls will also have small conventional front projection booths for standard projection and so television cameras can record special lecturers on video tape for future use or immediate transmission to audiences in other halls.

The front of the halls will be connected to the audio-visual area so that technical staff will be able to service the rear projection chamber easily. Patient

Continued on page nine

See UBC PIONEERS



This cross section drawing of the Instructional Resources Centre shows the main areas included in the Centre.

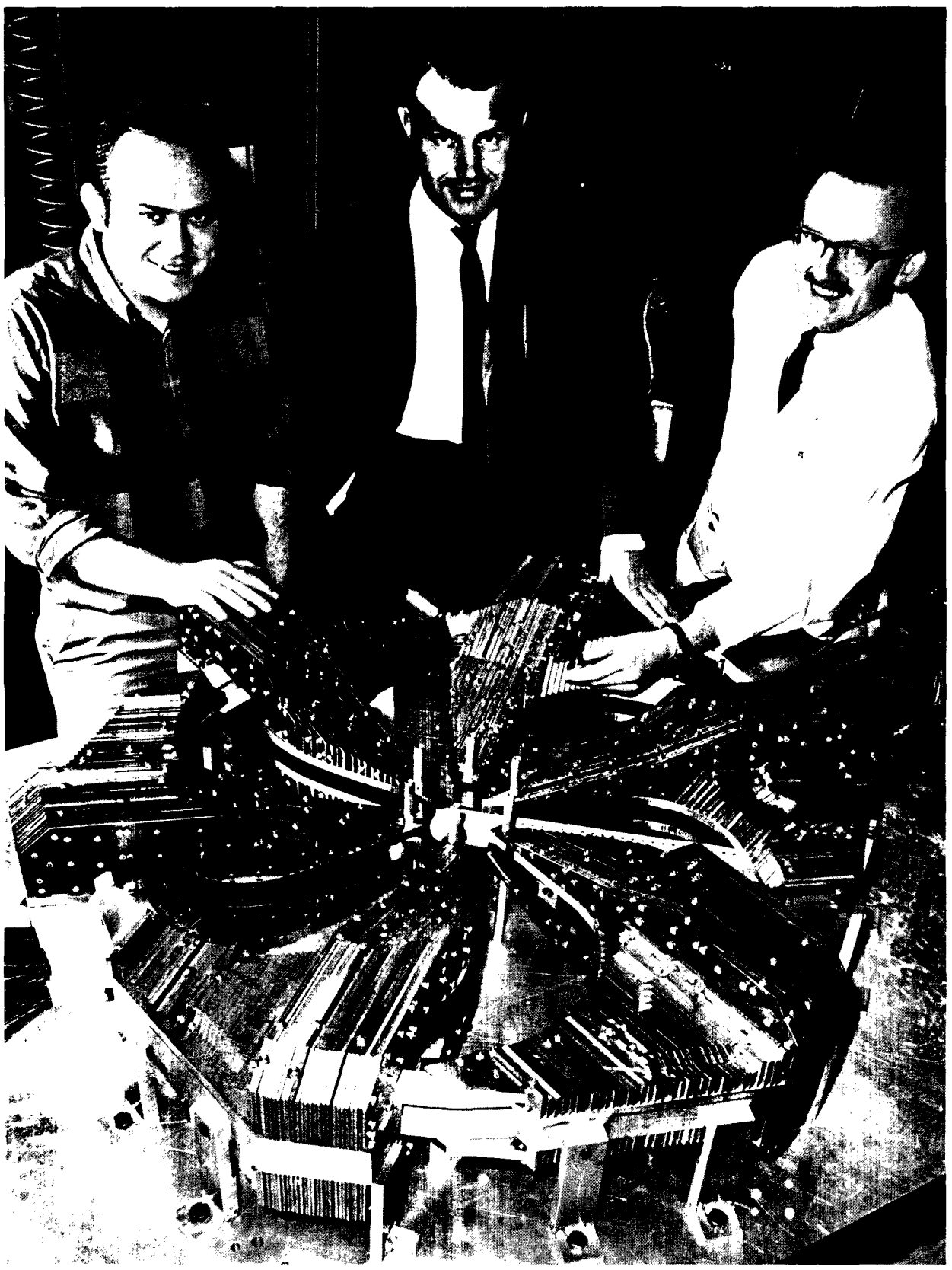


Photo by Extension Graphic Arts

THREE MEMBERS of the TRIUMF staff involved in the design of the powerful magnet at the heart of the nuclear accelerator are shown above. Magnet model shown is 20 times smaller than the full-sized magnet which will be used in the first experiments early in 1973. TRIUMF personnel are, left to right, Mr. Nick Rehlinger, magnet technician; Mr. Alan J. Otter, magnet engineer and Dr. Ed Auld, leader of the magnet design group.

