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A heart-to-heart chat with Jacques Genest

Plans breathe new life into the MUHC's cardiovascular program

The conversation that inspired Jacques Genest to spend the last 20 years examining the mysteries of the human heart happened over a meal that would scandalize any self-respecting cardiologist: the smoked meat special from Schwartz's Delicatessen.

“The french fries were exceedingly greasy,” concedes Genest, now Director of Cardiology for the McGill University Health Centre (MUHC) and the man responsible for the vision behind the reorganization of the cardiovascular health program in anticipation of the move to the Glen site. “But the conversation with Allan was inspirational.”

“The french fries were exceedingly greasy,” concedes Genest, now Director of Cardiology for the McGill University Health Centre (MUHC) and the man responsible for the vision behind the reorganization of the cardiovascular health program in anticipation of the move to the Glen site. “But the conversation with Allan was inspirational.”

The Allan in question is Dr. Allan Sniderman, currently one of the MUHC's renowned cardiovascular researchers. His lunch with Genest was the result of a friendly wager over the mechanics of heart sounds, which are the sound waves that are recorded, broken down and mapped out in a phonocardiogram.

“We were arguing about the intensity of the



Genest says that being the son of a cardiologist and growing up in a house surrounded by medical professionals fed his fascination with the human heart and his decision, at 18, to follow in his father's footsteps.

first heart sound and the length of what's called a PR interval on an EKG. It turned out that Allan was right for the first two thirds of the PR interval and I was right for the last third. Nevertheless,

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(Dr. Jacques Genest continued from page 1)
majority rules, and he won the bet fair and square.”

The loser had to pick up the tab at Schwartz’s. But Genest had a stipulation — that the sandwiches be eaten over a detailed explanation of lipoprotein metabolism (the genetically predetermined way our bodies process cholesterol), which was the focus of Sniderman’s research at the time.

“At that lunch, I had absolutely no idea what Allan was talking about, and I was so deeply ashamed of my ignorance that I learned everything I could about lipoprotein metabolism. That’s how I got hooked.”

In 1984, Genest began a six-year stint at Tufts University in Boston, where he studied lipoprotein metabolism and molecular genetics. Following his post-doctoral studies, he came

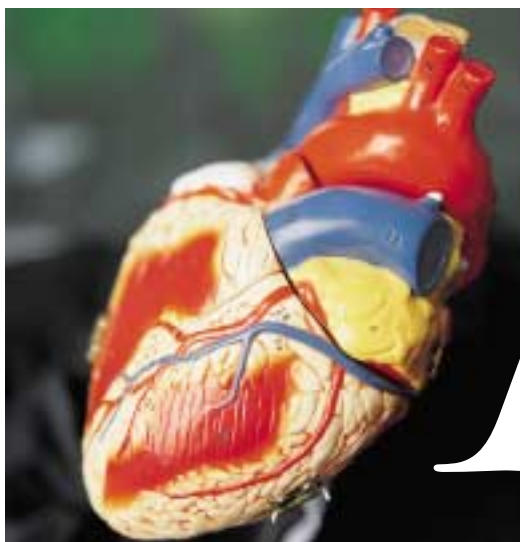
who at that time were developing the physiology of the cardiovascular system. The risk factors played a very minor part.”

The soft-spoken Genest points out that, before a series of key studies in the late 70s and early 80s, reversing blockages of the arteries was considered an impossibility. “When we sent patients for a bypass, very little attention was paid to risk factor modification. You bypassed the blood vessels, the pain went away and the patient went home. But the processes that led to the blockage of the arteries still existed.”

Those processes and risk factors have since been identified. They include increasing age, the male gender, post-menopausal women, cigarette smoking, diabetes, a high cholesterol level, a low level of protective cholesterol, and high blood

together talent from across the McGill University Health Centre and the Jewish General Hospital. “If we want to have what’s called a super-regional centre [at the Glen], we need the expertise of people in the field of pulmonary hypertension at the Jewish, cardiac transplantation, electrophysiology . . . Very complex cases need a well-integrated approach and I want the MUHC to play a leadership role.”

