IN MEMORIAM

HOWARD ATWOOD KELLY
1858—1943

IN THE death of Howard Atwood Kelly on January 12, 1943, the American Gynecological Society lost its most illustrious member. Dr. Kelly was born in Camden, New Jersey, on February 20, 1858. In an autobiographical sketch[1] he says: "On my father's side were the families of Kuhl and Michael Hillegas, our first treasurer of the United States, and the two Kelly brothers (Thomas and Philip), who came over from the north of Ireland in the eighteenth century, when they had been converted from the established church to Methodism under John Wesley and found it difficult to remain at home; they became pillars of the Methodist Church in Philadelphia."

Dr. Kelly's mother, Louisa Warner Hard Kelly, was the daughter of an Episcopal minister, Anson Bois Hard, whose ancestors came from England to Connecticut in 1646. The Warners were prominent in Wilmington, Delaware, in colonial days. During the Civil War, while his father, Henry Kuhl Kelly, was serving in the Union Army, the mother, with Howard and his three younger sisters, made their home near the maternal grandparents in Old Chester, Philadelphia. It was in these earliest formative years that his mother instilled an interest in the Bible and in the natural sciences, two subjects that were followed with enthusiasm throughout a long and astoundingly productive life.

In Charles J. Cohen's privately printed *The Faires Classical Institute,*[2] Dr. Kelly's "Reminiscences" give us a vivid picture of the higher type of private school prevailing in America a century ago. The Reverend John Wiley Faires was a Scotch-Irish schoolmaster who did not spare the rod and spoil the child. He seems, however, to have been a man of character, who understood his boys and knew how by precept and example to direct them toward good scholarship and cooperative community living. According to this source, Dr. Kelly's schooldays forecast an active future both physically and mentally. As a boy of ten he did not hesitate to carry an argument by force if milder persuasion failed. Having one day been threatened by two schoolmates, he packed in his lunchbox the next morning a hatchet. "I still feel the thrill of unmitigated satisfaction at their alarm," he says, "when at the corner of Thirteenth and Locust Streets the weapon was produced and brandished in token of readiness for action." He introduced a novel wrestling maneuver in the gymnasium activities. With

a sudden rush he ducked quickly, grasping the adversary by both ankles, pushing his legs apart and then upending him on the gymnasium floor. "This strange device worked well," he reports, "and placed me on a pinnacle with my coevals until I grew rashly bold and one day tackled Caspar Morris, who was certainly born for the ring, for he simply reached over my bowed back and, grasping me by the seat of my breeches, inverted me *kopfheister* in the air." These boyish pranks combined with a naturally phenomenal mental and physical coordination foreshadowed some of his civic activities when years later, as a member of the Baltimore Reform League, he resorted to strong-arm arguments in an effort to convince a bunch of loafers on Marsh Market Space that ballot-box stuffing was not in keeping with American tradition.

Having entered Faires School in 1867, at the age of nine years, Dr. Kelly's college preparatory course included a thorough grounding in English, Latin, Greek, French, mathematics, history, penmanship, and drawing. He recalls that his two bugbears were the annual oration, and the weekly composition. Posterity is indeed fortunate in that he should have overcome these two aversions to the extent of becoming both an accurate and convincing writer and speaker.

In 1873 he enrolled in the arts department of the University of Pennsylvania, being awarded the matriculate prize in Latin and at the end of four years went on to the Medical School. He states: "I entered the Medical Department in the University of Pennsylvania in 1877, not because I loved medicine as such, but because anatomy and sundry associated scientific studies seemed the closest approach to Natural History, in which it was hard to make a living. Four years in Medicine brought delightful associations with eminent scientists, Joseph Leidy, Edward Drinker Cope and Harrison Allen. Cope I had long known as a teacher and patron through my interest in the reptile kingdom.

"The attempt to cultivate both science and medicine proved too much for the frail flesh, so I had to go West for the year 1880-1881, as a cowboy on the plains of Colorado, on the O. Z. Ranch, to win back my ability to sleep. Returning from Colorado I took my medical degree in 1882 and entered the Episcopal Hospital in Kensington, Philadelphia, for a residence of over a year. Here at last my real medical education began in the dispensaries and wards under excellent and always kindly and sympathetic chiefs, men of reputation, such as Morris Lewis, Louis Starr, J. M. Anders, in medicine, and C. B. Nancrede, John Hooker Packard, and William S. Forbes, in surgery. I found a particularly congenial friend in Andrew K. Minich, chief of the dispensary service, who took a keen interest in his young protégés. After I left the hospital Dr. Minich continued his interest in aiding and abetting my surgical aspirations in every way, circulating the report that I did a cesarean section every morning before breakfast.

"Hospital experience drew me into intimate touch with the problems of suffering humanity and revealed the priceless gratitude of the poor when treated with affectionate consideration; this was the final touch necessary to convert all my interest to my profession, no longer merely a means of livelihood, but a shining path of service replete with rich spiritual rewards. I owe to the poor and the millworkers of Kensington, and all others since who have trusted me so unreservedly through life, the rich rewards of joy and satisfaction the practice of surgery has brought me, these past forty-three years."

Imbued with this spirit, it is not surprising that at the end of his internship in 1882 he decided to give up his home in Philadelphia and settle among his mill people where active surgical work was waiting. His first hospital consisted of two rooms on the second floor of a workingman's home where the housewife acted as nurse. In 1884, needing more space, he moved to a three-story house, and about 18 months later to Kensington Hospital, established in 1883, a four-story building on Norris Square. Dr. Kelly was most active in the organization of this hospital and its incorporation in 1887. During all these years the activities of our young surgeon were commanding attention from the medical men at home and abroad. He never ceased to recall with gratitude the encouragement given him by such men as Agnew, Horatio Wood, William Pepper, Wier Mitchell, William Osler, and Joseph Leidy with whom Kelly as a student had served as prosector in anatomy. At a Testimonial Dinner on his seventy-fifth birthday, he states:[3] "What interested Osler most was, I think, my good library of the medical classics, which I got mainly in Germany. I had the Editio Princeps of Galen (1525) and the first Latin edition of Hippocrates, and a great number of others, coming down the centuries."

In 1888 Howard Kelly was appointed with Barton Cooke Hirst to fill jointly the chair of obstetrics and gynecology in the University of Pennsylvania, recently vacated by the resignation of William Goodell. In 1889, at the age of 31 years, Dr. Kelly was called, largely through the influence of Osler, to occupy the chair as professor of obstetrics and gynecology in the newly organized medical department of the Johns Hopkins University, and to the directorship of these branches in the hospital.

By referring to the bibliography of Dr. Kelly's publications, prepared in 1919 by Miss Minnie Wright Blogg,[4] librarian of the Johns Hopkins Hospital, we find that in his Kensington years, from 1882 to 1889, or from the age of 24 to 31, he had published sixty-five papers. That this record attests an enormous capacity for work must be admitted when we reflect that in those pioneer days the surgeon usually served as his own secretary in obtaining a systematic history and physical examination, and in writing the notes of operation and postoperative care. He was likewise intern, nurse, and orderly for a large part of the patient's postoperative treatment. Much of his operating was done in the pa-

tient's home, and the surgeon was often his own coachman and anesthetist, at least until the patient was asleep, when some member of the family or a neighbor poured ether or chloroform under close supervision by the operator. If fortunate enough to secure a reliable coachman, the surgeon sometimes trained him to act as anesthetist as well.

Despite all these time-consuming activities, Dr. Kelly devoted many of his best hours to the avocation of being a good citizen. He tells us[2] that, in association with his sister, Esther (later Mrs. Robert P. Bradford), "there began that model Christian social work in which the all-pervading, dominating force is the evangelical message, while the physical needs of the people are met as well throughout the year. This is the widely known Lighthouse (Kensington) on West Lehigh Avenue near the hospital, with its great associated activities, now maintained by a large corps of Christian workers."

During the seven years of pioneer work in Kensington, Dr. Kelly visited Europe three times. In 1886 he went to England, Scotland, and Germany. At the meeting of the British Medical Association at Brighton, Dr. Kelly reported on the diagnosis and removal before rupture of a tubal pregnancy. Lawson Tait, then England's foremost abdominal surgeon, made it plain that he did not think much of the young man's "cocksure" diagnosis, for this was a matter of "expert instinct" and therefore hardly attainable by the average man.

In Leipzig Dr. Kelly was tremendously impressed by the teachings of the gynecologist Sänger on the great importance of systematic, careful palpation of the ureters in every preliminary physical examination of the patient complaining of pain in the back, abdomen, or pelvis.

