Canadian surgery and the *Canadian Journal of Surgery* — decades of change

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Dr. Robert M. Janes, first Chairman of the Editorial Board, in his opening comments in the new *Canadian Journal of Surgery* (*CJS*) (vol. 1, no. 1 [Fig. 1], opined that "the establishment of a Canadian journal should not be regarded as further evidence of nationalism but as the assumption in yet another field of the obligations that attend our ever increasing size and responsibility."[1] He was aware that contributions to the journal would come largely from the surgical departments of Canadian universities and hoped the journal might serve to stimulate such but also hoped for stimulation among those in surgery, not in universities, to provoke opportunities for long-term follow-up, observation and contributions.

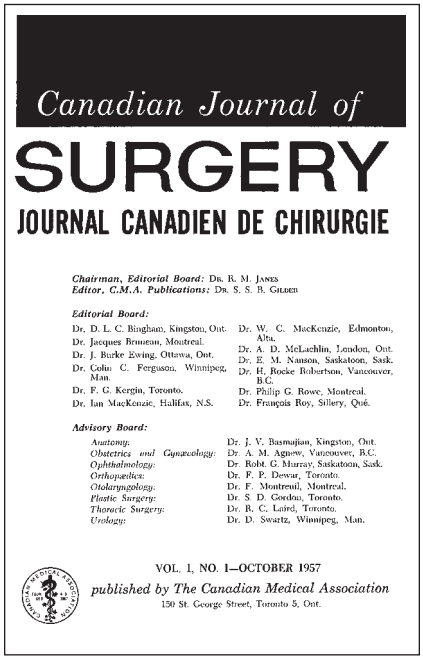
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FIG. 1. Cover for volume 1, number 1, of the new *Canadian Journal of Surgery*, containing the introductory foreword by Dr. Janes.[1]

Complimentary good wishes from the *British Journal of Surgery* and the American College of Surgeons, praising the establishment of the new journal were published in the opening pages.[1] Dr. I.S. Ravdin, Chairman of the American College of Surgeons Board of Regents, wrote "the stature of Canadian surgery over many, many years fully justifies such a publication."[1]

The history and evolution of Canadian surgery reflects the advantageous position that the Canadian discipline had, situated so well between the British tradition of keen clinical observation and the better-funded scientific approaches of American surgery. The Canadian approach, so positioned, allowed the evaluation, acceptance or rejection of new science, clinical recommendations and advances to be incorporated rapidly or delayed as progress and time dictated.

Just as the *CJS* dream took some time to become a reality, by virtue of technical and financial problems (suggested Dr. Janes) so did Canadian surgery, often short of funds and technology, tend to adopt new advances at a slower rate. Notably, the first paper published in the new *CJS* featured the historic but prolific Francis J. Shepherd — anatomist, surgeon, dermatologist, friend of William Osler, professor of anatomy and surgery, dean of medicine at McGill University and president of the Canadian Medical Association.[2] The article underscores the fact that advances and changes in medicine are the end result of the energy, ambition and tireless effort of individuals, whether it be the development of new sciences, new operations or new surgical journals. Canadian surgery is a testimonial to a long succession of individuals such as F.J. Shepherd and visionaries, movers and shakers all encouraging the incredible advances and changes that have occurred over these past 5 decades.

A review of some 270 issues of 50 years of *CJS* publications attests to the enormous range of subjects and

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interests presented to the journal in the form of editorials; historical reviews; original and review articles; symposia; research communications; continuing education submissions; surgical craft, biology and imaging; evidence-based reviews; case reports; book reviews; and meeting abstracts. The entire spectrum of surgery is seen in review. An attempt to create a spreadsheet of these topics and subjects met with failure, because every adult and pediatric organ system is included, and under those headings, nearly every surgical disease and disorder can be found by cross-reference and index. Over the years, the Canadian surgical community, academic or not, has been very supportive in presenting to the journal such topics of personal interest and experience that have resulted in a library of publications, the breadth of which is astonishing. Dr. Janes' hopes and aspirations that contributions to the journal would come from all corners of Canadian surgery have in large measure been fulfilled. Contributions have come from all corners of the country and, indeed, all corners of the world.