TRIUMF *Continued from page six*

Each ion will gain 400 kilo electron volts of energy per revolution. It will take a minimum of 1,250 turns or revolutions for an ion to reach an energy level of 500 million electron volts at the outer edge of the magnet. While spinning out from the centre to the outer edge, each ion will travel 25 miles in the machine.

A focusing force will be required to keep the ions from leaving the horizontal plane and bumping into the top or bottom of the cyclotron chamber. If the ions did this, the cyclotron would become contaminated with radio-activity. This is where the magnet comes in. The spiral shape of the sectors and the spaces between them will focus the ions in the horizontal plane. Energizing the magnet will be two aluminum water-cooled coils which will run on 2.5 megawatts of direct current power.

REVERSE CHARGE

Since the direction in which charged particles circle in a magnetic field depends on their charge, the easiest way of extracting the ions from the cyclotron will be to reverse their charge. Two electrons will be stripped from each ion as it passes through a metal foil about 1/1,000-of-one-inch thick, changing it to a proton and causing it to swerve out of orbit and out of the machine.

The stripping foil can be moved from the extreme edge of the magnet towards the centre. In this way protons with energies from 150 million electron volts to 500 million electron volts will be deflected from the cyclotron, depending on the distance of the stripping foil from the centre. Scientists will also be able to extract more than one beam of protons by placing several foils in the path of the ions. This multi-beam feature is unique to negative hydrogen ion cyclotrons.

PROTON BEAM

Approximately 95 per cent of the ions put into the machine will be successfully extracted. The extraction efficiency of conventional cyclotrons is less than 70 per cent because they use protons whose charge can't easily be reversed. Since many of the particles in conventional cyclotrons penetrate the walls, the intensity of the particles travelling through the cyclotron is limited to avoid dangerous levels of radio-activity. TRIUMF's extracted proton beam will have five times the energy of McGill's and 1,000 times the intensity.

The negative hydrogen ions will spin around in a vacuum. Providing the vacuum will be a stainless steel tank 56 feet in diameter which will fit into the 20.8-inch gap between the magnet's upper and lower poles.

The tank will be subject to an atmospheric load of about 2,700 tons. The load will be supported by a total of 664 tie rods from an overhead steel support structure and the concrete floor of the vault so that the tank won't collapse under the pressure of the atmosphere.

Holding up the support structure will be 12 columns around the edge of the cyclotron and a hollow post in the centre. Jacks on the top of the 12 columns will lift the upper half of the vacuum tank and magnet three feet so that maintenance can be done inside.

The 12 columns are designed to act as a spring in the event of an earthquake. This will allow the machine to remain relatively stationary while the earth moves beneath it and prevents high loads or stresses in the cyclotron's structure.

Support columns will remain safely below the yield stress during the maximum probable earthquake. When the earthquake is over, the designers expect, the cyclotron will simply return to its original alignment.

Normal design practices would have allowed for some permanent deformation of support columns during an earthquake. The spring-type support system will cost very little extra to build and eliminates the possible cost of realigning and repairing the columns if an earthquake does occur.

Experimental areas where the beams will be intercepted will be adjacent to the cyclotron proper and the entire vault will be covered on the sides and above by concrete walls 16 feet thick. The roof will be formed from concrete span beams 100 feet long. Each beam will weigh 90 tons. They will be mounted in three staggered layers so that the span beams can be removed, stacked and replaced over the vault.

STAFF MOVES

The vault will be located 30 feet underground. Main reason for this is that earth fill is a cheap biological shielding for personnel in the area. Soils tests for the cyclotron vault are underway.

Early in October TRIUMF staff moved into a 19,000-square-foot building located 50 feet from where the cyclotron structure will be built. Administrative offices, laboratories and workshops are included in the building. It was built by Stevenson Construction for $520,000.