On his second European trip, in 1888, he made a special point of a visit to Pawlik of Prague to perfect himself in the method of catheterizing the female ureter through the water-filled bladder by "fishing" for the orifice with the metal ureteral catheter, devised in 1875 by Gustav Simon. Dr. Kelly had used this method since Pawlik's first publication, and after his Prague visit he went to Berlin where Rudolf Virchow gave him access to abundant autopsy material for further experimental study. This continued to be the simplest and most satisfactory method of ureteral catheterization until in 1893 he discovered his own method of catheterizing the ureter under direct vision with air distention of the bladder.

The chief event of Dr. Kelly's third European visit during his Kensington period was his marriage on June 27, 1889, in Danzig, to his life's helpmeet, Laetitia Bredow, daughter of Dr. Justus Bredow of Stettin. This union was destined to continue to the day on which both of them died, fifty-three years and six months later, and it was marked by an ideal family life with nine children.

During the Kensington period Dr. Kelly's pioneer surgery was of a general nature, but tending more and more toward specialization in

gynecology. Only six of his sixty-five publications during this period were on obstetrical subjects, two of these dealing with cesarean section. He performed three successful cesarean sections, the first one said to have been the first to terminate favorably in Philadelphia in fifty years. His "Pelvic Measurements"[5] and the "Resuscitation of the Asphyxiated New-Born Child,"[6] both showed his bent for scientific research on better methods for avoiding serious catastrophies during childbirth. After occupying the combined chair of obstetrics and gynecology for the first ten years of the Hopkins period, Dr. Kelly felt that both departments could be greatly strengthened by having separate executives, and he relinquished the chair in obstetrics in favor of his associate, J. Whitridge Williams, who had had nominal charge of the department since the medical school opened in 1893.

Dr. Kelly's generally conceded position as Father of American Gynecology depended on so many factors that one hesitates to attempt to analyze some of the chief influences affecting his career. In the first place, he was endowed with a phenomenal mind, as shown by his intelligent grasp of many scientific interests early in life. He had many athletic tendencies, being an expert swimmer, canoeist, and cyclist, and his devotion to botany, biology, anthropology, astronomy, and geology meant numerous short or long trips into the wilds and away from too close confinement to city life and book work. His annual vacation of from two to three months at his summer home on beautiful Lake Ahmic, 200 miles north of Toronto, contributed greatly to his marvelous physical health and enabled him to keep up his lifelong studies in the natural sciences. Finally, his practical religious life, stimulating his endeavors to an unselfish interest in helping others physically, mentally, and spiritually, filled enough time to occupy the entire life of an ordinary individual.

His surgical activities began at an opportune time. General anesthesia was well established, robbing surgery of its previous horrors. Dr. Kelly's open mind quickly grasped the importance of the newer discoveries in pathology and bacteriology as applied to diagnosis and aseptic technique. Having been prosector for Leidy in his student days, he continued to make valuable use of the autopsy room for working out details of anatomical relations as an aid to rapid and fearless operating, and especially to help in the art of illustrating his work. His remarkable operative dexterity fascinated visitors from all parts of the world. He had the ability of explaining each step of the operation without sacrifice of valuable time. With blackboard and chalk he could ambidextrously add further details between operations. Broedel always claimed that Dr. Kelly's unique ability as an illustrator, and his appreciation of the difference between an imitative and a creative drawing in the illustration of an operation or a tumor had a great influence on the department of anatomical art. His mastery of Greek and Latin gave him direct access, through his library of

classical medicine, to the lore of the ancients, while his command of German, French, Italian, and Spanish enabled him to keep abreast of the modern medical world.

His more certain claim to the veneration of posterity is to be found in the printed and illustrated word which he bequeathed in such abundance and richness to his beloved profession. Only those of us who are old enough to have been familiar with the surgical practices of the last decade of the nineteenth century can fully appreciate the value of Dr. Kelly's early contributions in originating, extending, simplifying, and standardizing many procedures which are commonplace today. Furthermore, his greatness as a man and a teacher is testified to by the accomplishments of the hundreds of men who had the great privilege of at least one year under his special tutelage.

Few living men are old enough to have experienced the disagreeable atmosphere and stultifying etiquette prevailing in operating rooms early in this century, and it has always been this writer's conviction that to Dr. Kelly's example is due much of the favorable change. For a number of years it had been the custom for American surgeons to broaden their education by frequent visits to European clinics. The Germans were the leaders during the last quarter of the nineteenth century, and too often the atmosphere of their operating rooms was that of Prussian militarism. Along with the good points of technique brought home from these visits many surgeons adopted the overbearing, boorish attitude of publicly belittling their assistants and of transferring to them the onus of any shortcomings in operative procedure. This humiliating criticism not infrequently led to resentment and a distinct let-down by the victim in the character of his staff and hospital work. Dr. Kelly, on the contrary, kept every assistant on his toes, stimulating him to do his best. In the event of a momentary lapse slowing up team work, the offender might get a *sotto voce* admonition to "assist with the head as well as with hands and feet," but this would be in a half-joking spirit and inaudible to the large audience usually in attendance. Dr. Kelly's approachability, frankness, and kindliness created a remarkable *esprit de corps* within his staff, while his immense capacity for work, his inquisitiveness for a better understanding of the obscure, his constant striving for better methods of procedure (with newly devised instruments if necessary), and his quiet insistance on complete records of the patient (covering early history, therapeutic or operative measures used in hospital, and laboratory findings before and after operation), set a high standard for every member on the staff. One could not be associated with this man's dynamic and inspiring personality for long without being stimulated to emulate him and to make at least some small contribution to medical knowledge.

For those fortunate enough to remain on the staff for the five years necessary to complete the residency, Dr. Kelly, with the enthusiastic

cooperation of Cullen, arranged that one of these years be devoted to assistant residency in the department of general pathology, coincident with supervision of the staff work in gynecological pathology.

Dr. Kelly's activities in urology having been centered largely on diseases of the female, one can scarcely speak of him as the Father of American Urology. During his active days no one doubted his leadership in surgery of the urinary tract. Of course Sims led the world in developing successful methods for the cure of vesicovaginal fistula, and Emmett and Kelly were early and enthusiastic contributors in this field. Kelly's renal surgery set a high standard which has probably never been surpassed. The beautifully illustrated two-volume textbook, published in 1914 by Kelly and Burnam, on *Diseases of the Kidneys, Ureters and Bladder,* still provides the urologist with one of the most valuable sources of reference for the early developments in this specialty.

History will probably give Kelly his highest rating in urology, not because of his superb surgery in this field, but because of his early recognition of the ureter as an organ susceptible to disease. His first visit with Sänger of Leipzig, in 1886, resulted in his publication in the *Transactions of the American Gynecological Society* in 1888 of the article on "Examination of the Ureters," in which he emphasizes the relative frequency of ureteral disease, the tendency of mistaking its symptoms for disease of the kidneys or bladder, or for "functional disease," and the ease with which the signs of ureteral disease may be detected by vaginal palpation.

After evolving, in 1893, his own simple method of catheterizing the ureters by direct vision through the air-distended bladder, Dr. Kelly wrote many articles on the value of catheterizing the ureters for diagnosis and therapeutic purposes, and described many new instruments to help in this work. His contributions probably did more than those of any other individual to reduce the prejudice existing in the medical profession concerning the dangers of these methods of diagnosis and treatment.

In 1902, in the *Journal of the American Medical Association,* we find his paper on "Stricture of the Ureter." After pointing out the recognized ill-effects, upon the bladder and upper urinary tract, of neglected urethral stricture, Dr. Kelly states: "We must with better discrimination call many of our cases hitherto labeled 'pyonephroses' and 'hydronephroses' by the proper name of 'stricture of the ureter' and then describe the secondary changes produced by the accumulation of urine or pus in the upper urinary tract." This statement, probably the most important one written in urology since Simon of Rostok, in 1875, showed that the ureter could be catheterized, was so far in advance of the thought of that day that no one gave it any notice, and there still exist prominent urologists who have not grasped its implications.

Forbidden to name Dr. Kelly the Father of American Urology, it is probably safe to say that the ultimate judgment of history will give him a leading position as one of the world's great urologists.

In his "Janeway Memorial Lecture,"[7] Dr. Burnam presents in clear outline Dr. Kelly's early activities as a pioneer in radiation therapy, both with radium and with deep x-ray. The author credits Dr. Robert Abbe of New York City as being the American pioneer and "one of the very earliest users and proponents of radium in the world."

Always concerned with the question of whether a given case of cancer would respond more readily to treatment by operation or by radiation, it was only natural that Dr. Kelly should become intensely interested in the newer methods of endothermy and electrosurgery. In 1932, with his associate, Dr. Grant E. Ward, he published a valuable treatise on *Electrosurgery*.