In the overall review of progress and change over these many years, decade by decade, there have been significant advances that have changed the nature of surgery and patient care and outcomes in this country in very significant ways. These advances were eventually reflected in the material submitted to the journal, the publication of which profoundly influenced patient management. Not everyone would agree to the same list of significant advances per decade; not all advances profoundly effecting surgery occurred in just 1 decade nor originated necessarily in Canada; they usually spanned several decades and institutions in their development, subsequent perfection and incorporation into any surgeon's armamentarium.

If the 1940s were the era of antibiotic availability, especially penicillin and its introduction into WWII wound care, then the 1950s were the era of open heart surgery and all the attendant advances it fostered in cardiac medicine and surgical care. The 1960s saw clinical transplantation, especially renal transplantation, come into effect, and new advances in related medical care followed. In the 1970s, the introduction of parenteral feeding and better understanding of nutrition allowed profoundly injured or depleted patients to avoid starvation and metabolic deterioration in intensive care units and changed general surgical care and outcomes, especially those related to the gastrointestinal tract. New drugs and immunological understanding opened the 1980s to more extensive transplantation activities of other solid organs, such as the liver and heart, and favoured such advances in cellular transplantation as pancreatic islet cells of Langerhan. This understanding also fostered newer approaches to cancer therapy. Concurrently, technological advances were happening in most branches of surgery, especially orthopedics. They were benefitting from advanced instrumentation, computers and imaging and monitoring possibilities. Advances in technology opened the 1990s to minimal invasive procedures in radiology and to videoscopic surgical approaches to the abdomen and chest and to all other branches of surgery, including gynecology, otolaryngology, urology and even in the vascular, cardiac and neurosurgical fields. The world of surgical advances has depended on many paramedical disciplines of engineering, electronics, computer science and metallurgy — to name a few — all of which have collaborated in these changes. Not only were there advances in technology, but educational thrusts were needed to communicate and disseminate the changes, which stimulated new programs in teaching and educational research. Because all these advances became more refined and were integrated and incorporated into surgical practice and patient care, it was not surprising that the coordination of resources, facilities, funding and administrative concerns became an issue. Perhaps this first decade of the 21st century will be the years of sorting out the impact of these issues that weigh so heavily, even on the very availability of physicians and surgeons themselves.

There was considerable basic laboratory and clinical research activity in Canada in these decades, when changes and advances were being incorporated into the daily life of Canadian surgery. Many excellent reports and publications in the *CJS* attest to this activity. Some are highlighted here. Publications in the *CJS* by Mustard of Toronto[3] and by Callaghan of Edmonton[4] reveal the challenges in the 1950s of resolving cardiopulmonary bypass problems and operating on complex cardiac conditions, congenital and acquired. A review of all the pertinent literature supporting the tremendous advances of open heart surgery at the time is beyond the scope of this article, but the status of extracorporeal circulation, fundamental to the advance of open heart procedures, was reviewed by Dobell and colleagues.[5] A significant contribution by Elliot and Callaghan[6] researched the acid-base changes during extracorporeal circulation, and bleeding disorders during open heart surgery was reviewed by Wright, Darte and Mustard.[7] These were important and significant contributions to the science and practice of an emerging specialty reported in the *CJS* at the time.

Transplantation was rapidly emerging in the 1960s. Some excellent publications and reviews revealed the widespread activity of this new clinical application. The problem of rejection was discussed and reported in a study by Irvine and Kling,[8] where splenic and bone marrow allografts were subjected to radiation as a means of rejection control and immunological alteration. An extensive review of organ transplantation with good data was published in October 1965, authored by Joseph E. Murray of the Peter Bent

Brigham Hospital, Boston,[9] who cautioned that renal transplantation was beginning to approach realization, but that a conservative attitude should be maintained. A detailed article on the surgical technique of renal transplantation appeared in July 1966 by Collins and Christensen,[10] the technique perfected after the surgery and care of some 60 dogs. A study pertaining to the preservation of donor organs for allografting appeared in the April 1968 issue, by Brownlee and colleagues,[11] specifically studying the preservation of pulmonary tissue and the resulting metabolic alterations influencing the quality of the graft before being transplanted. A lot of excellent work in transplantation science was being done in many centres across the country, including London, Ontario, and Halifax, Nova Scotia, as surgery of allografted organs accelerated.