Participating in TRIUMF are the University of Alberta, the University of Victoria, Simon Fraser University and the University of B.C. The three B.C. universities will provide the $4.4 million necessary to build the TRIUMF buildings. Ottawa will cover the $23.3-million capital costs for the accelerator, ancillary equipment, beam transport system, moveable shielding and experimental facilities.

The University of Alberta is contributing $250,000 a year for the next five years. The federal government will also supply the $4 million per year necessary to operate the facility.

Though the project is aimed at basic rather than applied research, probable benefits from TRIUMF experiments will be cheaper nuclear power and advances in cancer therapy. Negative mesons have a large potential for radio therapy. Unlike x-rays or Cobalt 60 rays, their energy can be released only where wanted. This means that a cancerous tissue can be destroyed by a negative meson beam without also destroying the healthy tissue in the path of the beam.

Negative pi mesons are not only more exact than X-rays or Cobalt 60 rays, they could also be more efficient. There are two types of cancer tissues. The cells of one receive a good supply of oxygen. The other is anoxic. It's cells have an oxygen deficiency.

X-rays and gamma rays produced by Cobalt 60 are 100 per cent effective against well-oxygenated cells but only 40 per cent efficient with anoxic cancer tissue. It's hoped that negative pi mesons will be highly effective in destroying both.

TRIUMF could also act as an economic nucleus around which new industries may cluster in the Lower Mainland. This pattern has already occurred in Florida and California around space and aeronautical research organizations.

The potential new industries would have a high technological input and would be capital-intensive, perhaps the ideal type of secondary industry the province could attract.

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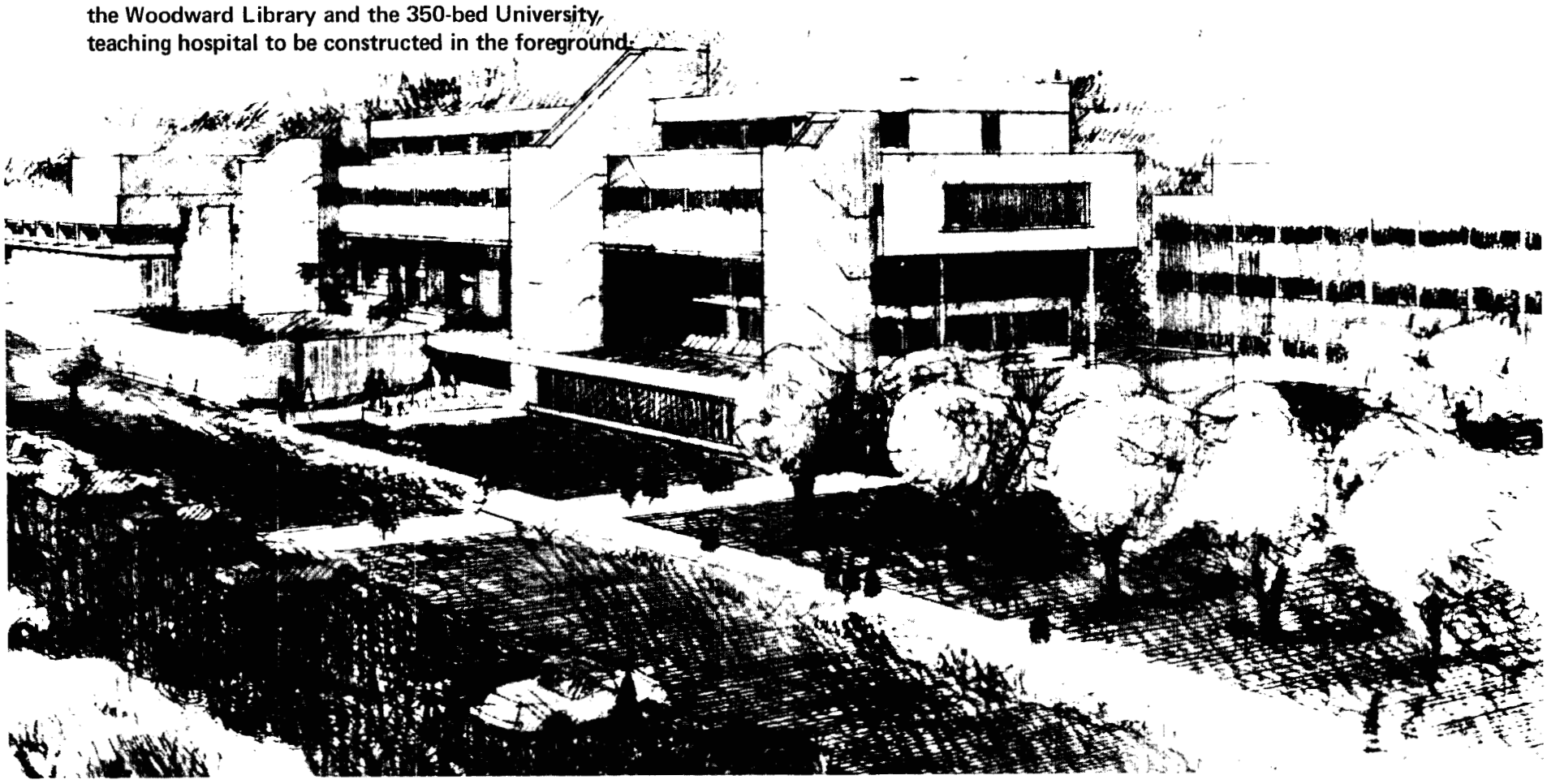
Architect's sketch shows how the new Instructional Resources Centre will fit in to UBC's Health Sciences Centre complex. At far left is the Woodward Biomedical Library, now being doubled in size. IRC will be linked with the Woodward Library and the 350-bed University teaching hospital to be constructed in the foreground.