His passion for making operative procedures plain to the student, and especially to the rural surgeon who does not have easy access to large surgical clinics, led to the development of his Stereo Clinics. Beginning in 1908 and extending over a period of several years Dr. Kelly, with his associate, Dr. Cecil Vest, visited clinics in America and Great Britain to obtain the stereo photographs for this series of thirty-nine sections. Incidentally this was the forerunner of the present-day moving pictures of important operations.

In Dr. George W. Corner's "Howard Atwood Kelly as a Medical Historian"[8] we learn that "his first historical paper appeared in 1890, soon after his removal to Baltimore. He took a leading part in the first meeting of the Johns Hopkins Hospital Medical History Club in November, 1890, and was still interested fifty years later, at the Golden Anniversary of the Club, when he gave a lively review of its early years. During the half-century between these two events, he published about sixty articles and books on historical topics."

The most extensive of these historical works is his *A Cyclopedia of American Medical Biography, Comprising Lives of Eminent Deceased Physicians and Surgeons from 1610-1910.* Fielding H. Garrison says: "The best account of American gynecology is the essay by Howard A. Kelly in the introduction to his *Cyclopedia of American Medical Biography.*" This introduction, or Dr. Kelly's "History of American Gynecology" in Arthur H. Curtis' *Gynecology and Obstetrics,* 1933, Vol II, p. 473, should in this writer's opinion be required reading for the physician planning to enter gynecology as a specialty. The following quotations from his introduction to the *Cyclopedia* reveal Dr. Kelly's warm human enthusiasm over his chosen specialty:

"The history of Gynecology seems to me more full of dramatic interest than the evolution of any other medical or surgical specialty."

"Gradually out of the inchoate mass transmitted to us through the centuries, in the course of the last hundred years, there has arisen a

specialty which has aroused more interest, and whose development has been followed with more enthusiasm, than that of any other branch of our art."

"The new specialty, the first of all modern specialties, was the child of a new spirt in a new age, born in an era of healthy skepticism, and fostered by every new and quickening influence in an age pre-eminent in scientific investigation and progress."

"First and foremost of all our special societies in its long and splendid record of service stands the American Gynecological Society which was founded in 1876, under the presidency of Fordyce Barker."

In an evaluation of Dr. Kelly's gift to the Hopkins Library of his collection of medical classics, the late Dr. John R. Oliver[9] states: "Dr. Kelly's gift makes the Hopkins (now Welch) Library one of the best sources in America for those who wish a 'book-laboratory' for the study of Medical History."

Dr. Kelly was blessed with remarkably good health almost to the time of his death in 1943. After resigning the professorship at the Hopkins, in 1919, he confined his work to his private hospital, but during all that interval it was always a gala day on the gynecological service when Dr. Kelly was announced to operate. His last operation at the Hopkins was for an ovarian cyst of endometrial origin, done on January 10, 1938, about one month before his eightieth birthday. He led a surprisingly active and useful life for another five years.

Early in January, 1943, urgent symptoms of uremia developed and he was taken to the Union Memorial Hospital. Mrs. Kelly had been confined to bed, or in a wheel chair, for several years with arthritis, and a change for the worse determined her removal to the same hospital a few days later. Dr. Kelly passed away quietly at 3 A.M. on January 12, and Mrs. Kelly died five hours later. A simple but most impressive dual funeral service was held in Memorial Protestant Episcopal Church on January 14, 1943. Of their five sons and four daughters, all were present except Major Edmund B. Kelly, who was serving with the Hopkins Base Hospital Unit No. 18 in the Fiji Islands.

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HOWARD ATWOOD KELLY*

Presidential Address

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ONE cannot assume the presidency of this Society composed, as it is, of one's best friends and most respected colleagues without a feeling of great humility. One is especially humbled when he contemplates the illustrious men who have preceded him as president of this organization. I look back at one of our former presidents with special pride and affection and I am sure many of the older Fellows will join me in this fond memory. I refer to the first Professor of Gynecology of the Johns Hopkins University, Dr. Howard Atwood Kelly. To most of the present Fellowship of this Society he is only an illustrious name but we all owe much of our training in modern gynecology to him whether or not we are conscious of it.

"Accordingly as we remember others so those yet to come will remember us. If we live only for the present and for our own age and reject the past because of imperfections, so in turn will we ourselves as surely be forgotten and despised as the centuries roll over our dust." These are the words of Howard Kelly spoken in 1912, to this Society in his introductory remarks as he presented his Presidential Address on "The History of Vesico-Vaginal Fistula." It would seem from these words that he had some intimation that he, too, was making gynecological history as did the illustrious Simms, Emmett, and others, whose work he was reviewing.

It is not an easy task, within the time allotted me, to give you a comprehensive picture of the life of such a colorful and versatile man as Howard Kelly, but I shall try to give you a very brief sketch of the many facets of this remarkable character.

Dr. Kelly was born in Camden, New Jersey, on Feb. 20, 1858, the son of Henry Kuhl and Louisa Warner Kelly. His mother, the daughter of an Episcopal minister, was a deeply religious woman and it was from her that he apparently acquired his early training in religion of the strictest fundamentalist type, which he professed openly and worked at ardently throughout his life. His father was a successful man of affairs and served in the Union Army. His great-great-grandfather, Michael Hillegas, was the first treasurer of the United States.

At the age of 9, Howard Kelly was entered as a pupil in Faire's Classical Institute. There he received excellent training in the classics. Perhaps this early training accounted for his ability to write, speak, and read German, French, and Spanish easily and correctly. After his school days he became sufficiently familiar with Greek and Hebrew to read the Bible in these languages. He was wont to keep his linguistic talents to himself but on occasion amazed the

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staff when he displayed them. Dr. Casler relates how on one morning there was a visiting nurse from Athens, Greece, in the operating room. When she was introduced to Dr. Kelly, he conversed fluently with her in her native tongue.

While reviewing his own life at the banquet given for him in 1933, Dr. Kelly said, "I wanted first to be a naturalist and went into medicine as a close ally. Going through the medical school at the University of Pennsylvania, I got a bad case of insomnia, and broke down, shortly before graduation, mostly from overwork. I went out to Colorado in 1879, batching it in Colorado Springs and then went out onto the O-Z Ranch in Elbert County as a cowboy.

"I gave thanks when I returned to Philadelphia in 1882. My real education came in the dispensaries and wards of the Episcopal Hospital among the Kensington folk who trusted me and repaid my poor efforts with a warm friendship which continues today. In this atmosphere of trust and affection, I felt I had found richer rewards than even the greatest of the sciences could bestow.

"After my residency in the Episcopal Hospital, it seemed better to locate right there in Kensington, where work was waiting, than to settle down assisting the older doctors. The patients were poor, some of them lived in near-by Louse Harbor! But they let me do things which would not have been possible down town.

"My old friend and teacher, Dr. William Goodell, was rather critical, fearing I was getting too bold."

But Dr. Kelly was encouraged in his pioneer efforts at surgery by such men as Agnew, Horatio Wood, William Pepper, and Osler, whom he called frequently in consultation.

He continues: "After my apprenticeship in the big Philadelphia mill area, and as associate professor at the University of Pennsylvania, came the call to Hopkins to join the splendid group, ready to venture new things in medicine both in its practice and teachings, with Welch and Osler, Halsted and Hurd, in 1889."

Thus at the age of 31 did the youthful-appearing "Kensington Colt" come to Hopkins as the first professor of gynecology and obstetrics and director of these departments. His youthful appearance was the occasion of many practical jokes, especially by Osler who took pleasure in portraying Dr. Kelly to his patients as a man of mature age and dignity. Then he would usher in the boyish, smooth-shaven Kelly and delight in watching the patient's reaction.

On one occasion Osler asked Kelly to cystoscope one of his patients, which he did by the air method. As Dr. Kelly put his eye to the cystoscope the patient suddenly sneezed, allowing a blast of urine to hit him in the face. Kelly immediately picked up the patient's history and wrote: "Dear Osler: All I know about your patient is that her urine is salty."

