In 1925, founder John Keefe¹ and in 1974, the late Tom Perry² delivered presidential addresses to the New England Surgical Society (NESS) recounting the essential happenings of surgery in Rhode Island from its founding to the mid-19th century. We will not repeat the details of those excellent essays, but events from that era must be reviewed to permit an understanding of the course of events since.

**EARLY HISTORY**

Rhode Island was founded in 1636 by Roger Williams, who was of too independent a mentality for the Colony of Massachusetts. Quoting from a 19th-century encyclopedia,

The general court banished him from the colony... because he had called into question the authority of the magistrates in respect to the right of the civil power to impose faith and worship... Opinions which would not allow the magistrate to intermeddle, even to restrain a church from heresy or apostasy, were not to be endured.³(p639)

Williams was to be sent back to England, but he escaped, making his way south, painfully. Settling on a river bank, he, “having of a sense of God’s merciful providence unto me in my distress, called the place Providence.”³(p640) Two years later, Dr John Clarke, similarly exiled for religious views, arrived on Aquidneck Island (later Island of Rhodes, or Rhode Island), becoming the first physician in the colony. In 1663, Williams and Dr Clarke secured a royal charter for “Rhode Island and Providence Plantations” embodying the religious freedoms they had established in the colony. Their insistence on the separation of church and government persisted, eventually finding its way into the US Constitution.

The first formal effort at medical education in the colonies⁴ apparently occurred in Newport, RI, in 1752, when Dr William Hunter of Newport,⁵ cousin to William and John Hunter of London, presented the first advertised lectures on anatomy and surgery.

**BROWN’S FIRST MEDICAL SCHOOL**

In the mid 1700s, some Baptists in Pennsylvania thought that their preachers should be men of both piety and scholarship. Recognizing that religious education might proceed in Rhode Island without interference from the state, they established Rhode Island College in 1764. Baptists became a majority of both governing boards of the college, and presidents of the college were Baptist ministers until 1937. After a gift of $5000 from Nicholas Brown, class of 1786, the college was renamed Brown in 1804, developing a fortunate and lasting relationship with the Brown family.

With increasing interest in science and recognition of the regional need for appropriate medical education, Brown, under President Asa Messer, decided to open a medical program.⁶ Three professors were appointed in 1811. Dr Solomon Drowne, class of 1773, attended medical school in Philadelphia and was swept into the revolutionary war as a surgeon. Highly regarded, he was appointed to the Board of Fellows of the college in 1783. An expert on the medicinal effects of plants, he was

From Lifespan (Drs Hopkins, Bowen, and Francis), Department of Surgery, Academic Medical Center, The Miriam Hospital (Dr Hopkins), and the Rhode Island Hospital (Drs Bowen and Francis), Providence.
appointed professor of botany and materia medica. Appointed the first professor of anatomy and surgery was Dr William Ingalls, a professor at Harvard, who journeyed from Cambridge to instruct the students in Providence. Appointed professor of chemistry was William Corliss Bowen, MD, of Providence, who received his medical degree from Edinburgh, Scotland, in 1809. Several years later (1815), Dr Levi Wheaton was appointed professor of the theory and practice of physic. A graduate of the college, although not a medical school graduate, he had served as a surgeon in the Revolutionary War and was a highly regarded physician in the community.

Dr Ingalls, weary of the commute from Cambridge to Providence, resigned in 1816. His immediate successor, Dr John Matthewson Eddy, died 2 years later. Thereafter, students apparently traveled elsewhere for lectures in anatomy and surgery until Usher Parsons, MD, arrived in 1822.

Parsons (Figure 1) was an apprentice to Dr John Warren in Boston (1811) and was commissioned in the US Navy. In the War of 1812, he served with Commodore Oliver H. Perry, a Rhode Islander, in the Battle of Lake Erie in September 1813. Two physicians were seriously ill on the day of battle, leaving Parsons alone to care for all of the casualties. Of 97 wounded, only 3 died, a remarkable record for the time. Parsons' report on the care of these wounded became a classic in its time. He remained a naval surgeon for another 10 years, using opportunities to continue his medical education in Europe and the United States. He received his MD from Harvard in 1818. In 1820, he was appointed professor of anatomy and surgery at Dartmouth but resigned 2 years later, presumably because of the remoteness of the location. In 1822, an eventful year, he moved to Providence to join Dr Wheaton in practice, was appointed professor of anatomy and surgery at Brown, and married Mary Holmes, older sister of Oliver Wendell Holmes. Parsons was a perpetual student, an able teacher, and a prolific writer. Former students later said that his presence gave “new life to the institution.”