CONTINUED FROM PAGE SEVEN

UBC PIONEERS CONTINUING EDUCATION

dressing and washroom facilities will also be at the front of the halls. This arrangement makes it easier for people involved in the presentation to get to the working area of the halls and it minimizes the length of expensive transmission cables from the central control area to the rear projectors.

Podiums at the front of the halls will have control panels for operating slide and movie projectors, and adjusting screen height and lighting and sound levels. A hand-held control system will allow the lecturer to walk around the hall while working.

SEMINAR ROOMS

The 10 seminar rooms on the basement and ground floor will each seat 20 students and one lecturer. Some of the rooms will be designed to double up by opening folding doors and most will be equipped with rear and front screen projectors as well as overhead projectors and TV monitors and chalkboards.

The central projectionist's control room will monitor sound levels in the various halls and have telephone or intercom communications with the lecturer. Most of the projectionist's time will be spent loading cassettes and maintaining equipment.

This area will have splicing equipment for 16 mm and Super 8 mm film, editing equipment for 35 mm slides, signal generators, tube testers, transistors and diode testers and replacement parts.

There will also be an area for a library of audio-visual material; a motion picture preview room; lecture preparation booths where teachers can put together lectures; projector and audio-visual loan-out rooms; a medical art area where drawings, graphs, motion picture animation, lettering and three dimensional wax models will be produced; photographic studios and darkrooms; waiting and changing areas for patients; a TV studio and mobile equipment depot and TV script and storage rooms.

Audio-visual facilities will be as flexible as possible to avoid future obsolescence. The sloping floors in the halls are designed so that they can easily be removed and the halls converted into two rooms one on top of the other. About 4,500 square feet of the basement will be unfurnished, set aside for future developments in audio-visual technology.

Mr. Doray said he is in constant contact with hospitals, universities and institutions in the U.S. which are planning instructional resources centres and want the benefit of UBC's experience.

"We're feeding information to the Albert Einstein Hospital in New York, the University of Washington and the U.S. Naval Hospital in Maryland to name a few and eventually our IRC will be reflected in their buildings.

"The Educational Facilities Laboratories funded by the Ford Foundation at $10 million is particularly interested, especially about our hook-up of non-print resources—the IRC proper—and our print resources—the library."

Other floors of the building are designed to carry out the major ideas behind the Health Sciences Centre. Their aim is to integrate health sciences teaching as much as possible and to provide continuing education to health professionals already practising.

Medical knowledge is no longer confined to the brain of any one doctor and medical service limited to the familiar black bag. Medicine is becoming more and more complex, the function of computers, automated and expensive diagnostic equipment, and groups of professionals working together as a health team.