Immediately on the opening of the Johns Hopkins Hospital, Kelly established the long-term residency training in Gynecology, with Hunter Robb as the first resident. Judging by the quality of his several residents we may wonder whether this was not his greatest contribution to his specialty. A list of his

residents would include many of the fellows in this Society of that era. Kelly's postgraduate discipline, by means of the long-term residency, was an entirely new concept in surgical training at that time. Each year the assistant residents were given increasing responsibility in the care of patients and in the operating room. Surgery upon the ward patients was done almost exclusively by the resident and his assistants, subject to consultation and help when necessary by the senior staff. Kelly was most kind and considerate in his relation to his house staff, treating the younger men as friends and younger brothers, rather than assistants. Nevertheless, he gave them heavy clinical responsibility and insisted that they fulfill their obligations. When asked on one occasion why he did so much for his house staff he replied: "When I was resident in a Philadelphia hospital, the head of the surgical department wanted to do everything himself, and when I amputated a finger upon one occasion, the surgeon reported me to the trustees for over-stepping my authority. I made up my mind, right then and there, that if I ever were head of a surgical department, my men would be given every opportunity." How long it has taken for Dr. Kelly's idea of real residency training with increasing responsibility year by year to be generally accepted in this country, and how much the creation of more residencies in fact as well as in name would do for the training of gynecologists!

We have set up standards of training in gynecology today, but to what avail if first-class residency training cannot be obtained by the competent and eager young physician who desires the best in gynecological training? We are in the position of the playwright who wrote an extraordinary play, requiring five elephants on the stage at once. The producer read the play and said, "This is fine but how do I get five elephants on the stage?" To which the playwright answered, "That is your problem, sir. I only write the plays." We have written the requirements for the prospective gynecologists but have failed to date to produce the residencies necessary to complete our obligation.

While still a young man in Philadelphia, Dr. Kelly began traveling abroad, and in 1886 he first visited England, Scotland, and Germany. While in England he attended the meeting of the British Medical Association at Brighton. Lawson Tate gave the address in surgery. Kelly was invited to take part in the proceedings of the gynecological section and reported a case of unruptured tubal pregnancy diagnosed preoperatively and proved at operation. Tate remarked that he did not concur in the "cocksure diagnosis" of the young man and made light of his communication. Thus early in his career the future leader of American gynecology had an encounter with the then most dominant figure in abdominal surgery in England.

In 1888 he again visited Europe in company with Hunter Robb and Constantine Goodell. In Berlin he met Virchow, and worked on cadavers in an attempt to determine a method of ureteral catheterization. From Berlin the party went to Prague where they saw Pawlick catheterize the ureters blindly through the water-filled bladder. In 1889, he returned to Germany and married Laetitia Bredow in the Danzig Cathedral.

Kelly's early work on air cystoscopy and ureteral catheterization proved to be one of his greatest contributions to gynecology and led to the bitterest controversy in his medical career.

After visiting Pawlik's clinic in Prague in 1888, Kelly returned to Philadelphia, and began practicing catheterizing ureters blindly by fishing for the orifices in the water-filled bladder by Pawlik's method. He described this to the American profession as Pawlik's method in 1893. He began viewing the water-distended bladder through a cystoscope of his invention with the patient in the knee-chest posture in 1892. The instrument which was made for him had a glass partition to prevent the water from running out of the bladder. He inspected the bladder by direct vision, using a head mirror. One day a cystoscope was dropped by an assistant and the mirror was shattered. Shortly thereafter Kelly noticed that, with a patient in the knee-chest posture, air spontaneously rushed into the vagina. It occurred to him that the bladder might similarly be distended with air. To quote his resident of that year, John Clark, "The idea suddenly struck Dr. Kelly that the same effect would be produced on the bladder if air was allowed to enter it and he called for the short speculum from which the glass had fallen out and inserted it into the urethra. The bladder at once ballooned out and its walls could be inspected, and after some search the ureteral orifice on one side was located and the ureter catheterized under direct inspection for the first time."

In November, 1893, he published in the *Johns Hopkins Hospital Bulletin* "The Examination of the Female Bladder and the Catheterization of the Ureters under Direct Inspection." Other papers appeared in 1894 showing modifications of the cystoscope.

In 1896, there appeared in the *American Journal of Obstetrics* an article by Dr. W. Rubeska, an assistant of Dr. Pawlik, entitled, "A Criticism of Prof. Howard Kelly and His Discoveries in the Domain of Urinary Diseases." He stated that Kelly had observed a demonstration of ureteral catheterization in Pawlik's clinic in Prague and that Pawlik told him of his yet unpublished method of cystoscopy by distending the bladder with air with the patient in the knee-chest posture. He concluded by stating: "1. A Kelly ureteral catheter does not exist. 2. That the so-called cystoscope of Kelly is entirely the discovery and intellectual property of Professor Pawlik."

Kelly had always had a keen interest in medical history, and in many of his scientific articles he prefaced the report of his contributions by a short chronological review of the discoveries up to that time, being careful to give credit where credit was due. He had no intention of letting Rubeska's claims go unchallenged. Fortunately, he had with him as a traveling companion in Prague Dr. W. C. Goodell who later wrote Kelly verifying the latter's statement that only the blind method of ureteral catheterization by "fishing" had been demonstrated to him and Dr. Kelly.

The training in cystoscopic methods and female urology was made a part of the training of Kelly's residents after that. To the author this is also a milestone in gynecological education. The symptoms resulting from disease of the

urinary organs and the generative organs are frequently so closely intertwined that only by complete urological examination can the correct diagnosis be made. What could be more logical than to train gynecologists to make this examination in order to evaluate these symptoms? And yet how slowly has female urology been accepted as part of the training in gynecology in this country!

It was not long before Kelly's operating skill attracted many visitors to his amphitheater from this country and abroad. He was a real showman and a full gallery spurred him on in his fearless surgery. I recall one of his last visits to Hopkins for the purpose of operating for a visiting society. It was my residency year and I had the privilege of helping him. The occasion was the meeting of some surgical society and, for the convenience of the visitors, all the operations were done in Halsted's surgical amphitheater. The patient was on the table and draped for surgery when Dr. Kelly stepped into the operating room. As was his frequent custom in his later years he gave a brief historical review of the contemplated operation before stepping up to the table. The subject was a Negro woman with a huge fibroid. With one stroke of the knife he cut through the skin, fat, and fascia. The tumor was enormous and he began to push the dressings away and call for more room for a longer incision. He kept pushing the dressings and extending his incision to the upper abdomen. Fearing that his incision would soon extend beyond the sterilized area on the abdomen, I was worried. In the gynecological operating room where Kelly had worked for many years the operating table was so placed that the patient's head was at the north and the feet at the south end. In Halsted's amphitheater the reverse was true. Suddenly a thought came to my mind and I said, "Dr. Kelly, this is the head end of the patient." Without the slightest embarrassment he said, "My mistake," took the knife in his other hand (for he was quite ambidextrous), and extended the incision downward. The uterus was out in about ten minutes and the operating table pushed into a side operating room where the first assistant resident, Dr. George Gardner, closed the incision. A second patient was rolled in and I helped Dr. Kelly rapidly dispose of an ectopic pregnancy. After I had closed this incision I walked into the adjoining room to see how Gardner was getting along. I found him still sewing on the enormous incision of the first patient extending from symphysis to xiphoid.

Dr. Kelly's pioneering efforts in surgery were directed at techniques of hysterectomy, myomectomy, vesicovaginal fistula, rectovaginal fistula, ureteral and kidney surgery, and uterine suspensions, while Drs. Clark and Sampson, his residents, worked on the radical operation with lymph node dissection for cervical cancer. By temperament he was too impatient to be suited to obstetrics and in 1899 he put the department of obstetrics under the able direction of J. Whitridge Williams. Kelly was also not the man to spend hours at the microscope and he placed T. S. Cullen in charge of the pathological laboratory.

From the time of Dr. Kelly's graduation in 1882 he was a prolific writer. The subject of his first paper had to do with the assassination of President

Garfield and was entitled, "Was the thoracic duct injured in the case of President Garfield?" Some issues of the *Johns Hopkins Hospital Bulletin* carried two or three articles by him. Up to 1919 he had been the author of 485 books and journal articles. While still in Philadelphia, he became a collector of early medical books and was enough of a bibliophile to interest Osler, with whom he often chatted about early editions after consultations. He took a leading part in the meetings of the Hopkins Medical History Club and was a charter member. Fifty years later at the golden anniversary of the Club he gave a lively review of the early years. He published about 60 articles on historical subjects. His writings were not always polished literature, as many were obviously hastily written, but on occasion he could and did write with a fine thoughtful style.

Kelly's contribution to medical illustrating was not the least of his accomplishments. Max Brödel had been brought to America by Professor Mall of the anatomy department. After a short time Brödel's services were taken over by Kelly who supported him until the University created the chair of Art as applied to Medicine as the result of a generous gift by Mr. Henry Walters. In fact, Kelly was turning out so much published work that two more artists, Becker and Horn, were brought from Germany to assist Brödel. Although Kelly's publications did much to establish these artists, they also helped establish Kelly's reputation in the eyes of the reading medical public. Kelly became so interested in medical illustrating that he wrote an article, "Art Applied to Medicine and Surgery," which was partly a historical review and partly propaganda for better illustrating.