The third area is an electrophysiology program that will build on an existing McGill University Health Centre-Sacré Coeur Hospital link to develop the ability to diagnose complex heart rhythms such as arrhythmia and atrial fibrillation. Patients will be treated on-site with rapidly evolving technologies such as pacemakers, defibrillators and cardiac catheters that help destroy abnormal pathways or the region of the heart that stimulates the heart abnormally.



A

s the biggest single cause of death in Canada — about 37 percent of total deaths in 1995 — and a major cause of disability, cardiovascular disease takes up about 8 million days of hospitalization every year, representing \$8.3 billion in direct costs and \$16 billion in indirect costs.

home to the Clinical Research Institute of Montreal, which was founded by his father, renowned physician and Canadian Medical Hall of Fame inductee Dr. Jacques Genest Sr.

As it turned out, Genest’s (fils) lipoprotein research combined with his training as a cardiologist put him at the forefront of a new wave of specialists who took a far more wide-ranging approach to cardiovascular disease than their predecessors did. “When I started it was still a very esoteric field. People knew the importance of cholesterol disorders in coronary artery disease, but it wasn’t a very well-accepted concern on the part of cardiologists,

pressure. “We’ve since learned that if we can modify these factors,” says Genest, “we can influence the outcome tremendously.”

To that end, there are three areas currently being developed at the McGill University Health Centre under Genest’s leadership. One is the Preventive Cardiology Lipid Clinic at the MUHC’s Royal Victoria Hospital site, which will regroup cardiologists, endocrinologists, internists and medical biochemists to provide preventive strategies to patients who have a strong likelihood of developing coronary artery disease or who have any form of vascular disease. The program will link with the research laboratories in both the genetics and lipoprotein fields.

The second area of development, at the Montreal General site, will address adult congenital heart disease. Patients with congenital heart defects who had a 10 per cent survival rate 30 years ago now see over 90 per cent survival because of early detection and tremendous advances in surgical techniques. Genest wants to build on the MUHC’s tradition of excellence in pediatric cardiac surgery — from the contributions of eminent pioneers such as David R. Murphy and Anthony Dobell to Christo Tchervenkov and Renzo Cecere’s recent first mechanical heart implant in a child — by following the progress of children with congenital heart defects as they grow into adults.

Genest’s vision is one that brings together

These three axes will form the basis of the combined cardiology/vascular program, called Cardiovascular Health that Genest plans to launch at the Glen. “When we move to the integrated site,” he says, “I want everyone to be pretty much ready to go there as an integrated team.”

The idea behind a program approach rather than maintaining two separate departments, says Genest, is for cardiac and vascular surgeons to be in physical proximity so they can share common diagnostic, intensive care, nursing, administrative and physical resources. “Very often, post-operative patients have cardiac complications, and just as often, our medical patients urgently need surgical help,” he says. “Since the problems we deal with are very similar, we want to be together. That will require a structure that will transcend the traditional departmental boundaries so that cardiology, cardiac surgery and vascular surgery are physically in one area.”

It’s no surprise, given his background, that Genest is also pushing to upgrade the MUHC’s cardiovascular research program. “There’s a lot of work being done in cardiovascular sciences at the university but the amount of research being done on cardiology in the actual hospitals is weaker than it should be. We’re now addressing that through three broad axes: continuing lipoprotein metabolism, the genetics of cardiovascular disease, and vascular function.”

At present, the genetics of cardiovascular disease is a particular focus of two of the Cardiology

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M U H C HEALTH PERSPECTIVES

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Focusing on the big



In this case, the C stands for complementarity, and those concentrating their attention on achieving it are McGill University Health Centre- and McGill University-affiliated researchers intent on developing and exploiting the fullest and most complete interface of theory and practice of basic and applied medical research.