For this new type of medicine to succeed, it is essential that physicians, nurses, clinical psychologists, physio and occupational therapists and others study in an integrated atmosphere. They must know each other's capabilities and limitations. This will be partially accomplished by integrating lectures as much as possible. But the architecture of the building carries the intermixing further.

INTENSE TRAFFIC

A two-storey mall on the ground floor will connect the hospital tower and library. The mall will be split-level. Registration and exhibition areas will be on the lower section. The upper level will be furnished as a quiet lounge. Traffic between the teaching hospital and library will be intense. Faculty and students in the various professions will be forced to use the mall as a central area for relaxation and conversation.

Not only is it important to integrate the students, but the deans of the various faculties and their staff should also intermingle. Administrative offices of the faculty of medicine, dentistry, pharmacy, nursing, and rehabilitation medicine will all be located on the third floor of the building, above the mechanical floor. Also sharing third floor space will be hospital administrators.

Mechanical services and a staff lounge and washroom area will be located on the second floor. The fourth floor will contain offices for the Coordinator of Health Sciences and facilities for distinguished visitors. About 3,000 square feet of the fourth floor will be unfinished for future expansion.

The Division of Continuing Education in the Health Sciences will occupy the entire first floor, reflecting the growing necessity for health professionals to keep up in their disciplines. With the volume of knowledge doubling every seven to 10 years, it is imperative for professionals to continue their education. Licences to practice could become conditional in the future.

CAPITAL COSTS

The Division will rely heavily on the audio-visual library of video tapes and other material. Packaged lectures will be distributed throughout the province for screening on TV stations for local doctors. This is already being done by the Division. B.C. is considered a pioneer in the field of continuing education in the health sciences in North America.

Half of the IRC's capital costs will come from the federal Health Resources Fund. Money from the late P.A. Woodward's $4.2-million gift to the University will cover the other half.

Main economic aim of the IRC and the Health Sciences Centre is to cut off spiralling medical costs. Society's attitude toward health services has changed. More and more citizens and politicians consider medical service no longer the responsibility of the individual but his birth right.

Like every other business faced with rising costs, medical instruction is turning to technology and economies of scale to keep unit costs down.

Dr. Roy L. Taylor, shown below in UBC's tropical greenhouse, is the architect of a 77-acre Botanical Garden development approved by the Board of Governors. A prime aim of the development is . . .

CREATING PEOPLE INTEREST IN PLANTS

A blueprint for development of a botanical garden totalling 77 acres on the University of B.C. campus has been approved by the Board of Governors.

The plan, submitted to UBC's Board by Dr. Roy L. Taylor, director of the Botanical Garden, calls for establishment of a world-wide collection of plants designed to develop interest in and promote the botanical study of plants in relation to the environment and man.

"The garden," said Dr. Taylor, "will be a laboratory of living plants for teaching and research activities of students and staff at the university and will be an aesthetic and educational experience for the general public."

A prime objective of the Garden is a concept of creating "people interest" in plants, Dr. Taylor added.

MAJOR ATTRACTION

Fourteen of the 77 acres which make up the UBC Botanical Garden are now partly or fully developed. Three established areas are Totem Park, a major public attraction because of its rare examples of northwest coast Indian totem poles and a replica of a Haida village; the Nitobe Memorial Gardens, developed to provide an authentic example of Japanese landscape architecture for the campus, and the Faculty Club—Graduate Centre complex, which contains rhododendron and rose collections.

NEW GARDENS

Major renovation is planned in only one of three established areas—Totem Park. Here it is intended to increase the function of the 3.1 acre park by introducing plants which were economically important to the Indians of the Pacific northwest.

The main botanical gardens at UBC will be developed on a 14-acre site immediately to the west of the Thunderbird Stadium and will include a research-administrative centre with associated greenhouses and conservatories.

"It is anticipated that this centre will provide for the academic and operational requirements of the Botanical Garden and should be completed by 1980," Dr. Taylor said in his report to the Board.

Included in the research-administrative center will be space for resident research staff and graduate students, a small herbarium for housing current research material, a special seed storage facility and a small reference library to handle public information calls and university enquiries.

Greenhouses in the development will feature five display houses containing tropical, temperate and dry habitat plants as well as displays of economic and chemically useful plants.