From childhood Dr. Kelly had been interested in mineralogy. He spent several summers in Mexico, looking into the subject of mining. In 1903 he obtained a small amount of radium through Madame Curie. When it was discovered that there were deposits of radium in Colorado, Dr. Kelly and Dr. James Douglas of New York undertook to extract radium from the Colorado deposits. Secretary of the Interior Lane placed the best brains of the mining experts in his department at their disposal. Dr. Douglas gave his share of the radium thus obtained to the General Memorial Hospital of New York and Dr. Kelly's share came to Baltimore. He and his associate Dr. Burnam began treating malignancies, myomas, and functional bleeding with irradiation and contributed much to these now generally accepted therapeutic measures.

After thirty years as active head of the gynecological department of the Johns Hopkins University, Kelly resigned as Professor of Gynecology in 1919 at the age of 60. The circumstances leading to his resignation are recorded in the files of Edward H. Richardson in the form of a sheaf of personal letters from Howard Kelly to Sir William Osler, covering a period of 1911 to 1913. They were presented to Dr. Richardson in March, 1950, by Dr. W. W. Francis, nephew of Dr. Osler, who is Librarian and Literary Executor of the Osler Library at McGill University. They clearly indicate that Dr. Kelly thought injustices were perpetrated against him by the formulation of plans by certain faculty members for a transition to the full-time system at Hopkins. This

report was circulated among the trustees and served the purpose of making Kelly feel that his services were no longer acceptable as Professor of Gynecology. His own feelings were expressed in a letter to Sir William Osler written in May, 1911, from which the following is an excerpt: "Dear Osler: We confabulated last night from 8-11 o'c. All were for the change, putting the clinical men on salaries and cutting off all private work, except Myers and myself. Myers' objection to the change was that he was unwilling to yield his liberty, but he did not expect to do any practice. Finding I stood alone and my minority report was looked upon rather as an attempt at personal vindication than any criticism of the real matters at issue, I told them to go ahead and do whatever they conscientiously felt to be right without reference to me. I shall be very sorry but it will mean my retirement wholly into my private work. Williams will also be able to realize the great ambition of his life, the control of both gyn. and obst. This I think is a bad arrangement, but it may work well for a term of years, especially under his able management."

Some years elapsed before Kelly actually resigned but when he did in 1919 he was only 60, ten years before the stipulated retirement age, and at the height of his ability and career. Following the announcement a wave of indignation and resentment emanated from gynecologists whom he had trained and the Hopkins alumni in general, but Kelly's career as a teacher was over, broken on the rock of an ideology formulated by men who apparently believed the system which they envisioned was more important than the individual, no matter what the caliber of that individual might be.

Thus far we have concerned ourselves chiefly with Kelly's scientific accomplishments but his life was far broader than his profession. His interest in nature was derived from his mother who loved natural history. Kelly frequently spoke of these interests and believed that one's avocations had as much to do with the molding of one's character as his profession. Botany, mycology, astronomy, geology, and reptilia were among his avocations. Although his interest in these sciences was, according to his own statement, amateurish, he published several papers in these fields. He employed a full-time artist to draw and paint various fungi specimens. He assembled the best collection of books on mycology in this country, which he presented to the University of Michigan where he believed they could be best utilized. Snakes had always interested Dr. Kelly and in 1899 he wrote a paper on "The Recognition of the Poisonous Snakes of North America." In fact, he kept several of them running freely about his house. On my last call upon Dr. Kelly about a year before his death, the door was opened by the butler and just behind him was an enormous snake coming down the hall steps. I found Dr. Kelly in his library and mentioned the snake to him. He recognized the snake from my description and was delighted, for he had not seen it for several weeks and feared that it had escaped from his house. Incidentally, when I entered the library he was amusing himself by permitting a tarantula which someone had brought him from one of the banana boats in Baltimore Harbor, to crawl over his hands. "See," he said, "it won't bite you if you don't annoy it."

At one memorable meeting of the Hopkins Medical Society he spoke on snakes. He had several with him to demonstrate his points. Everyone gasped when Dr. Kelly grasped a diamond-backed rattler by the nape of the neck with his left hand, held the tail in his right hand, and with it pointed out the snake's markings. There was a sigh of relief when he put the snake back into the gunny sack. But just at that moment the snake bit him through the burlap bag. For a moment he turned pale but continued on with his talk. The meeting was over in a few minutes and Dr. Kelly returned home, none the worse. The snake had been teased before being brought to the meeting and had discharged most, if not all of its venom.

Although an indefatigable worker, Kelly never neglected to take a long summer vacation at his camp north of Toronto on Lake Ahmic into which flows the beautiful Magnetawan River. There were the summer homes of many of his best friends: Abraham Flexner, Cullen, Brödel, and there is where real friendships were formed. He was an expert swimmer and canoeist. Fishing required a little more patience than he could afford, but he spent much of his time collecting botanical specimens in the woods. When well past middle life he broke his neck by striking the bottom of the lake while doing a high dive. On another occasion he almost lost his life on a daredevil canoe trip during high water on the Susquehanna River.

Dr. Kelly founded the first camp for underprivileged city boys in America at Ricketts Glen in Luzerne County, Pennsylvania, hoping to interest the youth in nature, from which he had received so much pleasure during his lifetime.

Dr. Kelly's mother was a deeply religious woman and he followed her example. His Bible was his constant companion. He had the Gospel of St. John printed in pamphlet form and distributed the booklets freely to anyone he chanced to meet—doctors, nurses, businessmen, and taxi drivers. In fact, he frequently tipped his taxi driver with one of these booklets. Although reared in the Episcopal church he recognized no denominational delineations. His activities suggest that he felt the Episcopalians were a bit too reserved and he often worked with the more evangelistic denominations. He spoke from some pulpit or in some Sunday school almost every Sunday. In fact he often worked so hard on Sunday that he was most difficult to assist in the operating room on Monday morning. This ministerial activity was not stopped in the summer, when he frequently preached in one of the country churches near his Canadian camp. He actively supported the evangelist, Billy Sunday, while he held revival meetings in Baltimore, often sitting on the platform with him and urging his house staff to be present. In middle life he learned to play the organ for the purpose of playing gospel hymns.

One of his well-meant undertakings was directed at the red-light district in Baltimore and he spearheaded a spirited campaign to do away with it. According to Dr. Kelly's interpretation the district was eliminated; according to the more skeptical, the business was disseminated throughout the more respectable residential districts of Baltimore. But Kelly made a real attempt

to rehabilitate these women to respectable society, even to the extent of inviting them to his own home. Dr. Samuel Crowe relates that while Dr. Kelly was entertaining a prominent British surgeon in his home on one occasion he placed the surgeon between two of these girls at the dinner table. In the course of the meal the conversation turned to the snakes that were crawling about the floor. Imagine the sentiments of the proper Britisher with snakes at his feet and a harlot at either elbow!

In his later years he usually wore a flower in his buttonhole and just below this a small button on which was a question mark. When asked, "What is the question?" he would reply, "What do you think of Jesus?" Imagine the dilemma in which this placed some of his friends!

In spite of Dr. Kelly's religious leanings he was reported to have charged some tremendous surgical fees as judged by today's standards. Just as the scientific compartment of his mind was airtight from his fundamentalist religion, so was the religious compartment airtight from the financial one. He gave of his services freely to the poor but the wealthy paid and paid well. His charities were many and very liberally given. Most of his donations were made to churches, missions, the education of missionaries' children, and for many years he underwrote the philanthropic work done by his sister, Mrs. Robert Bradford, at "The Lighthouse" in Philadelphia.

Probably the man best able to evaluate the life of Dr. Kelly was Dr. Welch. On the occasion of Kelly's seventy-fifth birthday Welch sent the following letter: "I have always felt, as did Osler, that you did more than any of us to extend the fame of the Johns Hopkins University to distant parts; and the hospital offered no greater attraction than the opportunity to see you and your work, and the new methods which you were so rapidly developing."

On Jan. 12, 1943, Dr. Kelly died of pneumonia at about 3:00 A.M. On the same morning at about 8 o'clock Mrs. Kelly followed him. A double funeral was held and they were laid to rest side by side on the brow of a hill, at a site picked by Dr. Kelly a few years before. It was close to the nature which he had loved. With the exception of the youngest son, Dr. Edmund Kelly, who was in the armed forces in the Pacific, all nine children were present at the funeral. Thus was terminated at the age of 85 the life of one of the most dynamic men of medical history, a man who did more to establish American gynecology as a surgical specialty than anyone before or since his generation. How true his prediction in 1912 had become: "Accordingly as we remember others so those yet to come will remember us."