The new life, however, was a short one, for the school effectively closed a few years later. Undergraduate discipline at Brown deteriorated late in President Messer's administration, and students were given to “idleness and dissipation.” At least one of their merry pranks did not help. According to a tale told later by Charles Parsons, a barrel with “a skeleton in the course of preparation” had been inadvertently left outside the anatomical building... till college students began to kick and roll it down the steep of College street, and at the level of Benefit street it ran against some obstacle... Out came the head of the barrel, followed by another head, and great was the consternation and excitement.

No cause and effect relationship of this episode to subsequent events has been documented, but President Messer resigned, and Rev Francis Wayland was appointed as his successor. To address the lack of discipline among students, he submitted to the corporation a resolution, adopted in March 1827, to the effect that all its officers be actual residents within the walls of the Colleges... that no compensation be paid to any Professor, Tutor or other officer, who shall not during the course of each and every term occupy a room in one of the colleges... and assiduously devote himself to the preservation of order and the instruction of students—perhaps the first truly full-time faculty.

With their practices, homes, and families outside the institution, these provisions could not be met by the medical faculty, which was not exempted. The medical school de facto ceased to exist after 1827. Its faculty and graduates, however, continued to enrich the medical life of Rhode Island and other regions for years to come. Dr Parsons continued to practice surgery and to write extensively, receiving the coveted Boylston Prize on 4 occasions. A graduate, Alden March, MD, 1820, was a founder of the Albany Medical College and professor of surgery there for 30 years. He was also president of the American Medical Association. Elisha Bartlett, MD, 1826, a much-admired physician and professor at several medical schools, was appointed professor of materia medica and medical jurisprudence at the Columbia College of Physicians and Surgeons in New York. Many others became prominent physicians and surgeons in Rhode Island and elsewhere.

THE RHODE ISLAND HOSPITAL

Except for a military hospital in Portsmouth, a small Marine hospital, an asylum for the insane, and the Butler Hospital (established for the mentally ill in 1844), no hospitals existed in Rhode Island. Patients were generally cared for in their homes. In 1851, a committee of the
Rhode Island Medical Society, chaired by Dr Parsons, petitioned the City of Providence to establish a hospital for “the reception of patients who require medical and surgical treatment, and who are not otherwise provided for.” The petition went unheeded. Largely through the efforts of a returning Civil War veteran, Thomas Poynton Ives, who had studied but not practiced medicine, the original committee with several additions sent another petition, this time to the Rhode Island General Assembly. Ives had convinced his father to leave a sum of $50,000 in trust for the eventuality of a hospital. This sum, together with the stimulus of the Civil War, led the legislature to approve the proposal in 1863. The Rhode Island Hospital (RIH) was formally dedicated in October 1868 with Dr Parsons, now 80 years old, as guest of honor. He died a few months later. The RIH and the Newport Hospital, founded 10 years later on the Island, were the only general hospitals in the state before the 20th century.

As was true elsewhere, the hospital was established for those who could not afford private care. For those who could, surgical procedures were performed at home on beds, chairs, or the kitchen table. The hospital remained only for indigent patients until World War I, when increasing costs, the need for income, and a demand for appropriate hospital facilities by the well-to-do, led to the opening of a private pavilion in 1922.

A Department of Gynecology was established in 1877, with George Porter, MD, trained at the Women’s Hospital in New York, as chief. The first of 3 generations of Porters to play a significant role in surgery at the RIH, Dr Porter performed the first abdominal operation in the hospital in 1884. Early results had such a high mortality that the operating room was made off-limits for abdominal surgery. A tent and subsequently a wooden structure nicknamed “the hut” were erected for Dr Porter. With isolation from the hospital and strict antisepsis, the success rate was greatly improved. Asepsis was introduced in the 1890s by C. M. Coddington, MD, who had recently completed a surgical internship at the Massachusetts General Hospital. A new era for surgery in Rhode Island was established.

After the report on appendicitis by Reginald Fitz, MD, George L. Collins, Jr, MD, described the first planned appendectomy conducted on March 3, 1891, at RIH. House Surgeon Donald Churchill, MD, reported the first 10 years’ experience at the hospital with 214 cases in 1902.

As the century was about to turn, William Osler, MD, spoke to the Rhode Island Medical Society. He commented:

“...the reception of patients who require medical and surgical treatment, and who are not otherwise provided for.”