In addition to the display houses, three research greenhouses for special projects and two houses for propogation of teaching material are planned.

The botanical gardens surrounding the research-administrative centre will contain the main systematic plant collections, regional, ecological and geographical gardens and special gardens including aquatic,moss and alpine rock collections.

SPECIAL DISPLAYS

The second major development will take place on a site of approximately 30 acres between the present Marine Drive and the partly complete Southwest Marine Drive Boulevard.

This development, to be known as the Marine Drive Gardens, is located to the west and southwest of the projected new main botanical gardens.

The area will consist of semi-cleared, native stand forest with trails and will include special rhododendron and azalea collections and feature native plants of B.C.

In his report to the Board, Dr. Taylor said that it is anticipated that a significant portion of the funding for the overall project will come from private sources. To facilitate this, a separate Botanical Garden Development Trust Fund has been established.

"It is hoped that federal government monies may be forthcoming for the project as the University Botanical Garden should form part of a National Botanical Garden system," Dr. Taylor's report said.

The report also emphasizes the importance of the Gardens to the research and teaching program of the University. The general research program, Dr. Taylor said, is designed to provide for the development of a center of excellence concerned with the biological aspects of the flora of British Columbia and related western North American regions.

Special research programs will include development of indigenous plants as ornamentals and ethnobotanical studies related to the native peoples of B.C.

"It is hoped," Dr. Taylor said, "that members of other departments on the campus will contribute to the research programs of the botanical garden as well as developing new areas for research based on material contained in the garden plant bank."

Special teaching programs will be developed by the garden staff and many courses now offered by UBC can become closely associated with the resources of the botanical garden, Dr. Taylor said.

The staff will be responsible for development of special displays and trail walks that will assist in teaching and self-educating programs.

FUNDS APPROVED

The UBC Board has approved the use of up to $15,000 in capital funds for the planning and programming phase of the total botanical garden development.

On the recommendation of the client's committee for the development, Mr. Barry V. Downs has been appointed consulting architect and the Vancouver firm of Justice and Webb, consulting landscape architects, will assist in programming and development.

UBC NEWS IN REVIEW

A COLUMN FOR GRADUATES OF THE UNIVERSITY 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 WHICH CONTAIN FULLER DETAILS OF THE ITEMS BELOW CAN OBTAIN THEM BY WRITING TO THE INFORMATION OFFICE, UBC, VANCOUVER 8, B.C.

The Hon. Mr. Justice Nathan Nemetz, former chairman of the Board of Governors and a UBC graduate, was named Great Trekker for 1969 by the Alma Mater Society on Oct. 22.

President Walter Gage presented the award to Mr. Justice Nemetz on the steps of Vancouver's courthouse during a rally staged by the AMS to publicize Trek Week, a series of events designed to revive the spirit of the 1922 protest march from downtown Vancouver to the Point Grey campus which resulted in completion of UBC on its present site.

In accepting the award, Mr. Justice Nemetz said that of all the awards made at the University, "this is the one that I value the most, because it is a student award.

"To me, the Great Trekker Award symbolizes the bond which exists between you, the present student body, and the students who have gone before you. We both share, and I hope will continue to share, great concern for the welfare of our University and our society.

"And in that spirit, I accept this award with my thanks and gratitude."

Mr. Justice Nemetz graduated from UBC with first-class honours in history in 1934. As an undergraduate he was a member of the staff of *The Ubyssey*, and a member of the McGowan Cup debating team. He graduated from the Vancouver School of Law in 1937.

He is a past president of the UBC Alumni Association and was elected to the UBC Senate in 1957 by the Association's board of management. The same year he was elected as one of three members to represent the Senate on the Board of Governors.

In 1965 he was elected chairman of the Board, to complete the term of office of the late George T. Cunningham. In 1966 he became one of six governors appointed to the Board by the Lieutenant-Governor-in-Council. Mr. Nemetz announced his resignation as a member of the Board on Oct. 1, 1968, because of the growing pressure of his duties as a judge of the B.C. Court of Appeal.

Mr. Nemetz was a senior partner in a Vancouver law firm until 1963, when he was appointed judge of the B.C. Supreme Court. In March, 1968, he was elevated to the B.C. Court of Appeal.