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OBSTETRICAL AND GYNECOLOGICAL SURVEY

Memorable Medical Mentors: III. Howard Atwood Kelly (1858–1943)

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Howard Kelly was my professor of gynecology as John Whitridge Williams was my professor of obstetrics: "one generation removed." They were not my mentors in life, but their teachings and policies were embraced by their successors, my teachers, and the aura of their personalities persisted, hovering over their departments like guardian angels. I never knew Williams personally; he had already passed away when I entered medical school. Kelly had long retired from teaching, but he still maintained an interest in medical history, and I met him from time to time and exchanged pleasantries with him during his frequent visits, laden with books, to the Welch Medical Library.

The youngest and most colorful of the Johns Hopkins "Big Four" (Osler, Halsted, Welch, and Kelly), Howard Kelly is widely regarded as having done more than any other American to establish gynecology as a surgical specialty in this country. In a brief tribute shortly after Kelly's death, George Corner, who had been one of his students and an intern in his Department, wrote of him: "There will be no one just like him hereafter—perhaps not even any one who will really understand him—for he represented to the full, in word and deed, the grand old tradition of spiritual, intellectual and economic individualism which was characteristic of evangelical America. A vigorously professing Christian, he believed on standing on one's own feet in this world and in getting to Heaven by personal piety and good works. Strong in his own strength and fortified by absolute trust in the direct help of God, he was a consummately bold and confidant surgeon. His religion gave him answers to the moral problems of his day and made him a lifelong crusader for the evangelical faith

Howard Atwood Kelly (1858–1943).

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against political corruption, alcohol, and prostitution." (1)

Richard TeLinde, who had also been a medical student at Hopkins during Kelly's professorship and who subsequently occupied the chair of gynecology that had been held by Kelly, recalled his complexity of person: "He was a man who had three compartments in his brain: a scientific compartment, a financial compartment, and a religious compartment. The three never mixed. In religion he was a fundamentalist and surely believed that Jonah was swallowed by the whale. This literal acceptance of the Bible never conflicted with his scientific views. He charged terrific fees, and yet he gave away tremendous amounts of money." (2)

Named for him are several surgical instruments, including the widely used Kelly clamp; the Kelly stitch, a mattress suture placed at the juncture of the bladder and urethra for the correction of urinary stress incontinence in women; his pads for drainage from the operating and delivery tables; and his air cystoscope. He served as President of the Southern Surgical and Gynecological Association in 1906 and of the American Gynecological Association in 1912. A full biography of Howard Kelly was written, at his request, by Audrey W. Davis, a close friend and editorial assistant to him for over 20 years (3).

Kelly was born in Camden, New Jersey, February 20, 1858. He entered the University of Pennsylvania in 1873 and after graduation, took up the study of medicine in the same institution. He received his MD degree in 1882 and interned for a year in the Episcopal Hospital in Kensington, then a mill town some 5 miles from Philadelphia. He opened an office in Kensington while continuing his work in the wards and dispensaries of the hospital, but there was little room and less welcome there for gynecologic patients. He therefore performed most of his operations in the home, after the floors and walls had been scrubbed and the table (usually in the kitchen) had been scoured. Kelly carried with him a small copper boiler, in which were packed his instruments and dressings, and a 5-quart rubber bag for holding tap water, which he boiled for an hour. He soon founded his own hospital, the Kensington Hospital for Women, which began in 2 rooms on the second floor of a residence, one of the early institutions in America devoted exclusively to the surgical treatment of women's diseases. By 1909, in its third home, the hospital had grown to a capacity of 45 beds. It was there that Kelly did his early experiments on ureteral catheterization, and it was there, in 1888, that he performed the first successful cesarean section in Philadelphia in 51 years. In 1888 also, he established a training school for nurses, a year before he joined Welch, Osler, and Halsted at the newly formed Johns Hopkins Hospital.

Until that time, Kelly practiced obstetrics as well as gynecology, and had even published a few papers on obstetric topics, including a report of his historic cesarean section. Not until the opening of the Johns Hopkins Medical School in 1893, however, did the Hopkins Hospital provide facilities for obstetrics. No longer interested in this field, although nominally in charge, Kelly delegated responsibility for obstetrics to his even younger assistant, John Whitridge Williams, and in 1899 consented to the Department's division, with the creation of a separate chair of obstetrics under the latter. Thomas S. Cullen was placed in charge of the pathology laboratory. Not until 6 decades later did the governing bodies of the Johns Hopkins medical institutions acknowledge the need for a reunion of the Departments of Obstetrics and Gynecology.

At the opening of the Johns Hopkins Hospital, Kelly established the long-term residency program in gynecology, an innovation in surgical training and a major contribution to the development of the specialty. Hunter Robb, who had been his first Resident, had established a private sanatorium for his private patients, because admitting privileges in the Johns Hopkins Hospital were restricted to the full professors. When Robb was invited to the Chair of Gynecology and Obstetrics at Western Reserve University, Kelly facilitated his move by taking over Robb's hospital, which he operated as the Howard A. Kelly Hospital. (Its name was later changed to the Kelly Clinic.) There Kelly pioneered the use of radium for treating cancer.

RADIUM

While gynecologists were experimenting with more extensive operations such as radical hysterectomy, first performed by Kelly's Resident John G. Clark (4), and other procedures in their discouraging search for a better method of treating uterine cervical cancer, the Curies in France discovered radium in 1898. For the next few years, this element remained little more than a scientific curiosity, as the physical properties of its emanations were being studied, until Becquerel's observation of a sore on his abdomen, where he had been carrying a vial of radium salt in a vest pocket, indicating for the first time the effect of radium on a living organism (5). The newly discovered element was introduced into medical therapy in America by Robert

Abbe (1851–1928), a surgeon to New York's St. Luke's Hospital, who predicted in 1904, after demonstrating the effects of its emanations on animals and seeds, their arrest of growth in meal worms, and their cure or shrinkage of several human tumors: "It alone can be used in deep structural disease. . .where it may be buried for hours, or days. . .. From radium, therefore, we may expect the greatest future results." (6)

Soon thereafter, Kelly began the efforts that resulted in the popularization of radium for gynecologic use. That same year, 1904, he bought a few milligrams of radium, which he used initially to treat small external lesions. As his enthusiasm for this new modality increased, he purchased more and more of the element from various European sources. In his hands, it became a valuable therapeutic adjunct in the treatment of cancer. In 1913, joined by engineers from the United States Bureau of Mines and experts from the Phelps Dodge Mining Company, he traveled to Colorado to investigate the economic feasibility of extracting radium from carnotite deposits in the mines of Paradox Valley. The radium refined from the ore was divided between the Kelly Hospital and the General Memorial Hospital of New York (later to be merged with the Sloan-Kettering Institute, to become the Memorial Center for the Treatment of Cancer and Allied Diseases). In 1907, the Kelly Hospital had 5 1/2 g of radium, believed to have been the largest amount in any clinic in the world. For years thereafter, it administered all the radium therapy for patients in the Johns Hopkins Hospital and most of such treatment for the entire state of Maryland.

Kelly was subjected to much vicious, undeserved criticism, even accusations of quackery, for his efforts to develop this new therapy, despite his careful and vigilant scientific investigation and its enormous financial cost to him. In a talk at Goucher College in April 1914, he told the students, frankly: "Radium is not a sure cure for cancer. It will undoubtedly cure many cases that surgery will cure; it will cure some cases that surgery will not cure; but there will be cases that neither surgery nor radium will cure. It is not the radium that does the work, but the emanations: not the cow, but the milk."

Within a few years, radium had taken its place with surgery, and for a time supplanted it, in the treatment of cervical cancer.

AIR CYSTOSCOPY

Kelly considered his embracement of female urology as his most important contribution to gynecology. The specialty of urology, as it was evolving in most medical institutions during the late 19th and early 20th centuries, encompassed both sexes. Kelly, almost alone, claimed the study and treatment of diseases of the female urinary tract for the domain of the gynecologist, and devoted much time and effort to female urology, as evidenced by his 2-volume textbook on the subject. My early years of gynecologic training at Hopkins, as a student and house officer, included female urology. Air cystoscopy, developed by Kelly, was still in use, in contrast to water cystoscopy, which was standard almost everywhere else.