With the Montreal Genomics and Proteomics Centre, the Bellini Life Sciences Building and the new [Glen] MUHC Research Institute in varying stages of planning and construction — and a clear plan developed that outlines the link between each of these major players — it is only a matter of time before valuable outcomes are realized that will benefit patients from across the McGill University Health Centre.

The research to be undertaken on the McGill campus is grounded in biology, biochemistry and chemistry, and examines the genetic, cellular and molecular basis of life. While some of the research methodologies and technologies employed in the McGill University laboratories and at the Research Institute at the Glen will be similar, there will be no conceptual overlap in the research themes at the two sites. Building on the existing relationship, an indispensable link between the more analytical research at the University and the more synthetic research relevant to the patient care programs at the Glen facility will be established, including the integration of fundamental biomedical science, clinical investigation and population-based studies.

Research at McGill will examine, among other things, gene products as substances that could be

influenced (stimulated or suppressed) by chemicals, thereby making them targets for new drug development. Other research at the University will examine the biochemistry of cells, how cells talk to one another, how they sense and signal changes caused by the outside environment and how they change, internally, to react to such threats. As well, interaction between proteins and other molecules and molecular events leading, for example, to a transformation of a normal cell into a cancer cell will be analysed.

Taking the cue from the current dynamic, research at the Glen will be complementary and will investigate these basic biological and biochemical processes as they pertain to specific disease categories. For example, distinct protein profiles of breast cancer tissues from patients with different genetic backgrounds, variable response to therapy and overall prognosis will be studied to discover subtypes of this disease and their characteristics. The data will be analyzed using protein profiling technologies and models developed at the McGill University labs and interpreted with the help of clinical data on the course of the disease at the Glen laboratories. Such interactions will lead to important breakthroughs and the development of truly individualized patient- and case-sensitive treatments. ❄

(Dr. Jacques Genest continued from page 2)

Division research teams. One team is working on disorders of high-density lipoproteins and lipid disorders, and the other is exploring the relationship between obesity, metabolic disorders and heart disease.

“Obesity is a huge problem, and it’s single-handedly reversing the gains made over the last 30 years, which had resulted in a decreasing incidence of heart disease. We’re now predicting increasing incidences in both men and women, not because of aging, but because of abdominal obesity, diets that aren’t well-integrated between energy expenditure and energy intake, and the fact that people live a sedentary lifestyle.”

Genest also predicts that, with the effects of globalization producing near-overnight middle classes in countries such as India and China, the risk factors that have made cardiovascular health a major concern in North America will soon spread to other countries. “Heart disease is on the verge of becoming a major focus of worldwide health.” On the strengths of its talent and vision, the McGill University Health Centre is well on its way to assuming a leadership role in diagnosing and treating this disease and exporting this knowledge to the world. ❄

Equipping Excellence

Preterm babies, or babies born before 32 weeks of the normal 40 week gestation period, make up a small percentage of babies that are born, but require a great deal of care and specialized equipment.

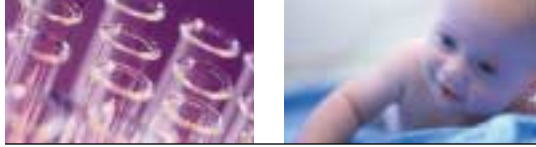
Neonatal ventilators, or respirators, help them to breathe, ensuring they get enough oxygen and dispel enough carbon dioxide waste, something their underdeveloped lungs aren’t capable of doing on their own.

Most infant ventilators can accommodate the small lungs of a premature baby weighing less than a kilogram as well as the lungs of a child weighing up to 30 kilograms. They work by generating positive pressure to inflate the lungs, promoting alveolar gas exchange (oxygenation and carbon dioxide elimination) in the lungs’ tiny airsacs, or alveoli. A computer in the device regulates the tidal volume, or amount of air inhaled and exhaled, as well as the timing of the breath, to prevent overextending and damaging the delicate lung tissue. The cost of a neonatal infant ventilator is approximately \$28,000.