Mr. Justice Nemetz is well known for his work in the field of labour relations. He has presided over many industrial arbitrations and in 1968 conducted an exhaustive study of labor relations in Sweden for the B.C. government. He has also served as a Royal Commissioner on several occasions.

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The UBC Senate has begun discussion of a 132-page report which is meant to serve as a guide to University development over the next decade. The report, prepared over the past 16 months, is the work of the Senate Committee on Long Range Objectives chaired by **Dr. Cyril Belshaw**, head of the department of anthropology and sociology.

The two most controversial and complex issues tackled by the 13-man committee were the questions of the limitation of enrolment and the improvement of the academic organization of the University.

The committee failed to reach unanimity on either of these issues. The majority favoured limiting UBC's enrolment to 27,500 but Dr. Belshaw dissented and in a minority opinion advocated a total enrolment based on the number of students that each faculty considers it has the capacity to educate.

Dr. Belshaw suggested that a "student admissions budget" should be drawn up taking into account appropriate teaching methods and the availability of teaching staff, space, equipment and teaching aids.

On the question of changing the organizational structure of the University the committee agreed on some recommendations (e.g., establishment of a College of General Studies, which would award a diploma to those students who did not want a degree program, and an orientation college for first- and second-year students), but divided 6–5 on a fundamental issue.

The majority favoured retaining the existing structure of the University with some modifications to create a more personalized environment and greater faculty-student contact; the minority proposed dividing the University into a number of federated colleges, eliminating the existing faculties and creating three academic divisions, each containing several colleges and institutes and each potentially a separate university.

The colleges advocated by the minority are envisaged as administrative units charged by Senate with the implementation of an academic program with clear purposes and functions set out in a charter. Programs would be flexible and each college would have a student population varying in size from 500 to 2,500.

In a chapter dealing with curriculum, the committee recommends a board of instruction to arrange for instruction in university teaching in every faculty, school and department, inspection of teaching several times a year and a call for faculties to "come to grips with the question of student membership on curriculum committees and devise clear, coherent faculty policies."

In its final chapter the committee recommends establishment of an International Coordination Bureau to stimulate and coordinate teaching and research in international programs, creation of a faculty of continuing education to replace the present extension department, reduction of Christmas exams and introduction of a 13-weeks-plus summer session to replace the present seven-week session. The committee also took a close look at the trimester system of university operation and recommended rejection of it for UBC.

It is likely that a number of committees, recommended in the report, will be struck to consider specific matters and report to Senate.

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UBC's Board of Governors has approved plans for creation of an exciting new undergraduate library.

The new building, to be constructed under the Main Mall of the University, will correct a critical lack of undergraduate library space by creating a facility for 200,000 books and more than 2,400 study spaces.

The design proposed by architects Rhone and Iredale is an ingenious solution to a difficult problem: how to create an attractive new library facility where it is accessible to a maximum number of students without destroying the traditional appearance of the treed Main Mall and adjacent lawns.

The solution: construct the library *under* the Main Mall. This makes it possible to preserve all but one of the 40-year-old northern red oaks and the vistas they frame along UBC's main street.

To create a light, open environment the architects will design the library in such a way that the east and west faces will open out onto landscaped courtyards in front of the main library and the mathematics (old arts) building. Concrete caissons will be constructed around eight of the Main Mall oaks and will run down through the two floors of the new library and provide visual anchors for the building.

UBC ALUMNI Contact

THREE STUDENTS get a kick out of old pictures showing the antics of students of yesteryear in a display during Great Trek week. The photographs were part of the Alumni Association's Memory Lane exhibit, telling UBC's history in pictures, which was set up in the Student Union Building art gallery. Memory Lane was one of the highlights of the Alumni Association's Reunion Days festivities. Many grads made the great trek back to campus to renew their ties with alma mater on Oct. 24 and 25. Other big attractions were the class reunions, the Great Trek Ball and a UBC–University of Victoria rugby match.

New Program Seeks Dialogue

The UBC Alumni Association will launch a special program next month aimed at stimulating more dialogue between the community and the University. Called *Interaction*, the program will consist of a series of weekly luncheons at the University to which key representatives of various community organizations will be systematically invited.

Over lunch, an appropriate dean or department head will outline some new campus developments and participate in an exchange of ideas with the guests.