The existing conditions in Providence are singularly favorable for a small first-class school. Here are college laboratories of physics, chemistry and biology, and modern hospitals with three hundred beds. What is lacking? Neither zeal, persistence nor ability on the part of the physicians, but a generous donation of a million dollars with which to equip and endow laboratories of anatomy, physiology, pathology and hygiene; the money should be the least difficult thing to get in this plutocratic town.

A worthy suggestion, but implementation would wait for another two thirds of a century.

With anesthesia and aseptic techniques well established, surgical progress was steady and dramatic. While rarely the innovators of new technology, Rhode Island surgeons were quick to learn and refine new techniques. Specialties also developed apace, with the Departments of Gynecology and Orthopedic Surgery established at the RIH in the late 19th century. In 1901, a Department of Anesthesia was established with the appointment of Albert H. Miller, MD, who introduced induction of anesthesia with nitrous oxide prior to etherization, a remarkable advance at the time.

Although the medical school remained for later years, educational efforts continued to develop. The 2-year internship was formally established as an educational program at the RIH in 1893. Formal residencies did not exist, but “house surgeons” serving as preceptees received important clinical experience under supervision. This became progressively more formalized, resulting in residencies similar to those of the present time.

In his presidential address to the NESS in 1937, Lucius C. Kingman, MD, chief of surgery at RIH, emphasized the importance of graded responsibility from internship through levels of the residency, including younger visiting surgeons who continue to develop and learn while teaching the resident staff. He also thought that residents should be paid and recommended a special endowment for the residency. As president of the Rhode Island Medical Society in 1940, Dr Kingman reviewed the previous 35 years of surgery in Rhode Island. He noted the high mortality at the beginning of the century for gallbladder surgery, which had since become a common and safe operation. He attributed improved surgical results to a better understanding of physiology and pathology, better diagnostic techniques and safe anesthesia, and a reliance on “statistics and observation to find the proof, not to fit a [preconceived] theory or assumption.”

During World War II, the RIH unit, the 48th Evacuation Hospital, with J. Murray Beardsley, MD, as chief surgeon, served largely to support the “Stillwell Road” in India and Burma. Several accounts of their experiences have been reported, including that of past-president, Tom Perry, MD. The war led to striking advances in surgery, the treatment of trauma and shock, transfusion therapy, antibiotics, and many others. It also led to an era of increased expectations and demands, including expansion of surgical training, increased funding for research, and the stimulus for development of new fields such as vascular and cardiac surgery.

Emery Porter, MD, son of Dr George Porter and chief of surgery, RIH, put the surgical residency on a firm footing. In his 1949 presidential address to the NESS, he emphasized the importance of graded responsibility for residents. He also thought they should be paid.

Although the suggestion will probably be met with opposition, I believe it is high time to give the student of medicine the same economic advantages as the graduates of other professional schools possess at a like stage in their careers.

In gynecologic surgery, the legacy of Dr George Porter was later inherited by Herman Pitts, MD, and George Waterman, MD. Dr Waterman, president of NESS, 1956, was a pioneer in the development of radiotherapeutic techniques for the treatment of uterine cancer, methods that became widely utilized elsewhere.
Two large bequests resulted in a new building for RIH in 1953. A major component was an intensive care unit (ICU), conceived by Dr Beardsley, then surgeon-in-chief, and his associates. It was apparently the first ICU designed and constructed for this purpose. Dr Beardsley, a pioneer in thoracic surgery in Rhode Island, thought of the ICU as a means to provide both appropriate care for critically ill patients and education for surgical residents and staff.

Teaching activities in surgery expanded greatly in the postwar period, with approved training programs established in most major specialties, including the first residency in plastic and reconstructive surgery in New England, organized by Richard Sexton, MD. Dr Beardsley also established a surgical research laboratory. Lester Vargas, MD, who had worked with a cardiac surgical team in New York, undertook research involving cardiopulmonary bypass. Although the first cardiac surgery in Rhode Island without bypass had been a mitral commissurotomy in 1951 by Jesse Eddy, MD, at the Memorial Hospital in Pawtucket, Dr Vargas performed the first cardiac surgery using cardiopulmonary bypass in 1959 and ushered in a new era in surgery of the heart and great vessels.