If you want to learn more about the equipment used by MUHC professionals, or if you just want to test your knowledge in this area, visit the MUHC Foundation’s web site at www.muhcfoundation.com and take the “How Much Does It Cost?” challenge. ❄



Image courtesy of Bear Medical Systems



The fertile mind and prolific career of Togas Tulandi

Dr.

Togas Tulandi's office at the McGill University Health Centre's Royal Victoria Hospital site is surprisingly tiny and sparse, somehow not where you'd expect to find an internationally recognized pioneer in the field of female fertility. But Tulandi spends little time in his office, and can more often be found in hospital operating rooms or behind the podium in lecture halls, where he repeatedly challenges conventional wisdom to broaden the options of women who otherwise would have far fewer choices.

Tulandi, who trained as a gynecologist in reproductive endocrinology and infertility, is the Director of the MUHC's Division of Reproductive Endocrinology and Infertility. Since 1991 he has been a professor of obstetrics and gynecology at McGill University and is the university's current holder of the Milton Leong Chair in Reproductive Medicine. In his twenty years in the field, Tulandi has combined his roles as physician, teacher and researcher to make the most advanced surgical techniques available to MUHC patients. Women with fertility-inhibiting conditions, such as fibroid tumours and endometriosis, who at one time would have undergone hysterectomies, have benefited from the wealth of knowledge Tulandi's research has brought to his surgical expertise.

"Whatever the problem is, I generally see women for the first time for excessive bleeding. Most doctors think that the way to treat excessive bleeding is with a hysterectomy, regardless of the cause. I look for answers that are less radical, less invasive and less technically demanding."

The affable, Indonesian-born father of two is quite clear about the advantages of his affiliation to both McGill University and the McGill University Health Centre: it provides him with the financial support to continue to see patients, teach and pursue his self-described passion for clinical research all at once. This view is echoed by many other MUHC doctors/researchers. Among Tulandi's memorable research projects was an *in vitro* fertilization study that established a conception advantage in women who lay down for ten minutes after being inseminated.

"I love what appear to be stupid questions and especially enjoy arriving at uncomplicated solutions," he says, remembering that not long ago, he and his staff had been telling women they could get up and go home immediately after insemination. Then one of the doctors mentioned that in his pre-

Togas Tulandi's office at the McGill University Health Centre's Royal Victoria Hospital site is surprisingly tiny and sparse, somehow not where you'd expect to find an internationally recognized pioneer in the field of female fertility. But Tulandi spends little time in his office, and can more often be found in hospital operating rooms or behind the podium in lecture halls, where he repeatedly challenges conventional wisdom to broaden the options of women who otherwise would have far fewer choices.

vious practice women were advised to lie down first to make sure the highly sensitive process wasn't undermined by gravity.

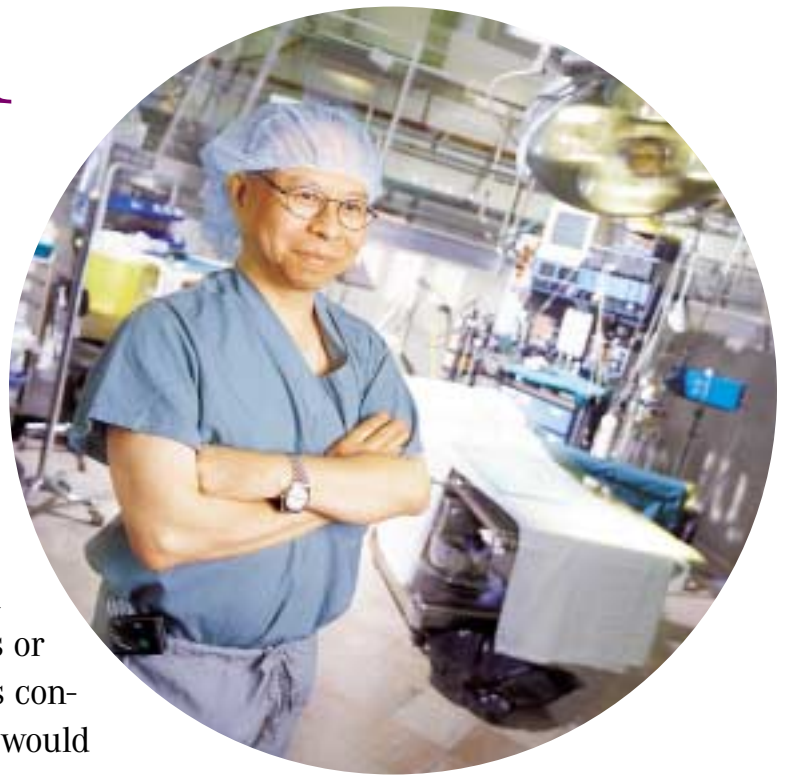
"So we did a study in which the first group of patients immediately went home and the second group lay down for ten minutes," Tulandi gleefully recounts. "In the second group, the pregnancy rate was significantly better."