A significant problem encountered in the care of acutely ill patients after surgery or trauma or for prolonged medical illnesses was the issue of nutrition and the maintenance of a positive nitrogen balance under intensive and trying circumstances. Until the clear demonstration by Rhoads and Dudrick that parenteric administration of calories derived from fat and protein solutions along with carbohydrates could maintain a positive nutritional state, many patients were slowly starving on simple glucose and mineral and vitamin solutions; they were dying from the associated high incidence of sepsis and metabolic and acid-base disturbances, along with a failure to heal their wounds or inability to recover from fistulas or other debilitating medical illnesses. In Philadelphia, Rhoads and associates were working on the idea of parenteral nutrition as far back as 1949, and others were working on the idea in the 1930s. Persistence with the idea and its attendant problems seemed finally solved with the famous puppy experiment, referred to as the "infusion heard around the world." Dudrick, Rhoads and Vars presented their findings at the International Society of Parenteral Nutrition in 1967.[12] This could be hailed as one of the most significant advances of the last 5 decades, if not the most significant. Many good papers appeared in the 1970s in the *CJS* as this clinical application became appreciated for the advance that it was in all branches of medicine and surgery. A full review published in the *CJS* by Freeman and MacLean[13] detailed the physiology, chemistry, technical aspects, clinical indications and problems of maintaining the treatment, including an extensive bibliography to that date. Another excellent short submission by Weisz and colleagues,[14] from Chicago, presented the use of parenteral hyperalimentation in the management of gastrointestinal fistulas. In October 1976, Jeejeebhoy reported on the concept of home alimentation, citing the experience of the Toronto group with home total parenteral nutrition (TPN) maintaining a small series of patients with short bowel syndromes for many months.[15] It didn't take long until TPN became widely available for clinical use, although the cost was initially high and indications were strict and limiting. Clearly, this advance changed the life expectancy of many patients who would otherwise have succumbed to their illnesses complicated by starvation. This was "big" in the scope of things to come and in the practice of surgery.

Momentum was gathering with more centres performing transplantations of various solid organs.[16,17] A breakthrough in the implantation of purified pancreatic islet cells was reported in the *CJS* in 1988.[18] (Fig. 2.) With better metabolic care and increasing technological advances to aid surgery and anesthesia, bigger and more aggressive operations for malignant disease were also occurring. To keep in step with these surgical advances, better chemotherapy for rejection control of transplanted organs[19,20] and adjunctive medical therapy for control of malignant disease were also rapidly advancing.[21] Several excellent papers and reviews were published during the 1980s on these subjects in the *CJS*.[22,23] As experience and case series increased in these respective fields, the 1980s seemed to be a decade of better understanding and application of the cellular and subcellular aspects of surgical science. Immunological modification, immunotherapy and monoclonal antibody investigation techniques were all exciting advances in this decade.[24,25] (Fig. 3.)

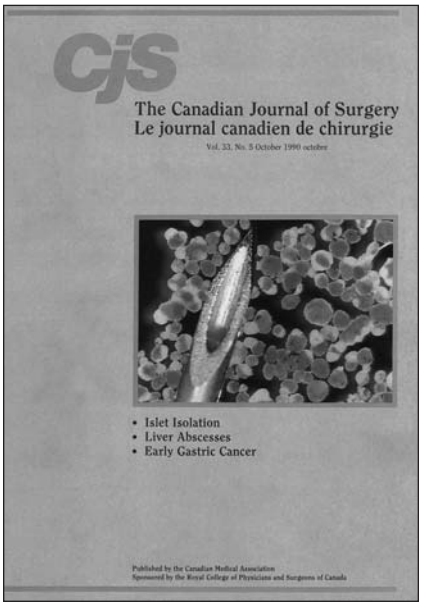

FIG. 2. The cover of the Journal for vol. 33, no. 5, shows purified human islets of Langerhans used for implantation, a major breakthrough in the 1980s and reported on in the *Canadian Journal of Surgery*.