BROWN’S SECOND MEDICAL SCHOOL

Brown University at the time had strong programs in the sciences and recognized the need for scientists with a medical orientation. In 1963, it opened a 6-year undergraduate/graduate program leading to a masters of medical science degree, from which graduates could continue to work for the PhD degree or transfer to other medical schools for 2 years to obtain an MD degree. For clinical experience, Brown decided to affiliate with several hospitals in Rhode Island with the idea that participation in undergraduate teaching would help maintain and raise standards in all participating institutions. Initial participants included 4 general hospitals, The Miriam Hospital (TMH), the RIH, the Roger Williams Hospital in Providence, and the Memorial Hospital in Pawtucket. Also included were the Providence Lying-In Hospital (later Women and Infants Hospital), the Butler Hospital for the mentally ill, and the Bradley Hospital for mentally ill children.

In surgery, Lester Vargas, MD, having succeeded Dr Beardsley as surgeon-in-chief of the RIH, was appointed professor of surgery in 1963. In 1967, 2 surgeons of national stature joined the faculty, Fiorindo A. Simeone, MD (Figure 2), and Henry T. Randall, MD (Figure 3). Dr Simeone came to Rhode Island from Italy as a small child. His interest in physiology was stimulated by Professor W. C. Young, MD, at Brown and refined by Professor Walter B. Cannon, MD, at Harvard Medical School. He completed residencies in surgery at the Massachusetts General Hospital and in urology at the Peter Bent Brigham Hospital. During World War II, he served with the Productive Research Unit attached to the Army's Fifth General Hospital. Following the war, he returned to the Massachusetts General Hospital, where he, with Robert Linton, MD, established one of the first vascular laboratories. In 1950, Dean Joseph Wearn invited him to join the faculty of Western Reserve University to help develop a new curriculum in which instructors in basic and clinical sciences cooperated throughout in teaching of subject areas such as the circulatory, gastrointestinal, and other systems. While there,
he continued his extensive studies of circulation and shock. In 1967, he was invited to return to his alma mater as professor of medical science, first chairman of the Section (later Department) of Surgery, and surgeon-in-chief of TMH. The Miriam Hospital was established by the Jewish community of Rhode Island in 1927. The trustees and staff of the hospital were enthusiastic about participation in the medical program, and a new research building was soon a part of the hospital complex, funded largely by the Jewish community.

Henry T. Randall, MD, was a graduate of Princeton and the Columbia University College of Physicians and Surgeons. His internship and residency at the Presbyterian Hospital in New York were interrupted by service in the Army during World War II. After completing his residency, he remained on the faculty at Columbia, engaging in research on metabolism and fluid and electrolyte balance. His lifelong interest in these areas resulted in numerous major contributions to knowledge and understanding of these complex problems. In 1951, he became clinical director and chairman of the Department of Surgery at the Memorial Center for Cancer and Allied Diseases in New York and professor of surgery at Cornell. In 1967, ready for a change, he was enticed by Dr Vargas to come to the Ocean State to head the Division of Surgical Research at RIH, and he was appointed professor of medical science at Brown.

The 2 major surgical teaching services in RIH at the time were led by Thomas Perry, MD (NESS president, 1974), and Arnold Porter, MD, the third generation of Porters to play a significant role at the RIH. One of us (R.W.H.) was attracted to TMH by Dr Simeone in 1970 and was also appointed professor of medical science (the title at the time referring to full-time teaching and research faculty). Dr Vargas fell ill and died in 1971, and Dr Randall then became surgeon-in-chief of the RIH and, by planned rotation, chair of the Section of Surgery at Brown. Karl Carlson, MD, joined the group in 1971 as director of the Division of Cardiothoracic Surgery at RIH and professor of medical science at Brown.

By the late 1960s, it was apparent throughout the country that a shortage of physicians existed. Medical schools were stimulated by federal funding to increase the size of classes and output of physicians. In Rhode Island, a majority of newly licensed physicians had obtained medical education outside the United States. Although some Brown faculty feared that a medical school would change the character of the institution, the university agreed to proceed with an MD program, extending the 6-year program to 8 years. This continuum provided for most students substantial coordination of undergraduate and medical studies. In January 1973, the first clinical clerkships of the new program in medicine were started—in surgery, of course—at the Miriam and Rhode Island Hospitals. The internists, happy to have more time to deliberate, were offered the initial clerkship in medicine after the 12 weeks in surgery had been completed. The students survived, receiving the MD degree in 1975. A number of the initial class are now full professors at major medical schools, including our own Department of Surgery.