Since the opening of the McGill Reproductive Centre in 1996 to encourage collaboration between the university and McGill University Health Centre reproduction specialists and researchers, Tulandi has been a key member of the research team led by Dr. Seang Lin Tan, Chief of Obstetrics and Gynecology at the MUHC and head of the centre, which deals with 20,000 patients a year. Under Tan's guidance, the

Tulandi was the first physician in North America to use microwave endometrial ablation to control excessive menstrual bleeding. He also discovered that the fertility of women undergoing radiation therapy could be preserved by protecting their ovaries from radiation. Most recently, he made the MUHC the site of the first operation in which a cancer patient's eggs and part of an ovary were removed and frozen for later use.

centre has generated several innovations, including a technique for maturing eggs outside of ovaries, North America's first *in vitro* maturation egg donation pregnancy, and Canada's first successful pre-implantation genetic diagnosis program. It also engineered the world's first pregnancy resulting from the air transport of eggs, in this case from Chicoutimi to Montreal.

In January 2002, the researchers, led by Tan, published an article in the scientific journal *Nature* that showed that organs can be successful-



ly transplanted after being frozen and stored in liquid nitrogen. The discovery that time was no longer the crucial variable it was thought to be in organ transplantation, and Dr. Tulandi's subsequent application of that research on a cancer patient, proved yet another international breakthrough for the McGill University Health Centre.

In 1999, Tulandi was the first surgeon in North America to treat endometriosis with microwave ablation. The procedure, pioneered in Britain, uses microwave frequency to decimate the lining of the uterus and stop the heavy menstrual bleeding caused by the condition. But microwave ablation is preferable only in some cases, and Tulandi still generally treats endometriosis using the rollerball technique, which pulverizes the uterine lining, or the longer-standing technique of combining endoscopy with

laser-painting of the uterine cavity.

Tulandi is best known, however, for his work in minimally invasive surgical (MIS) techniques such as endoscopy, where a probe equipped with a small camera is inserted into the body. The surgeon then operates using an image on a television monitor as guidance, a skill that has been likened to picking up food with chopsticks guided only by a mirror. Endoscopic surgery is used to terminate ectopic pregnancies and to remove ovarian cysts and endometrial adhesions in fallopian tube and uterine

As a surgeon, researcher and professor, Tulandi has to be in many different places in the course of a week, and as such he is one of the specialists whose lives, and efficiency, will be markedly improved by the MUHC's new Glen facility. Because his various roles are interdependent — his practical work as a clinician is enhanced by his research and vice versa — the advantages to his students if they have easier access to both will be enormous. "We need a place where we can conduct research, see patients and teach, all under one roof," he says.

surgery. Tulandi teaches classes in the technique at McGill University, and as a result has drawn a new generation of doctors to the MUHC who are keen to master this skill.

Tulandi has also pioneered experimental techniques for preserving fertility in women going through radiation therapy for lower abdominal cancers, Hodgkin's disease and lupus. Normally, radiation treatment in the lower abdomen or pelvic cavity kills ovarian function and induces immediate menopause, no matter the patient's age. "One, that means they can't get pregnant," says Tulandi, "and two, it means they need hormone replacement." For women still young enough to conceive, the implications can be heartbreaking.