His air cystoscope was a simple tubular device for visualization of the interior of the bladder and for catheterization of the ureters. Harsh controversy arose over the question of priority in its development. During a visit in Prague in 1888, Kelly had witnessed Professor Karel Pawlik's efforts to catheterize the ureters blindly by probing through the water-distended bladder. After his return to Philadelphia, Kelly modified Pawlik's technique by placing the patient in the knee–chest position, as described by James Marion Sims in 1852 in his historic report on the repair of vesicovaginal fistulas, and viewing the bladder through a shorter water cystoscope of his own design. During one examination, the cystoscope fell to the floor and its glass diaphragm became dislodged. Noticing, as had Sims, that the vagina became distended with air when the patient assumed the knee–chest position, Kelly predicted, correctly, that the bladder too would become filled with air if emptied of water. The bladder immediately ballooned out, permitting inspection of its interior and catheterization of the ureters under direct vision. Thus, air cystoscopy was born. Kelly soon devised a complete set of graduated tubular cystoscopes for this purpose. He published his new technique in a series of papers in 1893 and 1894, but Pawlik claimed credit for the idea in a controversy that dragged on for years.

KELLY PADS

In an article entitled "Perineal and Ovariotomy Cushions" (7) in 1887, Kelly described the need for these devices: "It has been my habit within the past year to use much water, both pure and in the form of solutions, at all of my gynecological operations. But with the manifest advantages accruing from this practice, I have found the minor disadvantage of wetting many sheets, cloths, and sometimes, even in a perineal operation, the clothes of the patient as high as the neck." In a recent trip through Germany he

observed that "patients are sometimes lifted up soaking in their own blood and the washings." The Kelly cushions were made of soft sheet rubber, opened on one side for drainage. To use the perineal cushion, he explained, the patient must be placed in position, the clothes raised well above the buttocks, and the rim well inflated, when by carrying the patient's heels together well up over the head, the buttocks are thrown up off the table, and the cushion slipped under, adjusted so that the whole apron falls vertically from the edge of the table to the bucket or tub. . .. The ovariotomy cushion is larger and has a small, round, inflatable rim, with a somewhat longer, narrower apron. . .. With these cushions any amount of water can be used on the wound without caring where it is going."

In a discussion at a meeting of the American Gynecological Society 2 years later, Kelly described a similar pad for obstetric use. He referred to circumstances to which he was often called for difficult labors, "where a family occupies one room and where if the bed is once soiled the patient will be likely to soak in her own discharges until she leaves the bed. . ." The obstetric pad, a rubber cushion with an inflatable rim, open on 1 side, and with an apron extending into a bucket at the bedside, he explained, "is a great help in keeping clean. . .. After the patient has been placed upon this, all douchings, blood, and discharges, even the child and placenta, fall within the rim, thus keeping the bed dry and clean."

PUBLICATIONS

A prolific author, Kelly had a bibliography of 575 medical publications, over 400 of which were written during his 30 years at Hopkins. His books included the 2-volume *Operative Gynecology* (1898); *Appendicitis and Other Diseases of the Vermiform Appendix* (1905), with Elizabeth Hurdon; *Medical Gynecology* (1908); *Myomata of the Uterus* (1909), with Thomas S. Cullen; the 2-volume *Diseases of the Kidneys, Ureters and Bladder* (1914), with Curtis F. Burnam; *Gynecology* (1928); and a book on electrosurgery, with Grant E. Ward. Uncounted are his contributions to religious journals.

Kelly indirectly exerted a profound effect on medical illustration in the United States through his association with Max Brödel, whom he brought to this country from his native Germany in 1893 and who remained with Kelly, illustrating his publications, until 1911, when he was named Director of the newly established Department of Art as Applied to Medicine of the Johns Hopkins University. Brödel became recognized as the world's foremost medical artist. His contributions to Kelly's *Operative Gynecology* were said to have revolutionized medical illustration. I had the good fortune to establish an avuncular friendship with this kindly, gentle man during my year in the Carnegie Embryological Laboratory, which was housed in the same building as his studio. At the testimonial dinner for Dr. Kelly on his 75th birthday, Brödel reflected: "All medical illustrating is either imitative or creative. . .. Any artist can imitate, but so can the camera with the difference that it often does it better, and always quicker and cheaper. . .. But photography has its limitations. . .. It was necessary to originate a different type of picture, one that would show far more than any photograph. . .. The artist must first fully comprehend the subject matter from every standpoint: anatomical, topographical, histological, pathological, medical, and surgical. From this accumulated knowledge grows a mental picture, from which again crystallizes the plan of the future drawing. A clear and vivid mental picture always must precede the actual picture on paper. The planning of the picture therefore is the all important thing, not the execution." This is where we learned from Dr. Kelly. He had a way of making little modest outline sketches when he explained his operative procedure to his illustrators. . .. Dr. Kelly had endless patience with us. He invented diagrams to show variations of form and relationship, motion, pressure, tension, rupture, the development of a pathological process, the sequence of operative steps, the placing of ligatures, sutures, etc.; in short, every clinical phenomenon, every operative procedure flowed in simple, eloquent lines from the end of his pencil. . .. In this way Dr. Kelly taught his artists the secret of the correct conception of an illustration, which is the very basis of all creative drawing. It usually was comparatively simple to build on, to give to the primitive contour correctness of form, to elaborate the plastic rendition and add to the surface texture. This is one great debt we owe to Dr. Kelly. . .. Dr. Kelly always permitted the artists to make original investigation to clear up the obscure point. . .. Without his sympathetic attitude we could not have learned our trade as we did."

FEES

Kelly was known widely for the size of his fees. Indeed, he was reputed to have charged his private patients the largest fees of any surgeon in the United States. It was his philosophy, frankly stated, that a physician or surgeon of skill and experience should

command large fees whenever such payment could reasonably be expected to enable him to give time and service to the poor, to whom he would submit no bill. He estimated that at least 75% of his services were provided without remuneration. For many years, he paid the salary of a visiting nurse to assist his patients who could not personally afford such care. In addition to his many well-known philanthropies, some highly publicized, he established from his own resources, during his early years at Hopkins, a "rotating fund" to enable needy students to complete their medical education. Charles S. Stevenson, a contemporary of mine, who went through the Hopkins residency and, after acquiring obstetric experience at the Boston Lying-In Hospital, was named Professor of Obstetrics and Gynecology at Wayne State University in Detroit, recalled: "In 1932, when I was in the spring of my second year at the Johns Hopkins School of Medicine, I found myself owing $365 to. . .the bursar of the Medical School, and I had no money with which to pay him. Since our country was in a deep depression,. . .quite a few students in the school were not able to keep their tuition payments up to date. Many were going around in threadbare clothes and had holes in the soles of their shoes, and some were getting only two meals a day. . .. We students did not talk among ourselves about our financial obligations but it was understood that repayment was our #1 priority."

A friend of one of Stevenson's aunts, who had been private secretary to Dr. Kelly, arranged an appointment with the great man. She urged him to "come right out" with his problem, for Kelly did not like one to "beat around the bush." "Dr. Kelly stepped up to me briskly," Stevenson recalled, "and put out his hand. . .motioned me to sit down, took a seat himself at his desk chair and swiveled around to face me. . .. 'We have some personal business to attend to,' he said right away. 'I understand that you are trying to work your way through Hopkins Medical School. . .. I'm sure that you, like so many, are having a difficult time of it.'. . .. Without further ado, he reached for his checkbook and turned to me again. 'Exactly how much do you need to pay up your medical school bill for this year?' 'Three hundred and sixty-five dollars,' I answered quickly. He proceeded to write out a check for that amount. . .[and said] 'I'm counting on you to study hard, to get good grades, and to become a truly good physician.' It all happened so quickly I was practically dumbfounded and deeply moved. I said, 'Sir, I don't know how to thank you. I want to discuss with you how and when I can repay this loan. . .' He interrupted me, 'You are not to repay the money to me. When you start earning and get ahead enough, you must search for another needy and worthy medical student. . .and pass it on to him. . .' During the last week before I boarded my ship [for military service in World War II]. . .I called Hopkins and explained the instructions Dr. Kelly had given me 11 years before and asked them to line up a 'needy and worthy' medical student for me to meet. . .. I went to the Bursar's office and there met Victor A. McKusick. . .wrote the check and explained to him, word-for-word, as best I could recall, what Dr. Kelly had instructed me to say. . . I have since seen Victor McKusick, now an internationally recognized professor of medical genetics at Hopkins, and he assured me that he, in his turn, had become able to pass along Dr. Kelly's gift to a promising and worthy medical student and that he was sure the odyssey of this historic gift was continuing."