In the 1970s, Dr Simeone continued his studies of shock and the circulation with one of us (R.W.H.) and numerous medical students. Dr Randall, with Chung-Ja Cha, MD, Robert Stephens, MD, and students, carried on studies of nutrition and metabolism, using the “space diet” to maintain nutrition in many patients whose gastrointestinal tract was only marginally functional. Dr Karlson with George Cooper, MD, continued to refine the membrane oxygenator for cardiopulmonary bypass—the origins of which may be traced to George Clowes, MD, in Dr Simeone’s laboratories in Cleveland in the 1950s.

In 1980, a new program for medical students was instituted in cooperation with the Dartmouth Medical School, in which students spend the first 2 years at Dartmouth and the last 2 years at Brown. Students may now apply to any or all of the Dartmouth, Brown, or Brown-Dartmouth programs.

The Veterans Administration Medical Center became part of the Brown University group of hospitals in 1973 with Harry Harrower, MD, as chief of surgery, adding an important element to the teaching of both students and residents. In 1975, an integrated surgical residency program was established, based at RIH and including TMH, the Veterans Administration Medical Center, and the Roger Williams General Hospital. Harold Wanebo, MD, joined the faculty at the Roger Williams as professor of surgery, heading a Division of Surgical Oncology. The integrated program has continued, with graduates holding important teaching appointments at a number of institutions.

At TMH, Dr Simeone retired in 1977, and M. Terry McEnany, MD, was appointed professor of surgery and surgeon-in-chief. Dr McEnany moved to the Ohio State University in 1980 and was succeeded at TMH by one of us (R.W.H.). In 1986, A. Gerson Greenburg, MD, was appointed surgeon-in-chief, where he has continued work on stroma-free hemoglobin as a blood substitute.

Dr Randall retired in 1980, and Donald Gann, MD, was appointed surgeon-in-chief at the RIH and chairman of the Department of Surgery at Brown. There he continued investigations of the metabolism of trauma and shock until 1988, when he moved to the University of Maryland. Dr Greenburg served as Brown’s chair of the Department of Surgery from 1988 to 1993. In 1993, Kirby Bland, MD, was appointed surgeon-in-chief at RIH and chairman of the department at Brown, continuing his long interest in surgical oncology, especially cancer of the breast. He relocated last year to become chairman of the Department of Surgery at his alma mater, the University of Alabama.

A pioneer in minimally invasive surgery has been Joseph Amaral, MD, Brown graduate, 1981, professor of surgery and now chief executive officer at RIH. At the Women and Infants Hospital, Blake Cady, MD, NESS president, 1995, returned to his origins and was appointed professor of surgery in 1997. Specialties have continued to grow. Richard Hopkins, MD, appointed professor and chair, Division of Cardiothoracic Surgery, in 1996, expanded the clinical and research programs and was recently appointed to the new position of Karlson Chair of Cardiothoracic Surgery. The program in pediatric surgery, initiated in the 1960s by Frank DeLuca, MD, and Conrad Wesselhoeft, MD, has flourished with the construction of the Hasbro Children’s Hospital and the appointment of Thomas Tracy, MD, as professor and di-
rrector of the division. Substantial progress has been made in other surgical specialties, including urology (with Barry Stein, MD, professor and chair, and Anthony Caldamone, MD, Brown graduate, 1975, professor and pediatric urologist), orthopedic surgery (Michael Ehrlich, MD, Zecchino professor and chair), and neurosurgery (Mel Epstein, MD, professor of clinical neurosciences [neurosurgery] and cochair of neurosciences).

During the 1980s, the rising costs of health care began to have an increasingly adverse effect on all hospitals, and plans for expansion and upgrading of programs had to be curtailed. In 1994, RIH and TMH, 2 major affiliates of the Brown University Medical School, merged to form Lifespan, a not-for-profit organization and Rhode Island’s first health system. In 1997, the Tufts–New England Medical Center joined Lifespan, which, with other Rhode Island partners, became the largest regional health system in New England.

Looking at the crystal ball, where does this lead? In Rhode Island and elsewhere, measures for controlling costs conflict with efforts to provide optimal medical care. Rising numbers of citizens are uninsured. Reimbursement for hospitals and physicians decreases while expectations of new and expensive care increase. Why should bright young people wish to enter the fields of medicine and surgery? Paradoxically, applications to medical schools remain high, and our students and residents are among the best ever. Do they know something we don’t know? Perhaps they do. In their spirit lies ample reason for optimism.


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Surgical Anatomy

The subclavian artery becomes the axillary artery at the lateral border of the first rib. The axillary artery becomes the brachial artery at the inferior border of the teres major muscle.