Three years ago, Tulandi moved the ovaries of a rectal cancer patient up outside the pelvic cavity to the level of the anterior superior iliac spine, which is about level with the navel but on the side, above the hip bone. This kept them out of the radiation field during treatment without actually detaching them from the uterus. By last year the patient had recovered from the cancer and Tulandi thought her ovaries were healthy enough to be used for *in vitro* fertilization. "Instead, she got pregnant on her own and had a healthy baby girl."

Tulandi is also researching the link between infertility and treating uterine fibroid tumours by blocking the blood vessels that lead to them. "It has been shown that several women have become menopausal after this procedure because of the link between blood vessels to the uterus and blood vessels to the ovaries." The study showing that the procedure decreases ovarian function will be published in the October issue of the journal *Fertility and Sterility*.

Aside from his research, Tulandi is working on two books on reproductive technologies, one of which, written for lay people, is called, *So You're Going to Have a Hysterectomy?* He is also the first non-American to be named General Program Chair (for 2004) by the American Society for Reproductive Medicine.

He credits the McGill University Health Centre for fostering the sort of atmosphere that allows him to call up other specialists, even in unrelated fields, if he sees an opportunity for collaboration. "There are good people in different specialties who are open and non-competitive," he says. "It's an enormously constructive environment. Nobody wastes time arguing about whose name goes first when you publish." ❄

Portraits in Time

Thousands of individuals have helped advance the development of the McGill University Health Centre, and in every issue of *MUHC Health Perspectives*, we feature some of these significant contributors.

MAUDE ELIZABETH SEYMOUR ABBOTT



Dr. Maude Abbott was a medical pioneer whose research in cardiology and pathology and work as a medical curator helped put Montreal and McGill University on the map. A graduate of McGill University's Faculty of Arts, she was forced to complete her medical training at Bishop's College because McGill did not yet admit women into its Faculty of Medicine. She returned to McGill eight years later, and in 1901 became curator of the university's medical museum, where she organized a collection that was, by Dr. William Osler's estimate, without equal in North America and Britain.

When Osler later invited her to write about congenital heart disease for his textbook *System of Medicine*, Abbott was immediately established as the world authority in this field. In 1936, she published *Atlas of congenital cardiac disease*. Her research is widely recognized as a key contributor to the development of cardiac surgical procedures, the improvements in the prognosis for "blue babies," and the advancement of women in medicine.

DR. JOHN McCRAE

"Pathologist, Poet, Physician and Soldier, a man among men." So reads the inscription on the stained-glass memorial to Dr. John McCrae at the Strathcona Anatomy and Dentistry Building at McGill University. While best known for "In Flanders Fields," the famous poem he penned during World War I, prior to the war McCrae served as Resident Pathologist at the Montreal General Hospital and Assistant Pathologist at the Royal Victoria Hospital. He was also a popular teacher at McGill University, where he lectured in clinical medicine and pathology, and at the University of Vermont, to which he commuted two days a week for



much of the year. In 1918, days after becoming the first Canadian to be appointed as consulting physician to the First British Army, McCrae died in France while serving as the officer in charge of the McGill unit.

To find out more about the builders of the McGill University Health Centre, visit the MUHC Foundation's web site (www.muhcfoundation.com) and take the Famous Montreal Physicians quiz in our features section. ❄



Update on reuse

Claude Forget, O.C., understands more than a thing or two about the business and politics surrounding the eventual reuse of the McGill University Health Centre's buildings. After all, the recently appointed chairman of the MUHC Reuse Committee is a former Quebec Minister of Social Affairs (1971-76), McGill University professor, and successful businessman. He is also a longstanding member of the MUHC family having served as chairman of the Royal Victoria Hospital (1991-1997) and now as an active board member of the MUHC.