THE FULL-TIME SYSTEM

Full-time professorships at the Johns Hopkins Medical School were first considered seriously in 1910, following Abraham Flexner's monumental Report (8), based on a visit to each of the American medical schools. The American Medical Association's Council on Medical Education had begun a study of the problems facing medical education in this country early in the 20th century and persuaded the Carnegie Foundation for the Advancement of Teaching to continue it. The ensuing investigation, headed by Flexner and culminating in his report, revolutionized the basis for the training of physicians in the United States and remains a milestone in educational history. "We have indeed in America," Flexner noted, "medical practitioners not inferior to the best elsewhere; but there is probably no other country in the world in which there is so great a distance and so fatal a difference between the best, the average, and the worst."

Singled out for particular criticism in the Flexner report was the teaching of obstetrics. It stated: "The very worst showing is made in the matter of obstetrics. Didactic lectures are utterly worthless. The manikin is of value only to a limited degree. For the rest, the student requires discipline and experience. The safety and comfort of both patients—mother and child—depend on the trained care and dexterity of the physician. The practice is a fine art which cannot be picked up in the exigencies of the out-patient work, poorly supervised at that. Principles, methods, techniques can be learned and skill acquired only in an adequately equipped maternity hospital; only after

that is the student fit to be trusted with the responsibilities of the out-patient department. Difficulties and limitations in such matters sit lightly on most of our medical schools. The hospitals of Atlanta and Los Angeles exclude students from the obstetrical ward; at Burlington there is no obstetrical ward, but the 'students see more or less'; at Denver a 'small amount' of material is claimed; at Birmingham it is 'very scarce'; at Chattanooga there are 'about ten cases a year,' to which students are 'summoned,' however by whom is far from clear. At the Hahnemann Medical College (Chicago) students 'look on at internes who do the work'; a committee of the Missouri state board reports of the College of Physicians and Surgeons of St. Louis that it could find only incomplete records of 21 cases for a senior class of 57; at Augusta, Georgia, the cases 'always come at night when you can't get students'; at Charlotte 15 cases were available from September 15 to February 4; the medical department of Lincoln Memorial University (Knoxville) has no out-patient department, but alleges 'a few deliveries before the class'; Vanderbilt relies on out-patient work mostly. There is a senior class of almost 150 at the American School of Osteopathy (Kirksville, Missouri). In two months they had eight clinical cases in obstetrics. Perhaps most lamentable of all, the Woman's Medical College of Baltimore concedes its opportunities to be "inadequate." At Toledo, Louisville, the University of Kansas, Albany, and Yale, obstetrics is practically altogether out-patient work; that is to say, the student gets about the same training as a midwife. At Willamette (Salem, Oregon) he probably does not get even that: for 'obstetrics depends on private practice and is very precarious. The student sees a delivery when the doctor is willing to take him.'"

After a visit to Baltimore, sponsored by the General Education Board of the Rockefeller Foundation, Flexner recommended to his Board and to the Trustees of the Johns Hopkins Medical School that the full-time plan be instituted at Hopkins and that obstetrics and gynecology be merged. Heated argument and discord among the Hopkins clinicians followed. Welch had always been full-time; Halsted and Williams gladly changed to it. Osler had already left for the Regius Professorship at Oxford. Kelly, who had initially been in charge of both obstetrics and gynecology at Hopkins, had been largely responsible for having the 2 disciplines separated and opposed their reunion. The idea of a full-time professorship, with the relinquishment of his large and lucrative private practice that it entailed, was untenable to him. When the University determined, in 1913, to adopt the full-time plan for the Medical School, Kelly decided to resign; but not until 1919, after 30 years of service to the medical school he had helped create, did he submit his resignation, whereupon he was named Emeritus Professor of Gynecology in the Medical School and Honorary Consultant to the Hospital. He returned there for occasional consultations and, when invited, to conduct a clinic or operation. His last, for the removal of an ovarian cyst, he performed on January 10, 1938, shortly before his 80th birthday.

KELLY AS COLLECTOR

Howard Kelly was an avid collector—of all sorts of things, living and dead. He became recognized as an authority on North American snakes, and as early as 1899 wrote a paper on "The Recognition of Poisonous Serpents of North America." Snakes slithered freely across the floors of his home, at 1406 Eutaw Place in Baltimore. He later took up the study of mycology, especially mushrooms, and employed an artist full-time to illustrate his specimens. He gave his books on the subject, the most extensive collection in the United States, to the University of Michigan.

Even in his boyhood, according to his biographer (3), "butterflies were not merely little fluttering things. . .they could be dissected and studied and mounted according to genus and species. . .. His curiosity in the natural world was insatiable." On a hiking trip through southern Canada one summer while still in college, he heard of a place where Ojibway Indian braves were said to have fallen in battle. On the shore of Lake Couchiching, with the help of several natives, he dug up approximately 50 skulls, from which he selected the best specimens for transport back to his home.

His son Edmund, also a physician, recalled the library in their home, "its walls solidly lined with books and thronged with curios from all quarters of the globe. . .never the same place from one day to the next, its stacks of newly arrived books on tables and chairs, its mysterious half-emptied packages of strange foreign objects, and its never-ending stream of visitors served to make of it a living organism. . .. Many a moment spent in idly handling a shell, a crystal, or an ancient weapon, or in peeping into an old volume, opened up undreamed of and ever-widening vistas of the realms of nature or human culture. Those of us who had untrammeled access to these precincts or, better still, explored its mysteries under

the tender guidance of the *genius loci* will remember It as one of our greatest and happiest privileges."

SOCIAL ACTIVIST

During the final quarter of his life, Kelly devoted himself increasingly to his manifold public, social, moral, and religious interests, to which he contributed nearly $1 million. He established the first boys' camp in America, in Rickett's Glen, Luzerne County, Pennsylvania. He was among the early advocates of women's suffrage and, in the face of opposition among his colleagues, supported women in their struggle against prejudice in the professions. Differing with his obstetric associate John Whitridge Williams, however, Kelly opposed the birth control movement, then in its infancy.

Kelly considered one of his missions in life to be the investigation and elimination of existing evil. His activities included the exposure of gambling dens and roadhouses and the menace of the saloon. He joined hands with like-minded crusaders in the Lord's Day Alliance, touring the state on Sunday afternoons in an effort to arouse fellow citizens to their responsibility to prevent desecration of the day through the legal prohibition of drinking, gambling, sports, and movies. "Commercialized amusements on Sundays," he insisted, "are destructive of the highest purposes for which the State exists. . ." Almost every Sunday morning he spoke from one or another of Baltimore's pulpits or in a religious school. In 1921, he made an unsuccessful bid for the Maryland State Assembly, with the promise that, if elected, he would sponsor an anti-racetrack-gambling law and a bill prohibiting all nonessential paid labor on Sundays.

In the early 1900s, several areas of commercialized prostitution existed in Baltimore, blocks of houses that operated openly. Kelly's public discussions of the problem resulted in the appointment by Maryland Governor Goldsborough of an investigatory commission, on which Kelly was invited to serve; but he declined, preferring his independence of action. His personal approach lay not in policing, but in persuasion of wayward women to abandon their profession for other means of livelihood. To this end, he frequently invited them to his home. After the "red light" districts were banned, Kelly rented a large house, engaged a housekeeper, and invited the city's prostitutes to live there at his expense until they could find other suitable employment.

In one of his many notebooks, Kelly listed the names and addresses of the women he had attempted to salvage. The story was told of the notebook having been lost and picked up by another doctor who, as a prank, passed it among his friends, with the suggestion that Kelly was carrying on his crusade against prostitution as a cloak for his own misdeeds.

Kelly attacked the liquor problem with similar gusto. Viewing it as a social evil as well as a threat to health, he became an ardent prohibitionist, arguing for the 18th Amendment to the U.S. Constitution. He dismissed the concept of personal liberty as inconsistent with the ethical and moral principles of our civilization and "fit only for savages."

Henry L. Mencken, Baltimore's iconoclastic journalist, felt impelled to comment on Kelly's activities in his column in the *Evening Sun* of January 3, 1927: "He happens to be a man I have long known, and in every respect save the theological, greatly respected. But in that theological respect, it seems to me, he is so plainly a menace to the peace and dignity of this town that what he believes should be made known to every one, that the people may be alert to his aberrations and keep a curb upon his public influence. If he had his way, it must be obvious, life here would be almost impossible to civilized men. He is against practically everything that such men esteem, at least in the way of relaxation and recreation, and he is moved by a perfect frenzy to put his prejudices into harsh and unintelligent laws."

Kelly and his wife died within a few hours of each other, on January 12, 1943, survived by 9 children. On March 15, 1882, the day of his graduation from medical school, he had written in his diary: "I dedicate myself—my time—my capabilities—my ambition—everything to Him. Blessed Lord, sanctify me to Thy uses. Give me no worldly success which may not lead me nearer to my Savior." His final words, as he died: "My Bible, Nurse, give me my Bible!"

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