"I believe it's not good enough simply to mail people information about the University or to hope that they will learn enough about campus developments through the news media," said Jack Stathers, Alumni Association Executive Director and coordinator of the *Interaction* program.

"People need an opportunity to sit down with University people and talk about University affairs. The key is interaction. We hope this program will be a way of keeping community leaders up to date with University affairs, and, in turn, keep the University in tune with the community."

Stathers said he expects to wrap up the organizational details soon and have the first luncheon meeting by the third week in November. The luncheons will be brief, informal sessions held every Wednesday at Cecil Green Park, headquarters of the Alumni Association.

Guests of the *Interaction* series will include key representatives from such fields as forestry, engineering, mining, construction, finance, labor and public school education. On the University side, the participants will include members of the faculty and the student body having interests in common with the visitors.

SURVEY SEEKS ANSWERS

Is UBC Education Any Good?

A UBC commerce professor is conducting a survey of alumni aimed at getting some clues as to how good an education the University provides.

Next month, Prof. Peter Tsong will mail out a 10-page questionnaire to 8,400 alumni (20 per cent of all graduates) asking them, in essence, to reveal what they think about their educational experience at UBC and to indicate how it might have helped them in their careers.

Tsong said the growing public and government concern with higher education has pointed up the need for more factual information about university matters. "Educators, students, government officials and the public in general have called repeatedly for the improvement of our higher education system," he said.

"Yet, despite the growing amount of public discussion, there has been very little systematic evaluation of the quality and value of higher education." Prof. Tsong hopes to help remedy this through his survey.

The questionnaire consists of three parts. The first part seeks information from alumni about their educational experience while at UBC. Here an alumnus will be asked such questions as why he decided to go to university, would he take the same field of study over again, is his present work related to his field of study and so on.

The second part requests information on work activities, asking an alumnus such questions as how many jobs he has had, is he thinking of changing jobs again, how large an organization does he work for and so on. The final part asks for demographic information which is needed for a meaningful statistical analysis.

The Alumni Association has assisted the survey by providing the names and addresses of the sample, which was selected at random. Prof. Tsong emphasized that beyond this there has been no further connection between the Association and the survey.

He emphasized also that one of the objectives of the survey is to protect the privacy of the alumni involved, and consequently those receiving the questionnaire are not required to identify themselves.

While the survey is being conducted as an academic research study in high level manpower, the results of the analysis will be made available to the president of the University and to the office of academic planning.

"The information accumulated by the survey could be useful in improving student counselling, academic planning and even university course offerings," said Prof. Tsong. "Undoubtedly, it will have a substantial impact on the nature and quality of education at UBC in the years to come."

Completing a 10-page questionnaire may seem to some alumni to be an awesome chore. But Prof. Tsong pointed out that this will not be the case with his survey. The questions only require check-mark responses and the whole thing can be completed on average in 20 minutes.

"Alumni who receive the questionnaire are urged to respond," said Prof. Tsong. "Their responses are important for the future of the university."

Record $22,400 Awarded

The UBC Alumni Association has awarded a record $22,400 in N.A.M. MacKenzie scholarships as part of its program of recognizing student academic achievement.

Sixty-four UBC freshmen are now benefitting from the annual MacKenzie scholarships, worth $350 each. The scholarship winners come from places as far apart as Vancouver and Vernon, Delta and Dawson Creek, Trail and Terrace–from virtually every electoral district in B.C. The MacKenzie scholarships were originally established in honor of former UBC president Dr. N.A.M. MacKenzie.

The money for the awards is provided by alumni donations to the UBC Alumni Fund. This year's awards mark an increase of $5,600 in scholarship support by the fund. Last year, $16,800 was granted to provide 48 MacKenzie scholarships. Donations to the 1969 Alumni Fund now are in excess of $180,000, well on the way to the campaign goal of $250,000. The money is used annually to support deserving student academic, athletic, cultural and social activities.

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It looks like UBC alumni will be well-represented at Expo '70 in Osaka, Japan. A UBC Alumni Association-sponsored charter flight to Expo is getting a good response from alumni eager to see part of the Orient.

Using an Air Canada jet, the Vancouver-Tokyo flight leaves Vancouver June 16 and returns July 16. The fare is $330 per person round trip. Accommodation and tours are not included in the price.