“**T**here are many interests that have to be considered here but no one can deny that these buildings are an important part of our history and that their future use has to be considered with the same significance as the mission of the McGill University Health Centre,” says Forget. “Many ideas for both public and private uses emerged from three rounds of public consultations held last winter by the Heenan commission and it is now time to move forward and engage commitments from our stakeholders.”

On August 31, 2001, the MUHC Board mandated Forget to establish a committee to closely examine the reuse. The committee reports to the MUHC Board and keeps the MUHC Development Corporation Board abreast of its progress. Forget then brought together a strong contingent of committee members to help guide the process. Members were selected on the basis of their expertise in architecture, finance, project management, historic preservation, real estate development, law and health care.

Vianney Bélanger, President of Coprim, is an accomplished project manager specializing in the rehabilitation and conversion of properties. Former Vice-President of RBC Dominion Securities, Marc Courtois, brings to the table his considerable expertise in finance. Jacques Côté, the former president and CEO of Canadian Pacific Rail's St. Lawrence and Hudson Railway (St.L&H), offers valuable experience in organizational restructuring and commercial real estate, as evidenced by his three year turnaround of St.L&H from a money-losing network to a financially viable asset. Clément Demers, of Quartier international de Montréal, brings to the bear his experience in neighbourhood rejuvenation; Demers was involved in the rehabilitation of the area around Montreal's Victoria Square. Nancy Dunton is Head of University and Professional Programmes at the Canadian Centre for Architecture. Bruce McNiven, partner at Heenan Blaikie lawfirm, is a former board member of Heritage Montreal.

The group has been meeting regularly since early March. “Our preliminary meetings focused on

determining a clear timetable for our committee to respect as well on outlining the scope of the task and informing committee members of the deliverables we expect to achieve,” says Forget.

Generally speaking, over the next four years, committee members will apply themselves to securing appropriate new users for the MUHC's current sites.

Currently, the ideas on the table for reuse range from facilities for long-term care patients to the creation of student residences for McGill University. The entire process will be open and transparent, with public consultation integrated into each of three phases of the committee's work. In the first phase, currently underway, members will determine the criteria to be met by potential users. These will include how to protect the heritage value of the sites and to provide public access to Mount Royal Park.

In the spring of 2002, the committee made first contact with the City of Montreal as well as with the Quebec provincial government regarding the conversion and reuse of the MUHC's current sites. Work will intensify this fall when the committee decides upon the necessary reuse criteria, potentially guided by a public hearing. In addition, members have successfully carried out the selection process for a project coordinator whose name will be released this fall.

In phase two, committee members will tackle the job of promoting the sites so as to get as many interested parties as possible to step forward, over and above those who spontaneously expressed their interest the Heenan commission's public hearings. “It will be a tremendous challenge to find enough takers for the 3.3 million square feet,” explains Forget. “There is a lot of space to fill, and

the costs of converting heritage sites, such as the Royal Victoria Hospital, can be significant.”

The Commissioners of last winter's hearings recommended that the buildings be put to public use insofar as public funding is available. They also urged the *Régie Régionale de Montréal Centre* to identify its need for space for Montreal's health-care network.

With this in mind,

Forget's committee plans to systematically approach the municipal, provincial and federal government bodies as

well as non-profit organizations to propose the sites for their use. “We will bend over backwards to accommodate the *Régie's* desires for the space,” Forget says. “And [public and non-profit organizations] will be given the first opportunity to apply for the space. However, as it's not likely that the *Régie* and other public organizations will have enough appetite to gobble up all the space, I expect that private users will also have an opportunity to submit proposals.” He lists private residential and commercial uses, possibly for scientific research, as two likely groups the committee will contemplate for partial reuse.

Once a complementary combination of new vocations for each site has been found and has gone through various approval processes, the committee will embark upon its final phase of work: ironing out the details of contract negotiation before the MUHC moves to its next incarnation at the Glen site. “All of the new users will have to be informed of and held accountable for complying with the requirements for reuse that will be determined this fall,” explains Forget. “Our goal is to maximize overall value to the community at large and enhance the quality of life.” ❄