Leading up to the 1990s, technology had also been advancing. Electronic digital readout monitoring advancements in intensive care and anesthesia, coupled with computers and advanced software (which was unheard of in the earlier decades) became standard requirements for patient management and safety. Stapling equipment, joint replacement, and intraocular lens implantation all experienced similar advances. Endoscopic diagnosis and surgery in urology and orthopedics had been standard for years, but fibreoptic lens technology, evolving since the 1960s, linked to

FIG. 3. A journal cover for vol. 32, which shows staining of pulmonary artery epithelial cells using anti-Factor VIII fluorescein-labelled monoclonal antibodies, a new technique in the 1980s, and described in Journal articles.[24,25]

miniature cameras, computers and television monitors, to take these and other endoscopic operations to newer heights. Videoscopic surgery within the closed abdominal cavity, however, was a new breakthrough. Mouret of Lyon started videoscopic or laparoscopic gallbladder surgery in France in 1987 and, within a year, took the general surgical world by storm.[26] In the early and mid-1990s, much controversy was expressed, as it seemed the industrial world was pushing the surgical world in new directions faster than surgical indications could be developed and faster than experience and thought were prepared for. The *CJS* published several reviews, papers, symposia and letters to the editor, initially with varying opinions and recommendations.[27–29] Into the 1990s, the advantages of the minimal invasive approach of videoscopic surgery became apparent, and the problems and complexities became better understood.[30–32] (Fig. 4.)

All surgery has potential problems and complications, and this technique of operating was no exception. But when performed well, this modality of surgery has huge advantage for the patient's more rapid and comfortable recovery, with very acceptable outcomes, and the learning curves have plateaued. Futuristic thinking is already adding robotics to this technological mix. Robotics, applied to fixed surgical fields (as is possible in orthopedic bone, hip and knee procedures[33,34]) or fixed targets (as in neurosurgical deep brain stimulation) will facilitate waves of new advances in the near future. Robotics is being developed for application in closed chest coronary artery bypass and intraocular microsurgery and in surgical training and simulation.

All advances in surgical science, technology and clinical care would occur in a vacuum if not for the interests and efforts of those with a zeal for education, teaching and the communication sciences. Teaching methods, curricula development, the organization of seminars and refresher updates for the surgical community, mentorships, surgical scientist programs for advanced training and proficiency and evidence based reviews in surgery[35] have provided abundant opportunity for surgeons

FIG. 4. One of the major advances in surgery made in the 1990s was laparoscopic gallbladder surgery, as shown by the picture on the cover of vol. 35, no. 3, 1992, of the *Canadian Journal of Surgery*, an issue that presented a symposium on the subject of laparoscopic surgery.

to remain current; and currency is vital in this age of rapid change and advancement. The major thrust of the Canadian Royal College of Physicians and Surgeons in the 1990s emphasized this aspect of lifelong, or career-long, learning.

The 21st century arrived with fanfare, fireworks and celebration progressing sequentially, longitude by longitude, around the world. A new term, "paradigm shift," had been added to the discussion and applied to surgical care and health care delivery in all of its many aspects. The concentration on surgical science, technology and the operations that developed and were applied to the treatment of disease and illness in the past decades have immensely benefitted all of society. This progress has, however, put a strain on resources, hospital planning, delivery systems, available facilities, access to care, patient's rights, cost of care, political philosophies and even debates and discussions in the medical and surgical profession. In the past 50 years, the medical profession has not had to justify itself or prove its qualification or certification to the extent that society is now demanding. We have done our learning, research, teaching and work and taken good care of our patients, with enviable outcomes and results. Medicine is a tenuous partnership between those who have the knowledge and skills and those who need the services. As a professional group, we have managed ourselves well over the decades, but society wants more control of who we are and what we do. Society has caught up in its sophistication and wants more input now into our professionalism, our decision-making, our style, our principles and our institutions. We must continue with our science, technology and delivery of care and the art of healing, to the best of our abilities and commitments, but the changes in these areas will have to be adapted and incorporated continually as we better understand immunology, cellular physiology, genetics and

the applications of these to surgery. More operations may disappear from our operating slates; although this may not be a comfortable thought to end with, it is part of change. Incredibly, though, the limiting factors to our delivery of care may come in the areas of ethics, societal demands and politics.[36] As Dr. Janes stated in his initial foreword in October 1957 "... we must assume an obligation."[1] Our obligation is to be involved in thinking, planning, consensus building and formulating the ongoing future of surgery. The *CJS*, as it has done so well over these last 50 years, will be a vehicle through which we can express our science, experience, opinions, thoughts, desires, principles, hopes and aspirations.

On reflecting over these many years, congratulations are in order to all who have contributed and worked so selflessly in effecting these decades of change; our best wishes go to those who will continue the process.

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